Diagnostic Imaging

A 3-in-1 Medical Reference

Medical Dictionary

Bibliography &

Annotated Research Guide

to Internet References

ICON Group International, Inc.

Diagnostic Imaging

A Medical Dictionary, Bibliography,
and Annotated Research Guide to
Internet References

James N. Parker, M.D.
and Philip M. Parker, Ph.D., Editors

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FORWARD

In March 2001, the National Institutes of Health issued the following warning: "The number of Web sites offering health-related resources grows every day. Many sites provide valuable information, while others may have information that is unreliable or misleading."[1] Furthermore, because of the rapid increase in Internet-based information, many hours can be wasted searching, selecting, and printing. Since only the smallest fraction of information dealing with diagnostic imaging is indexed in search engines, such as **www.google.com** or others, a non-systematic approach to Internet research can be not only time consuming, but also incomplete. This book was created for medical professionals, students, and members of the general public who want to know as much as possible about diagnostic imaging, using the most advanced research tools available and spending the least amount of time doing so.

In addition to offering a structured and comprehensive bibliography, the pages that follow will tell you where and how to find reliable information covering virtually all topics related to diagnostic imaging, from the essentials to the most advanced areas of research. Public, academic, government, and peer-reviewed research studies are emphasized. Various abstracts are reproduced to give you some of the latest official information available to date on diagnostic imaging. Abundant guidance is given on how to obtain free-of-charge primary research results via the Internet. **While this book focuses on the field of medicine, when some sources provide access to non-medical information relating to diagnostic imaging, these are noted in the text.**

E-book and electronic versions of this book are fully interactive with each of the Internet sites mentioned (clicking on a hyperlink automatically opens your browser to the site indicated). If you are using the hard copy version of this book, you can access a cited Web site by typing the provided Web address directly into your Internet browser. You may find it useful to refer to synonyms or related terms when accessing these Internet databases. **NOTE:** At the time of publication, the Web addresses were functional. However, some links may fail due to URL address changes, which is a common occurrence on the Internet.

For readers unfamiliar with the Internet, detailed instructions are offered on how to access electronic resources. For readers unfamiliar with medical terminology, a comprehensive glossary is provided. For readers without access to Internet resources, a directory of medical libraries, that have or can locate references cited here, is given. We hope these resources will prove useful to the widest possible audience seeking information on diagnostic imaging.

The Editors

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[1] From the NIH, National Cancer Institute (NCI): **http://www.cancer.gov/cancerinfo/ten-things-to-know**.

CHAPTER 1. STUDIES ON DIAGNOSTIC IMAGING

Overview

In this chapter, we will show you how to locate peer-reviewed references and studies on diagnostic imaging.

The Combined Health Information Database

The Combined Health Information Database summarizes studies across numerous federal agencies. To limit your investigation to research studies and diagnostic imaging, you will need to use the advanced search options. First, go to **http://chid.nih.gov/index.html**. From there, select the "Detailed Search" option (or go directly to that page with the following hyperlink: **http://chid.nih.gov/detail/detail.html**). The trick in extracting studies is found in the drop boxes at the bottom of the search page where "You may refine your search by." Select the dates and language you prefer, and the format option "Journal Article." At the top of the search form, select the number of records you would like to see (we recommend 100) and check the box to display "whole records." We recommend that you type "diagnostic imaging" (or synonyms) into the "For these words:" box. Consider using the option "anywhere in record" to make your search as broad as possible. If you want to limit the search to only a particular field, such as the title of the journal, then select this option in the "Search in these fields" drop box. The following is what you can expect from this type of search:

- **Magnetic Resonance Imaging of Neurodegenerative Diseases**

  Source: Journal of Neuroimaging. 4(3): 146-158. July 1994.

  Summary: This article addresses the value of **magnetic resonance imaging** (MRI) as a diagnostic tool in the major neurodegenerative disorders. According to the authors, MRI evaluations in patients with neurodegenerative diseases are hampered by limitations in accuracy of clinical diagnosis and by limited pathological correlation. MRI currently does not yield sufficient predictive power to provide an accurate diagnosis in most people. However, MRI features are being identified in population studies that help support or exclude a clinical diagnosis under consideration. In people with Parkinson's disease (PD), putamenal signal hypointensity is identified commonly in patients with atypical Parkinsonism but not PD. In people with dementia, hippocampal atrophy and

prolonged hippocampal formation T2 relaxation time may help identify those with Alzheimer's disease. Caudate and putamenal atrophy are seen in Huntington's disease and may serve as markers for disease progression. 9 figures, 112 references. (AA-M).

- **Single Photon Emission Computed Tomography (SPECT) Versus Clinical Assessment in the Evaluation of Dementia**

  Source: Clinical Gerontologist. 16(4): 19-27. 1996.

  Summary: This article compares single photon emission **computed tomography** (SPECT) and **computed tomography** (CT) with regard to their detection of abnormal brain functioning. It also evaluates SPECT in relation to 3 different diagnostic groups, using 72 hospitalized psychogeriatric patients with an average age of 73 years. Twenty patients had dementia of the Alzheimer's type (DAT), 29 patients had vascular dementia (primarily multiple infarct dementia), and 23 patients had various other psychiatric diagnoses. Patients were assessed by CT and SPECT. No specific correspondence between SPECT results and the clinical diagnoses was found. The bilateral parietal-occipital pattern, typical of DAT, was found in only one DAT subject. CT and SPECT were equally sensitive in finding brain pathology, but according to the authors, both CT and SPECT appear to have little value in the differential diagnosis of psychogeriatric patients outside documenting the site and severity of the brain pathology. The most reliable method of diagnosis for dementia, particularly DAT, appears to be the standard clinical assessment. 2 tables, 12 references. (AA-M).

- **Severe Amnesia After Hypoglycemia. Clinical, Psychometric, and Magnetic Resonance Imaging Correlations**

  Source: Diabetes Care. 14(10): 922-925. October 1991.

  Summary: This article presents a case report demonstrating the correlation between clinical, psychometric, and **magnetic resonance imaging** (MRI) findings after an episode of hypoglycemic coma resulting in amnesia. Detailed psychometric assessment, particularly memory testing, was performed using MRI on a man with severe amnesia after hypoglycemic coma. Psychometric testing confirmed impaired immediate recall. MRI findings were consistent with a lesion in the left temporal lobe. 1 figure. 13 references. (AA-M).

- **Appendicitis: Should Diagnostic Imaging Be Performed if the Clinical Presentation is Highly Suggestive of the Disease?**

  Source: Gastroenterology. 123(4): 992-998. October 2002.

  Contact: Available from W.B. Saunders Company. 6277 Sea Harbor Drive, Orlando, FL 32887-4800. (800) 654-2452. Website: www.gastrojournal.org.

  Summary: This article reports on a study that investigated whether **diagnostic imaging** is required if the clinical presentation suggests acute appendicitis with high probability. On the basis of clinical findings, 350 consecutive patients with clinical suspicion of acute appendicitis were prospectively divided into 3 groups as follows: low, intermediate, and high probability of having appendicitis. All patients then underwent diagnostic ultrasonography. The clinical likelihood of appendicitis and the ultrasonography results were correlated with the definite diagnoses. In the patients with clinically low probability of having appendicitis, appendicitis was present in 10 percent (11 of 109 patients), and, in those with intermediate probability, appendicitis was present in 24 percent (23 of 97 patients). Patients with clinically high probability of having

appendicitis had appendicitis in 65 percent (94 of 144 patients), an alternative diagnosis in 18 percent (26 of 144 patients), and no specific definitive diagnosis in 17 percent (24 of 144 patients). The authors conclude that even in patients with clinically high probability of acute appendicitis, **diagnostic imaging** should be performed because it accurately depicts a high percentage of normal appendices and differential diagnoses. 1 figure. 5 tables. 37 references.

- **Diagnostic Imaging in Urology: What's New? What's Next?**

  Source: Contemporary Urology. 15(3): 66-68, 70, 73-74, 76. March 2003.

  Contact: Available from Medical Economics Publishing Inc. Montvale, NJ 07645. (800) 432-4570.

  Summary: This article reviews changes in the urologic techniques used for **diagnostic imaging.** The authors note that evaluation can now be safely and effectively performed noninvasively with vastly improved imaging techniques. Many of these techniques have improved the ability to safely visualize the urologic anatomy and vasculature (blood vessels). Other techniques have demonstrated the potential for improved detection, staging, and treatment of various urologic malignancies, and still others offer promise for improved functional evaluation. The authors discuss **magnetic resonance imaging** (MRI) technologies; multidetector CT (**computed tomography**) and multiplanar reformations; positron emission tomography; ultrasonography; virtual endoscopy; and image guidance. 7 figures. 36 references.

- **CT Scanning in Hepatobiliary Disease: Use and Misuse**

  Source: Australian Prescriber. 14(2): 33-35. 1991.

  Summary: This article reviews the use and misuse of CT scanning to investigate hepatobiliary disorders. The author stresses that the yield from CT, as with all imaging, is improved if the request follows a careful history and examination and a specific question is posed for the radiologist. The author discusses the use of CT scanning in specific applications notably for abdominal pain, including biliary colic, cholecystitis, and acute and chronic pancreatitis; for abdominal mass including both a suspected abdominal mass on clinical examination and a reported abdominal mass on another imaging procedure; and for jaundice. 7 references. (AA-M).

- **Clinicopathological Study of CT Scans in Alzheimer's Disease**

  Source: Journal of the American Geriatrics Society. 40(5): 476-478. May 1992.

  Summary: This journal article describes a study that investigated the accuracy of cranial computerized tomography (CT) scans in distinguishing patients with Alzheimer's disease from patients with other types of dementia by measuring the presence of neuropathological evidence of Alzheimer's disease and specific findings of CT scans. A retrospective clinicopathological correlation was performed on 507 patients from urban and rural hospitals and nursing homes located in the Upper Midwest. The patients were all diagnosed with Alzheimer's disease while living, and their brains were subsequently referred to a dementia brain bank. Of the 507 patients, 375 had CT scans performed as part of their diagnostic testing for dementia. The results of the study indicated that 28 percent of the 375 patients evaluated with a CT lacked neuropathological evidence of Alzheimer's disease and, thus, were misdiagnosed. Of the 132 patients who were not evaluated with a CT, only 18 percent were misdiagnosed. The degree of atrophy and other CT findings did not differ between the two groups, however, the correctly

diagnosed patients had an increased ventricular size. The authors conclude that, although CT scans do not substantially contribute to an accurate diagnosis of Alzheimer's disease, they may help to distinguish Alzheimer's disease from other dementias by indicating the presence of ventricular enlargement. 12 references.

- **Functional Brain Imaging With Single-Photon Emission Computed Tomography in the Diagnosis of Alzheimer's Disease**

  Source: International Psychogeriatrics. 9(Supplement 1): 223-227. 1997.

  Summary: This journal article reviews the clinical applications of single-photon emission **computed tomography** (SPECT) in the diagnosis of Alzheimer's disease (AD). It summarizes findings from studies of regional cerebral brain flow in AD using SPECT with technetium-99m-labeled brain-retained tracers. It also discusses the potential value of SPECT as a diagnostic adjunct in patients with mild cognitive or behavioral symptoms, as a diagnostic adjunct in dementia patients with a diagnosis of probable AD, and for determining the relative contributions of degenerative and vascular pathology in cases of mixed dementia. Finally, it explores methodological issues for the optimal use of SPECT in AD cases. 15 references.

Federally Funded Research on Diagnostic Imaging

The U.S. Government supports a variety of research studies relating to diagnostic imaging. These studies are tracked by the Office of Extramural Research at the National Institutes of Health.[2] CRISP (Computerized Retrieval of Information on Scientific Projects) is a searchable database of federally funded biomedical research projects conducted at universities, hospitals, and other institutions.

Search the CRISP Web site at **http://crisp.cit.nih.gov/crisp/crisp_query.generate_screen**. You will have the option to perform targeted searches by various criteria, including geography, date, and topics related to diagnostic imaging.

For most of the studies, the agencies reporting into CRISP provide summaries or abstracts. As opposed to clinical trial research using patients, many federally funded studies use animals or simulated models to explore diagnostic imaging. The following is typical of the type of information found when searching the CRISP database for diagnostic imaging:

- **Project Title: 2ND INTERNATIONAL CERVICAL CANCER CONFERENCE**

  Principal Investigator & Institution: Follen, Michele; Professor of Gynecology Oncology; Biomedical Engineering Center; University of Texas Md Anderson Can Ctr Cancer Center Houston, Tx 77030

  Timing: Fiscal Year 2002; Project Start 01-APR-2002; Project End 31-MAR-2003

  Summary: "The 2nd International Conference on Cervical Cancer" is an interdisciplinary conference focused on innovative research in cervical cancer. The conference is expected to attract approximately 300 participants from around the world. The 1st International Conference on Cervical Cancer" was held one year ago, organized by the same

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[2] Healthcare projects are funded by the National Institutes of Health (NIH), Substance Abuse and Mental Health Services (SAMHSA), Health Resources and Services Administration (HRSA), Food and Drug Administration (FDA), Centers for Disease Control and Prevention (CDCP), Agency for Healthcare Research and Quality (AHRQ), and Office of Assistant Secretary of Health (OASH).

committee, and was considered immensely successful by the participants. "The 2nd International Conference on Cervical Cancer" will touch upon subjects not addressed in the first conference including: decision science, behavioral science, optical imaging, **diagnostic imaging, diagnostic imaging,** chemoprevention trials, innovative advances in the biology of cervical cancer, the role of nursing in cervical cancer prevention and treatment, and grant writing. Progress in this area will rely on the synthesis of knowledge from many fields including clinical medicine, epidemiology, fundamental optical science, biomedical engineering, medical imaging and device technology. This conference is a vehicle to facilitate the interdisciplinary interaction necessary to see ideas brought to fruition as research proposals. The conference is designed to encourage discussion and interaction, not only in the formal scientific sessions, but throughout the day and evening. The conference will be held at the University of Texas M.D. Anderson Cancer Center, Houston, Texas. This venue will provide a rich atmosphere for the conference and makes use of existing resources so that funds for the conference can be used to support travel for participants and publishing results in a special edition of "Cancer." An "all inclusive" fee covers registration, accommodation and meals. Formal sessions will be held from Thursday, April 11, in the afternoon through Sunday April 14, in the morning. There is time at the conclusion of each session to summarize findings and make research recommendations. The research recommendations, published in a special edition of the journal "Cancer", will disseminated the findings of the conference to a broad audience. There will be nine formal sessions. Each of these will be lead by an outstanding scientist, engineer, radiologist, or clinician. These session chairs have already invited speakers and the majority of speakers have confirmed their participation in the meeting. Each invited speaker will provide a review of their topic before presenting the most recent results from their group. Approximately one third of each session will be devoted to discussion. The session leaders have been selected partially on their ability to moderate a productivity interchange that will allow the exploration of topics from the perspective of both the basic scientist and the clinician. Each session chair and speaker has been chosen based on his/her publications, funding and national reputation.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: A DUAL DETECTOR FOR X-RAY ATTENUATION AND PHASE IMAGING**

  Principal Investigator & Institution: Liu, Hong; Professorr; School of Electrical and Computer Engr; University of Oklahoma Norman Office of Research Services Norman, Ok 73019

  Timing: Fiscal Year 2003; Project Start 01-SEP-2003; Project End 31-JUL-2007

  Summary: (provided by applicant): Objective: The overall objective is to develop a new diagnostic **x-ray** imaging technique that acquires both attenuation- and phase-images simultaneously. Challenges: Pioneer research performed with the 3rd generation synchrotron **x-ray** sources with high spatial coherence has proved that phase-contrast can significantly improve the sensitivity of **diagnostic imaging.** However, the costs, size and availability of a synchrotron **x-ray** source do not fit to clinical applications. A novel field-emission **x-ray** source with high spatial coherence and a dual-detector system is therefore proposed. Methods: Cutting-edge nanotechnology will be applied to fabricate a super tip for the electron gun of the **x-ray** source. The tip is made of the nanocrystal material, whose zero-dimensional electronic structure and non-Ohmic hopping conduction will allow a current density as high as 2 x 107 A/cm2 without burning out. By using the electron beam induced deposition the super tip will be integrated with a

miniature Orbitron vacuum pump and an ion mirror to avoid contamination and the ion bombardment of the electron emitter. The anticipated end product is an **x-ray** source with a small focal spot (less than 0.025 ram), and at the same time, a high tube current (greater than 25mA), thus providing a bright source with high spatial coherence. With such a new source, a dual detector system will be developed to acquire both attenuation- and phase-contrast images based on the in-line holography principle, and an algorithm will be developed to reconstruct a phase-image from these two images. Comprehensive measurements will be conducted to characterize the performance of the proposed system under clinical conditions. That includes objective measurements of resolution, contrast and quantum efficiency, and observer-based subjective measurements. Clinical benefits: The proposed technique has the following clinically friendly features: (1) The source-to-detector distance of the system is no more than 1 m; this is achieved by using the proposed field emission source with high spatial coherence; (2) Two images, a phase-contrast and an attenuation image are acquired at one exposure at the conventional dose level to enable phase-retrieval. (3) The reconstructed phase-image provides a significantly improved tissue-lesion contrast as compared with conventional **x-ray** images, because the phase differences between tissue and lesion are hundreds times larger than conventional attenuation contrast. Summary: By combining the nano-technology-based field emission source, a dual-detector system, and a phase-reconstruction algorithm, the proposed research would create a new sensitive way in diagnostic **x-ray** imaging.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: A MULTIMODE SONIC & ULTRASONIC DIAGNOSTIC IMAGING METHOD**

  Principal Investigator & Institution: Royston, Thomas J.; Mechanical Engineering; University of Illinois at Chicago 1737 West Polk Street Chicago, Il 60612

  Timing: Fiscal Year 2003; Project Start 01-SEP-2003; Project End 31-AUG-2005

  Summary: (provided by applicant): We will improve ultrasound (US) medical imaging technology by integrating a simultaneous noninvasive audible frequency measurement of biological sounds indicative of pathology. This multimode sonic / US imaging technique will advance diagnostic capabilities beyond the state-of-the-art and will be ideal for retrofit on existing systems. Measurement of naturally-occurring biological acoustic phenomena can augment conventional imaging technology by providing unique information about material structure and system function. Sonic phenomena of diagnostic value are associated with a wide range of biological functions, such as breath sounds, bowel sounds and vascular bruits. The potential range of applications can be further expanded by coupling the multimode technology with vibroacoustography, where one noninvasively insonifies a localized region of tissue via focused modulated US. The initial focus of the technology and of this proposal would be to provide an improved diagnostic tool for common peripheral vascular complications associated with arteriovenous (AV) grafts. The specific aim of this R21 application is to develop and evaluate the capability of the proposed sonic / US diagnostic technology to track and predict AV graft failure. To achieve this, we will: 1) construct the multimode system by combining a commercial US system with a novel sonic sensor array and associated instrumentation, 2) calibrate and improve its capability by conducting controlled phantom studies using simple and anatomically accurate geometries based on 3 dimensional in vivo US images, and 3) conduct serial feasibility studies on 3 human AV graft patients. An audible frequency (sonic) sensor array pad will be applied to the skin (or phantom) over which the peripheral vascular US probe is maneuvered. The US

probe images the discrete sensors in the array in addition to the underlying anatomical structure. The array sensors detect and focus on diagnostically indicative sonic phenomena resulting from turbulent blood flow and its dynamic interaction with the vascular wall/graft and surrounding biological tissues. The sonic array provides unique diagnostic information unobtainable via US imaging. In addition to providing anatomical geometry the US image enables one to improve the focusing capability and consequently, diagnostic value, of the sonic array. The assembled research team for this project has the unique and necessary expertise in sonic wave motion in biological tissue, hemodynamic flow through vascular constrictions, and the relationship between vascular pathology and vibro-acoustic "signatures". Finally, it is emphasized that, while the initial focus here is on prediction of AV graft failure, the proposed diagnostic advancement has much wider eventual application to diagnosis and monitoring of numerous pathologies.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: AN FPGA-BASED REAL-TIME VOLUME RENDERING SYSTEM**

  Principal Investigator & Institution: Sulatycke, Peter D.; Bio-Imaging Research, Inc. 425 Barclay Blvd Lincolnshire, Il 60069

  Timing: Fiscal Year 2004; Project Start 14-MAY-2004; Project End 13-NOV-2004

  Summary: (provided by applicant): This Small Business Innovation Research Phase I project involves the research and development of a real-time FPGA-based volume rendering system. In many scientific, engineering and medical **diagnostic imaging** applications, large amounts of data from 3D dimensional objects are generated. As a necessity or to gain better insight into the data, these data sets must be visualized. However, data set sizes are growing at such an incredible rate that current visualization solutions are proving inadequate. For example, there is no solution on the market that can cope with the multiple volumes produced per second by multi-slice CT scanners and 3D ultrasound devices. In addition, the high expense of the only hardware solution on the market has limited the availability of this enabling technology. As a result, important data is often overlooked producing inaccurate medial diagnoses. The volume rendering system developed in this project will alleviate this data overload problem, producing more effective medical imaging procedures. The goal of this research is to develop a low-cost FPGA-based volume render that is capable of 3D and 4D rendering of large data sets in real-time. By being based on FPGAs, the volume renderer will be low cost, making volume rendering available to a wider range of customers. Additionally, the renderer will support very high quality renderings through the use of higher-order gradients. The volume renderer will appeal to users in many markets, including: medical **diagnostic imaging,** oil exploration, security inspection and engineering simulations. One very exciting application of the 4D capabilities of the volume renderer will be in multi-slice CT cardiac imaging, enabling non-invasive procedures to be performed in place of current invasive procedures. The volume renderer will potentially make medical imaging more accurate and useful, speed up the discover of drugs and natural resources and permit fast viewing of the results produced from large scale engineering and scientific applications. As a consequence, the nation stands to benefit from productivity increases and reproved health care.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: ANTIBODY-TARGETED POLYMERIC SYSTEMS FOR TUMOR IMAGING**

  Principal Investigator & Institution: Torchilin, Vladimir P.; Professor and Chairperson; Pharmaceutical Sciences; Northeastern University 360 Huntington Ave Boston, Ma 02115

  Timing: Fiscal Year 2003; Project Start 30-SEP-2003; Project End 31-JUL-2007

  Summary: (provided by applicant): **Diagnostic imaging** requires the sufficient intensity of a corresponding signal from an area of interest in order to obtain diagnostically significant images. The contrast agents are specific for each imaging modality, and the tissue concentration required for successful imaging varies between diagnostic moieties in broad limits. Liposomes and micelles have been proposed as in vivo carriers for various diagnostic agents in order to increase their local concentration. The use of antibody-mediated targeted delivery of diagnostic agents to the areas of interest (tumors) was also proposed. To attach metals serving as radioisotopes and paramagnetic moieties to an antibody, chelating groups are introduced into a protein molecule. To couple many reporter groups to a single antibody molecule, the single-point modification of an antibody with polymers carrying multiple chelating residues (polychelating polymers, PPs) was proposed providing the major increase in the amount of heavy metal binding sites per antibody molecule without affecting the antibody properties. Polychelating amphiphilic polymers (PAPs) prepared by modifying PPs with a hydrophobic fragment capable of incorporation into the liposome membrane or the micelle core, have been used for liposome and micelle loading with diagnostic metals. Micelle-forming iodine-containing polymers have also been suggested as the contrast agents for **computed tomography** (CT). The attachment of an antibody to contrast-loaded polymers, liposomes, and micelles should enhance contrast accumulation in the targets; however, diagnostic monoclonal antibodies are usually tumor type-specific and unable to react with a broad variety of tumors. In recent years, we have identified a subset of natural antibodies capable of binding to the surface of a variety of cancer cells but not normal cells. These antibodies belong to natural anti-nuclear auto-antibodies (ANAs), which can be found in healthy mammals, possess the nucleosome (NS)-restricted specificity, and recognize the surface of numerous tumor cells both in vitro and in vivo via tumor cell surface-bound NSs as was clearly shown for two monoclonal tumor-specific ANAs (TSANAs), 2C5 and 1G3. We hypothesize that the combination of these two approaches - the attachment of antibodies or their fragments with broad anti-cancer specificity to contrast-loaded polychelating polymers and liposomes and micelles containing such polymers - will bring to life a new generation of highly efficient targeted imaging agents for cancer suitable for various imaging modalities depending on the type of a contrast moiety used. The proposed research pursues the following four specific aims to test our hypothesis: 1. To purify 2C5 and 1G3 and their Fab fragments; attach them to pre-synthesized PPs and PAP-containing liposomes and micelles; and investigate the immunoreactivity of these conjugates and their ability to bind cancer cells (murine EL4 T lymphoma, Lewis lung carcinoma, or B16.F10 melanoma and human BT20 and MCF7 breast adenocarcinomas) in vitro. 2. To investigate the biodistribution and tumor accumulation (tumor-to normal ratio) of the preparations demonstrating a good combination of loading capacity for different reporter groups and ability to specifically bind cancer cells in vitro in normal and nude mice bearing the tumors listed above. 3. To perform the gamma-imaging of the listed murine and human tumor in vivo in mice with 111-1n-loaded 2C5(or 1G3)-containing nanoparticular polymeric contrasts. 4. To perform the MR imaging of the listed murine and human tumors in mice with Gd-loaded PAP-containing immunoliposomes or immunomicelles

and their CT imaging with the use of antibody- or Fab-modified iodine-containing micelles.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: ASSESSMENT OF EARLY OSTEOARTHRITIC CHANGES WITH OCT**

  Principal Investigator & Institution: Brezinski, Mark E.; Professor; Brigham and Women's Hospital 75 Francis Street Boston, Ma 02115

  Timing: Fiscal Year 2002; Project Start 12-JAN-1998; Project End 31-DEC-2003

  Summary: (Adapted from Applicant's Abstract): The long term objective of this work is to develop a new method of intra articular imaging to overcome current limitations in reheumatologic **diagnostic imaging.** Recent reports suggesting that the progression of articular cartilage damage in osteoar-thritis may be modified have heightened the need for better methods to image early changes in cartilage and monitor the progression of these changes. A variety of imaging modalities have been applied to the assessment of early osteoarthritic abnormalities with limited results. The hypothesis is that optical coherence tomography (OCT), a new method of fiber optic based micron scale imaging, can be developed as a method of high resolution, minimally invasive, intra articular imaging to address current limitations in joint diagnostics. OCT is analogous to ultrasound B mode imaging using infrared light rather than acoustical waves. OCT is attractive for intra articular **diagnostic imaging** because of its high resolution (4-20 um), broad dynamic range (110 dB), small compact design and ability to perform imaging through small optical fibers. The applicants proposed to test the hypothesis principally through background feasibility experiments designed to assess the ultimate utility of the approach. These background experiments focus on identifying advantages and limitations of OCT for intra articular imaging and maximizing performance. The specific aims are to: 1. To perform imaging on a wide range of articular cartilage to identify limitations and advantages associated with OCT imaging. 2. To use the quantitized nature of light-molecular interaction to spectroscopically explore the biochemical changes of osteoarthritic articular cartilage. 3. To demonstrate the ability of OCT to perform in vivo imaging in a rabbit knee joint.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: C11 ACETATE PET IMAGING OF PROSTATE AND RENAL CANCER**

  Principal Investigator & Institution: Snyder, Scott E.; Assistant Professor; Radiology; University of Michigan at Ann Arbor 3003 South State, Room 1040 Ann Arbor, Mi 481091274

  Timing: Fiscal Year 2002; Project Start 01-APR-2001; Project End 31-MAR-2004

  Summary: (Adapted from PI's Summary) There is a need for new approaches to metabolic imaging of prostate and renal cancer. Positron emission tomography (PET) allows for cross sectional metabolic imaging, and is now emerging as an important clinical **diagnostic imaging** modality. PET imaging of glycolytic metabolism using the tracer fluorodeoxyglucose has proven useful in the diagnosis and staging of several malignancies, but has shown limited value in renal and prostate cancer. Positron radiotracers depicting metabolic pathways other than glycolytic metabolism are needed to fully develop the potential of PET in oncology. Carbon-11 acetate is a potential radiotracer for the depiction of the altered intermediary metabolism in malignant neoplasms. The purpose of this research is to understand the participating metabolic pathways responsible for the high uptake and retention of acetate radiotracer observed on PET imaging in certain malignant neoplasms, most notably renal cell carcinoma and

prostate cancer. Acetate is a central molecule of intermediary metabolism with access to both catabolic and anabolic pathways. In this proposed research, the participating metabolic pathways and intermediate pools of acetate radiotracer will be investigated in vitro using cell culture and animal models of selected malignant neoplasms and tissue culture of pools will be correlated with measurements of the expression of enzymes involved in intermediary and anabolic lipid metabolism of acetate to understand the rate limiting steps and dominant tracer pools responsible for the uptake and retention of radiotracer acetate in certain malignancies. Kinetics of carbon-11 acetate on PET imaging of human subjects with prostate cancer and renal cancer prior to resection, and on micro PET imaging of athymic mice bearing xenographs of selected malignancies will be analyzed and compared to enzyme measurement of these tissues in vitro to determine the role of transport and intermediary metabolism enzyme expression in the tracer kinetics of renal and prostate cancer. The carbon-11 acetate imaging of human subjects with prostate cancer and renal cell carcinoma involved in this study will also be compared with surgical and histopathological findings to assess diagnostic accuracy in clinical diagnosis.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CARDIOVASCULAR EFFECTS OF ULTRASOUND AND CONTRAST AGENTS**

  Principal Investigator & Institution: Dalecki, Diane; Biomedical Engineering; University of Rochester Orpa - Rc Box 270140 Rochester, Ny 14627

  Timing: Fiscal Year 2002; Project Start 01-SEP-2002; Project End 31-AUG-2005

  Description (provided by applicant): The overall goal of this project is to develop a greater understanding of the interaction of ultrasound with cardiovascular tissues containing gas-based ultrasound contrast agents. The role of ultrasound contrast agents in **diagnostic imaging** is increasing. However, ultrasound exposure of various tissues containing contrast agents can produce damage to blood vessels. Also, a single pulse of ultrasound can produce effects on cardiac function, such as the production of a premature cardiac contraction and effects on cardiac contractility. The presence of contrast agents in the blood can reduce the threshold for premature cardiac contractions, such that current output levels of diagnostic devices are capable of producing the effect. The proposed project is focused on investigating the effects of ultrasound and contrast agents on cardiac function and vascular damage. An integrated approach is proposed employing both experimental studies and theoretical modeling. Four inter-related specific aims guide the investigations. First, studies to characterize the bioffects of ultrasound on cardiovascular tissues containing contrast will be performed. Thresholds for effects on cardiac function and vessel damage will be determined as a function of acoustic and biological parameters. Second, a theoretical understanding of the response of contrast agents in cardiovascular tissues exposed to ultrasound will be developed. A broad goal of the proposed work is to develop a better understanding of acoustic cavitation in vivo. Techniques will be developed to model acoustic cavitation under conditions relevant to contrast agents contained within the vasculature in vivo. Third, the biophysical mechanisms by which contrast agents enhance bioeffects will be determined. It is hypothesized that ultrasound-induced premature contractions arise from acoustic cavitation and effects on contractility result from radiation force. Studies of vessel damage will be guided by testing two competing hypotheses; that ultrasound induced-damage to blood vessels contain contrast results from 1) phenomena associated with inertial collapse of microbubbles and/or 2) the initial expansion phase of the microbubbles. Fourth, therapeutic uses of ultrasound in cardiovascular tissues will be

investigated. The potential use of ultrasound and contrast agents for noninvasive cardiac pacing, defibrillation and electrophysiology procedures will be tested. Results of this project will provide information needed for safety recommendations, will increase the knowledge base of acoustic cavitation in vivo, and will determine the feasibility of potentially new applications of ultrasound and contrast agents in medicine.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CHOLINE TRACERS FOR IMAGING OF CANCER**

  Principal Investigator & Institution: Degrado, Timothy R.; Professor; Radiology; Indiana Univ-Purdue Univ at Indianapolis 620 Union Drive, Room 618 Indianapolis, in 462025167

  Timing: Fiscal Year 2004; Project Start 01-JUL-2004; Project End 30-JUN-2008

  Summary: (provided by applicant): Metabolic imaging techniques, such as positron emission tomography (PET), hold particular promise for **diagnostic imaging** of neoplasms. The central hypothesis of this project is that F-18 labeled choline analogs may serve as useful probes for PET imaging of cancer because they are good tracers of choline transport and phosphorylation are upregulated in cancer cells. We also believe their oxidative metabolism to betaine derivatives is very low, resulting in a simplification of their in-vivo kinetics. Preliminary work with C-11 and F-18 labeled choline analogs have shown promising utility in patients with prostate and breast cancer, brain tumors, and pulmonary nodules. The proposed work seeks to clarify the mechanisms that determine the disposition of the F-18 choline radiotracers in normal and malignant tissues, and compare the biochemical properties of three leading F-18 labeled choline tracer candidates: fluoromethylcholine (FCH), fluoroethylcholine (FECH), and fluoromethylallylcholine (FMAC). The work should provide a stronger basis for interpreting PET imaging studies of cancer with radiolabeled choline analogs and provide useful data for the selection of an optimal radiotracer for further development as a clinical imaging agent. The proposed research has the three specific aims: 1) to characterize the transport and metabolism of F-18 labeled choline analogs in relationship to C-14 choline in tumor and several normal tissues in 9L glioma-bearing rats, and also by in-vitro studies with recombinant human CK enzyme; 2) to clarify the relationship of tumor uptake of choline analog to tumor perfusion, and choline transport in 9L glioma-bearing rats; and 3) to evaluate the uptake of F-18 choline analogs in 2 animal models of inflammation in comparison with radiolabeled 2-fluoro-2-deoxy-glucose (FDG) and thymidine.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CLINICAL LASER OPTOACOUSTIC SYSTEM FOR BREAST CANCER**

  Principal Investigator & Institution: Oraevsky, Alexander A.; Vice President of Reserch Develoment; Fairway Medical Technologies, Inc. Suite #200 Houston, Tx 77099

  Timing: Fiscal Year 2002; Project Start 22-MAY-1998; Project End 30-APR-2005

  Summary: (Adapted from Applicant's Abstract): The goal is to develop a clinical prototype of the Laser Optoacoustic Imaging System (LOIS), a new concept in **diagnostic imaging** of breast cancer. Specific aims focus on (1) tests of LOIS using phantoms resembling optical and mechanical properties of breast with tumors, (2) the system improvement on the basis of results of initial tests, (3) evaluation of the system using mastectomy specimens, (4) modification of the system in preparations for the in vivo clinical trials and finally, (5) clinical trials on 50-100 patients. In vivo optical tomography studies suggest that enhanced light absorption in breast cancer compared

with normal breast tissues can help to reveal malignant tumors on the basis of optical contrast. The hypothesis is that LOIS utilizing sensitive detection of pressure waves preferentially induced by laser pulses in tumors will provide breast cancer images with greater contrast and sensitivity compared with **x-ray** mammography, ultrasonography or optical tomography. The major idea is that energy of short laser pulses absorbed primarily in tumors will create sources of pressure waves in ultrasonic frequency range. The ultrasonic waves will deliver diagnostic information to the breast surface, where signals can be detected by piezoelectric transducers. Reconstruction of a three-dimensional image of breast will be obtained on the basis of time-resolved detection and analysis of profiles of laser-induced pressure distribution recorded with a number of transducers located along the breast surface. Modalities presently applied for breast cancer detection are not free of serious limitations. The applicants propose to combine advantages of optical and ultrasonic imaging in one advanced tomography.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: COMBINED DIGITAL X-RAY AND ULTRASOUND BREAST IMAGING**

  Principal Investigator & Institution: Carson, Paul L.; Professor; Radiology; University of Michigan at Ann Arbor 3003 South State, Room 1040 Ann Arbor, Mi 481091274

  Timing: Fiscal Year 2002; Project Start 27-SEP-2002; Project End 31-AUG-2007

  Summary: 3D ultrasound will be combined with a full-field digital mammography (DX) system via an automatic scanning mechanism on the DX gantry. It is proposed to take full advantage of the many synergisms among an innovative combination of modes of these two modalities for breast cancer diagnosis, and, eventually, detection. The basic and advanced modes implemented and tested in the system are those which should provide relatively independent information about the breast tissues and with which we have extensive, related research experience in the numerous breast imaging groups at the University of Michigan and/or General Electric. Advanced modes include tomosynthesis which, unlike projection imaging, gives **x-ray** interaction properties of the specific tissues evaluated by the ultrasound methods. Nonlinear elasticity and 3D color flow imaging by ultrasound (UL) provide mechanical and physiological information unavailable from conventional, noncontrast **x-ray** and ultrasound imaging. Compound and single-view US imaging are complimentary, with the former providing better distal tumor borders and other features helpful to visual and computer-aided diagnosis. In a single positioning, with possible variation in compression, the breast will be imaged by: 1) the basic modes -- projection digital **x-ray** and full field 3D gray scale ultrasound: 2) the advanced modes -- 3D **x-ray** tomosynthesis and advanced ultrasound of the mass region (nonlinear elasticity, 3D color flow, and compound imaging). In the main clinical evaluations on 160 women with masses going to biopsy and 40 with simple cysts, the basic and advanced imaging modes will be compared on the same patients and good combinations of modes revealed. The first hypothesis is that the basic combined technique is diagnostically equivalent to the current best practice of high quality mammography plus hand-held ultrasound performed by MQSA-certified radiologists. Linear combinations of the basic and advanced modes will be evaluated for relative diagnostic accuracy. Clinical evaluation of the potential of the combined system for screening of selected populations must follow demonstration of diagnostic equivalence. Developments will be done to objectively illustrate some of the approaches and potential of visual and computer aided diagnosis (CAD) and detection with these multiple modes. In addition to the coregistration inherent in the combined system, image based registration will be applied to correct for modestly differing views,

compressions and tissue motions between modalities, modes, UL transducer sweeps, and studies at different times.

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- **Project Title: CONFERENCE--MEDICAL IMAGE PERCEPTION**

  Principal Investigator & Institution: Krupinski, Elizabeth A.; Research Professor; Radiology; University of Arizona P O Box 3308 Tucson, Az 857223308

  Timing: Fiscal Year 2003; Project Start 01-SEP-2003; Project End 31-AUG-2004

  Summary: (provided by applicant): **Diagnostic imaging** plays a vital role in diagnostic medicine. The extraction of information from image data by" expert readers (radiologists) is an essential step in this process. While performance of these highly trained readers is exceptional, it remains far from ideal. The introduction of new technologies for acquiring and displaying diagnostic information continually adds to the amount and complexity of information that the radiologist must visualize, interpret and act upon. The understanding and optimization of the diagnostic process starting from the point of information extraction and proceeding through the various steps towards the cognitive process of decision making is a key focus of the Medical Image Perception Society (MIPS) and the Medical image Perception Conference. This conference has been held every two years since 1985. it brings together radiologists, psychologists, statisticians, physicists, engineers, and others interested in the myriad of perceptual and cognitive processes associated with the diagnosis of medical images by humans and computers. Topics range from examining the visual search processes associated with image interpretation by the human (radiologist) observer, through quantitative evaluation and mathematical modeling of performance for the optimization of the human-machine interface. Particular emphasis is also placed on presentation of quantitative evaluation methods to assess observer performance, and these range from new variations on traditional Receiver Operating Characteristic (ROC) techniques to alternative evaluation methods that include the incorporation of subjective image ratings. Although the major focus of the conference in the past has been on radiological image perception and interpretation, recent conferences have included papers on other image-based specialties such as pathology and dermatology, especially in the context of telemedicine applications. The Medical Image Perception Conference X will be held 11 - 14 September 2003 at the R. David Thomas Conference Center on the Duke University campus in Durham, NC. We anticipate to have approximately 50 - 55 attendees from the US, Europe and Japan. This grant will be used to provide financial support for about 12 graduate students and residents, as well as logistic support for publicity and program printing.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CONTENT BASED IMAGE RETRIEVAL FOR MEDICAL DATABASES**

  Principal Investigator & Institution: Brodley, Carla E.; Associate Professor; Electrical and Computer Engr; Purdue University West Lafayette West Lafayette, in 479072040

  Timing: Fiscal Year 2002; Project Start 30-SEP-1998; Project End 31-DEC-2002

  Summary: (Adapted from the applicant's abstract): Increasing computerization of the process of acquiring and storing diagnostic images requires more sophisticated approaches to image retrieval in order to optimally use this information for improved health-care delivery and research. This research will develop a new technique for image retrieval that will assist a physician in interpreting **diagnostic imaging** studies. The image retrieval system will give the physician the ability to query an image database of

known cases and retrieve images (and associated textual information) that contain regions with features similar to what is in the image of interest. Through an interactive, menu-driven software interface, physicians will query the system by marking regions of interest in the query image. The system will then retrieve similar images ranked using a similarity criterion of the quantifiable properties of the abnormality. To facilitate development of the approach, the research will focus initially on content-based image retrieval of a specific category of disease and one form of imaging: the use of high resolution **computed tomography** (URCT) in patients with a variety of lung diseases. This area has been identified as one where inexperienced Radiologists would benefit greatly from the capability to query images by content to aid in making a diagnosis. The proposed research will address the following issues: the role of anatomical features in medical image retrieval, automatic selection of morphology delineation algorithms, optimal indexing of images for entry into and retrieval from a large database and automated improvement of the system based on physician feedback of query results.

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- **Project Title: CORE--CLINICAL**

  Principal Investigator & Institution: Poplack, Steven P.; Dartmouth College 11 Rope Ferry Rd. #6210 Hanover, Nh 03755

  Timing: Fiscal Year 2002

  Summary: Clinical research represents the final stage of development for **diagnostic imaging** technologies. The quality of this research is of vital importance to the ultimate understanding of the clinical utility of the new property- based imaging modalities being developed in this Program. The Clinical Core will provide a single, centralized programmatic structure for initial clinical studies of the new imaging schemes. The Core will lead the recruitment of alternative imaging exam participants and the subsequent analysis/evaluation of the images and data derived form these encounters. The specific aims of the Clinical Core are to (1) develop a comfortable and efficient breast analysis methods and statistical measures for assessing images and data derived from alternative imaging exams relative to conventional clinical information, (3) identify correlations of the pathological findings with alternative imaging property values through targeted immunohistochemical and specimen image analysis studies in order to improve the understanding of the biophysical basis of image contrast, and (4) conduct a formal clinical study involving 150 patients being screened for breast to evaluate the interrelationships between the different properties measured on the same individual and provide initial assessments of the sensitivity and specificity of the alternative imaging modalities, used both singly and in combination, for discriminating between individuals. a) with normal findings and with abnormal findings using conventional clinical methods and radiological examinations, b) with and without a confirmed diagnosis of cancer. c) with alternative pathological findings, among the 75 patients with abnormal conventional findings undergoing biopsy. Clinical Core members will create a level of expertise in diagnostic radiology, clinical research, statistics, and data management that would be difficult to duplicate within individual Projects.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CORE--MAGNETIC RESONANCE IMAGING**

  Principal Investigator & Institution: Dardzinski, Bernard; Children's Hospital Med Ctr (Cincinnati) 3333 Burnet Ave Cincinnati, Oh 452293039

  Timing: Fiscal Year 2002

Summary: The Magnetic Resonance (MR) Imaging Core will provide technical expertise, assistance and equipment to those investigators who require non-invasive methods to monitor disease progression in rheumatoid arthritis and animal models of autoimmune diseases. Expertise and assistance will be provided by core personnel in the following areas: Noninvasive MR imaging Design and fabrication of MR apparatus Image post-processing techniques Consultation on, and access, to state-of-the-art **diagnostic imaging** techniques Education and training of researchers, clinicians, fellows and students in the use of **diagnostic imaging** technologies in biomedical research. In addition, the Core will facilitate the acquisition, processing and storage of experimental data, maintain standards and quality control of MR procedures; and assist in the development of new techniques as needed.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CORE--RADIOLOGICAL SCIENCES**

  Principal Investigator & Institution: Cole, William; University of Colorado Hlth Sciences Ctr P.O. Box 6508, Grants and Contracts Aurora, Co 800450508

  Timing: Fiscal Year 2002

  Summary: (Applicant's Description) The Radiological Sciences core was one of the original cores established at the inception of the University of Colorado Cancer Center in 1988 to provide centralized facilities, training, and expertise for cancer research involving the use of ionizing radiation including irradiation facilities, preparation of radiolabeled cells and antibodies for cancer diagnosis and treatment, radiation dosimetry, and **diagnostic imaging** consultation services. Cancer center member usage of the60 Co irradiator has been stable over the last five years and has increased by about 50% for 1999. Radiolabeling services have been used primarily for monoclonal antibody labeling for radioimmunotherapy. This function is projected to increase due to the FDA approval of new antibodies and recruitment of new faculty. Dosimetry consultation services have focused on radiolabeled monoclonal antibodies for radioimmunotherapy as well. The transition to our new campus at Fitzsimons is expected to increase the need for additional facilities for irradiation as Cancer Center members move their research activities to the new site. In addition, the new cyclotron and PET capabilities are expected to increase research opportunities and the involvement of the Radiological Sciences core.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: CORE--RESEARCH ANIMAL SUPPORT FACILITY**

  Principal Investigator & Institution: Gray, Kenneth N.; University of Texas Md Anderson Can Ctr Cancer Center Houston, Tx 77030

  Timing: Fiscal Year 2003; Project Start 15-AUG-2003; Project End 30-JUN-2008

  Summary: The Research Animal Support Facility (RASF) has been a shared resource since the original CCSG was awarded in 1975. The RASF has components located in Houston at The University of Texas M. D. Anderson Cancer Center main and south campuses, and in Smithville in the Department of Carcinogenesis. All animal facilities are accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care International, have Animal Welfare Assurance approval (A3343-01), and are registered as research animal facilities with the United States Department of Agriculture (USDA) (74-R-065). RESEARCH ANIMAL SUPPORT FACILITY IN HOUSTON (RASFH) The RASFH is directed by Kenneth N. Gray, D.V.M., M.S., Chairman, Department of Veterinary Medicine and Surgery (DVMS). The RASFH

encompasses approximately 75,000 sq ft of space and provides housing and quality assurance monitoring for animals used in cancer research. It also provides clinical, surgical, **diagnostic imaging,** and radiation therapy facilities and services as well as diagnostic and pathology laboratory facilities and services. New services added since the last CCSG renewal include **magnetic resonance imaging,** computerized tomography, immunohistochemistry, microsurgery, and rodent technical support, newly acquired equipment includes an automatic stainer, automatic slide/cassette labelers, a digital analyzer and camera for pathologic evaluations, and an automated multi-species hematology system. There are 85 personnel in the RASFH, including 9 veterinarians, 4 section managers, 1 administrator, 2 animal facility operations managers, 8 laboratory personnel, 50 animal care personnel, and 11 clerical/support staff. Dr. Gray coordinates the daily administration and governance of the RASFH. Five staff veterinarians direct the 5 service sections that provide facilities, equipment, and services to research animal users. The newest section is the Section of Experimental Animal Imaging. Funding for the RASFH is currently provided by the CCSG (8%), user fees (29%), other grants/contracts (4%), and other M. D. Anderson sources (59%). The RASFH is used by 219 investigators supporting 20 different CCSG programs. Peer-reviewed investigators represent 90% of the RASFH users. In the past 5 years the RASFH animal population has grown 5% annually, from 27,310 animals in 1997 to 34,255 animals in 2001. RESEARCH ANIMAL SUPPORT FACILITY IN SMITHVILLE (RASFS) In Smithville, TX, the RASFS is directed by Lezlee G. Coghlan, D.V.M., Ph.D., Director of Animal Resources and Associate Professor, Science Park Research Division (SPRD), Department of Carcinogenesis. This shared resource serves a basic science facility (250 employees) remote from the Houston campus, located near Austin in central Texas. The RASFS encompasses approximately 18,239 sq. ft with an additional 13,570 sq ft under construction. Animals housed in the RASFS are limited to mice, rats, and hamsters. The fish-based research programs and facilities (1,800 sq ft) receive veterinary services, programmatic oversight, and regulatory compliance support from the RASFS. The RASFS maintains an average daily population of 20,000 specific pathogen-free (SPF) rodents, which is projected to grow to 35,000 during the proposed funding period. The RASFS provides consultation, housing, husbandry, health quality and genetic monitoring, animal procurement and shipping, clinical, surgical, irradiation, and custom research services, including breeding colony management and other services. There are 24 FTE in the RASFS, including the RASF director, one each animal resource operations manager, supervisor, technologist, clerk, two (Sr.) animal technicians, and 17 other support personnel. Dr. Coghlan coordinates the daily administration and governance of RASFS. Funding for The RASFS currently includes the CCSG (22%), User's fees (62%), Other Grants/Contracts (3%), institutional support (13%). The RASFS was used primarily by investigators in the CCSG Carcinogenesis program, and also supported members in two other programs; peer-reviewed investigators used 95% of the shared resource services. Over the past five years the animal (rodent) population supported by the RASFS has grown by 45% and average annual usage by 79%. While maintaining a separate AAALAC accreditation, the RASFS is harmonized with the RASFH through a shared OLAW Assurance, IACUC, and professional interaction.

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- **Project Title: COST EFFECTIVENESS OF LIVER TUMOR ABLATION AND RESECTION**

  Principal Investigator & Institution: Gazelle, G Scott.; Medical Doctor; Massachusetts General Hospital 55 Fruit St Boston, Ma 02114

  Timing: Fiscal Year 2002; Project Start 11-JUL-2000; Project End 30-JUN-2004

Summary: (Applicant's abstract): The proposed research seeks to apply decision analytic techniques in order to evaluate recently developed, minimally invasive techniques for percutaneous, in-situ tumor ablation in patients with liver metastases from colorectal carcinoma (CRC). It is now well documented that long term survival can be improved in patients with limited hepatic metastases by operative metastasectomy. However, the impact of in-situ ablative techniques on long-term survival is unknown. In addition, the importance of **diagnostic imaging** in selecting candidates for therapy, specifically the impact of diagnostic accuracy on treatment outcomes, has received relatively little attention. None of these techniques have been formally evaluated in order to determine their relative cost effectiveness. We have recently developed a Markov decision model based on the costs, performance characteristics, and outcomes of various diagnostic tests and surgical treatment strategies, in order to evaluate the cost effectiveness of operative metastasectomy in patients with CRC liver metastases. In the proposed research, we will further develop, verify, and refine this model in order to perform cost effectiveness analysis of strategies for **diagnostic imaging** and in-situ ablation in patients with CRC liver metastases. We will also explore the possibility that in-situ ablation, given its generally lower cost, morbidity, and mortality, could provide relatively cost effective life extension for patients in whom cure is impossible. Finally, we will investigate the effect of different analytic perspectives on health outcomes and costs at the population level. The research is multidisciplinary in nature, and represents a collaborative effort between researchers in the fields of health economics, health services research, and clinical cancer care. It will add to our knowledge base concerning the economic aspects of cancer management, and will provide guidance in the appropriate use of diagnostic and therapeutic interventions in patients with hepatic metastases. The research may also identify areas for potential clinical trials providing direct comparisons of surgical and percutaneous techniques, and/or evaluations of strategies for diagnostic liver imaging.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: DIAGNOSTIC IMAGING OF CEREBRAL BLOOD FLOW WITH MRI**

  Principal Investigator & Institution: Alsop, David C.; Associate Professor; Beth Israel Deaconess Medical Center St 1005 Boston, Ma 02215

  Timing: Fiscal Year 2002; Project Start 30-SEP-2000; Project End 31-AUG-2004

  Summary: Imaging of Cerebral Blood Flow (CBF) is a powerful technique for the diagnostic evaluation of patients with dementia, stroke and epilepsy. A technique known as Arterial Spin Labeling MRI has demonstrated the ability to provide high quality images of CBF without radioactivity or injection. The advancement of this technique has been limited, however, by the destructive effects of patient motion, the poor image quality of the fast, echoplanar imaging technique used to combat these motion effects, and the inability to acquire images from the entire brain in a reasonable exam period. The applicants propose to overcome these limitations by refining a novel background suppression approach. Multiple inversion pulses will be used to reduce the intensity of uninteresting signals prior to image acquisition. This approach can reduce motion-related errors by a factor of 100 while preserving the CBF signal. Because of the dramatic reduction in motion-related errors, a superior, 3D fast spin echo imaging approach can be employed to provide CBF images from the whole brain in under 6 minutes with twice the sensitivity of earlier approaches. We propose to realize this potential of this approach by: 1. Optimizing the design of the RF pulses used for background suppression to minimize CBF signal loss and systematic errors near the top and bottom of the brain. 2. Using a nonlinear minimization strategy to optimize the timing of the inversions so as to achieve ideal background suppression 3. Developing a

strategy for T1 quantification of brain tissue that will be compatible with the 3D fast spin echo sequence and which will be insensitive to the presence of cerebrospinal fluid(CSF). TI measurement is required for CBF measurement but can be contaminated by small amounts of CSF in the voxel. 4. Measuring the efficiency of the background suppressed sequences. Efficiency will be measured as a function of labeling plane location to guide the choice of parameters for subsequent applications. 5. Measuring the test-retest reliability of the optimized CBF imaging method in normal controls and patients with dementia and comparing it to unsuppressed methods. This information is needed for the design and interpretation of diagnostic tests, pharmaceutical evaluations and other studies employing CBF MRI. These developments will make reliable CBF imaging by Arterial Spin Labeling a widely applicable technique for **diagnostic imaging.**

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: DIGITAL X-RAY IMAGED BASED ON HGL2 POLYCRYSTALLINE FILMS**

  Principal Investigator & Institution: Iwanczyk, Jan S.; Vice President; Photon Imaging, Inc. 19355 Business Center Dr, Ste 8 Northridge, Ca 91324

  Timing: Fiscal Year 2002; Project Start 01-JUL-2000; Project End 31-AUG-2003

  Summary: The goal of this proposal is to develop a new detector technology for digital **x-ray** imaging based on HgI2 polycrystalline films coupled to large area flat panel amorphous silicon (a-Si:H) thin-film transistor (TFT)-addressed readout arrays. This novel imaging detector when optimized will provide order of magnitude improvements in sensitivity to **x-rays** and superior spatial resolution compared to detectors utilizing scintillating phosphors coupled to a-Si:H readout arrays. The increased sensitivity of the detector will allow for a ten-fold reduction in radiation dose to a patient for an equivalent quality image. The enhancement of the spatial resolution will have a direct impact on the quality of the image, which has paramount importance in many medical diagnostic procedures such as mammography. In addition, digital capabilities will allow for convenient film-less image acquisition, retrieval, and storage. Digital image processing, computer-assisted diagnosis, and the ability to provide real time images have distinct advantages in many medical diagnostics. During Phase I of this proposal we developed techniques for highly controlled growth of polycrystalline HgI2 films in terms of their thickness, sizes of the polycrystalline grains, uniformity of layers and good electrical properties. In the Phase II effort we will finalize the HgI2 film development and construct **x-ray** imaging detectors using initially small commercial flat panel a-Si:H readouts (approximately 2"x2"). Then we will scale up the film growth equipment and construct large area (approximately 14" x 17") **x-ray** imaging detector. The film growth process will be optimized for low production cost. This new x- ray imager will be characterized and compared with current commercial detectors in terms of spatial resolution, gain, linearity, noise, uniformity, and detective quantum efficiency. The imaging capabilities will be tested in our laboratory and at UCLA School of Medicine with the use of slits and phantoms. PROPOSED COMMERCIAL APPLICATIONS: There is a strong interest in application of digital radiographic detectors for medical diagnostic applications, nondestructive evaluation of materials, **x-ray** diffraction of biological and other material samples, and astronomical observations. Conservative estimates are that in the medical area alone there are over 600 **x-ray** images produced per 1000 population per year. The proposed detectors will be highly attractive to this enormous commercial market segment due to the order of magnitude performance improvements that they will offer.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: DUAL ENERGY CHEST RADIOGRAPHY CAD**

  Principal Investigator & Institution: Alvarez, Robert; President; Aprend Technology 2369 Laura Ln Mountain View, Ca 94043

  Timing: Fiscal Year 2004; Project Start 01-AUG-2002; Project End 31-MAR-2006

  Summary: (provided by applicant): The long-term objective of our proposed research is to improve the early detection of lung cancer with chest radiography. Because chest radiography is used for such a wide variety of medical conditions, it is, by far, the most widely used **diagnostic imaging** examination with over 30 million exams per year. Radiologists scan these images for all indications of disease, including lung cancer nodules, not just for the initial reason for the examination. Unfortunately, the fraction of nodules missed is quite high, over 30% in many studies. Our specific aim is to develop a computer-assisted detection (CAD) system to reduce the miss rate. The system uses low-noise, dual energy subtraction images, which have significant advantages for CAD yet there has been little research to exploit their unique characteristics. This is the opportunity for technological innovation addressed by our research. Dual energy provides images that eliminate ribs, a major contributor to errors in conventional CAD. It also provides images that may be used to measure nodule calcification, an important factor in malignant vs. benign diagnosis. Recently introduced digital, flat-panel **x-ray** systems provide dual energy images with lower noise than previous approaches. These lower noise images may improve detection of smaller, early-stage cancers. In Phase I, we showed the feasibility of our approach by developing new methods to utilize dual energy information in CAD. We developed a method for detection of potential nodules with high sensitivity and much lower extraneous response. We also developed a method for locating the lung fields in a chest image with higher accuracy and sensitivity than previous methods. Another innovation was a method of characterizing nodules based on a statistical technique called eigenimages that derives information directly from nodule images and whose accuracy increases as more nodule images become available. In Phase II, we will build on these methods to develop algorithms for the other components of the CAD system. We will study methods to incorporate these algorithms in a network application prototype to provide CAD services to multiple digital **x-ray** systems connected to a modern hospital information network. We will use the prototype to conduct a small-scale observer study to compare the performance of radiologists using our CAD system with unaided radiologists.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: FAST OCT TECHNOLOGY FOR COMPREHENSIVE DIAGNOSTIC IMAGING**

  Principal Investigator & Institution: De Boer, Johannes F.; Assistant Professor; Massachusetts General Hospital 55 Fruit St Boston, Ma 02114

  Timing: Fiscal Year 2003; Project Start 15-SEP-2003; Project End 30-JUN-2007

  Summary: (provided by applicant): Over the past 10 years, optical coherence tomography (OCT) has undergone a rapid development from inception to a versatile method for non-invasive high-resolution optical imaging. A wide range of medical diagnostic applications has been explored in ophthalmology, cardiology and in early cancer diagnosis in general. Preliminary studies have demonstrated that OCT can facilitate the accurate diagnosis of a variety of diseases when used in a point-sampling protocol analogous to random biopsy. The potential diagnostic applications having the highest impact, however, require screening or surveillance of large tissue volumes. The relatively slow image acquisition rate of current OCT technology therefore represents a

significant barrier to its utility as a powerful clinical tool. Since the current technology commonly operates at its theoretical limit for efficient light collection, dramatic improvements in imaging speed can only be obtained through a technological paradigm shift. We propose to develop a new, parallel detection principle for OCT that is several hundred-fold more efficient than current state of the art technology and that provides vastly improved image acquisition rate and resolution. The system design of the proposed technology is tailored to three high-impact clinical goals: early detection and monitoring of glaucoma, the second-leading cause of blindness in the U.S, detection and characterization of vulnerable coronary plaques responsible for acute myocardial infarction, and comprehensive surveillance for esophageal neoplasia in patients with Barrett's esophagus. Three clinical pilot studies, using technology developed in this work, will be conducted to test system performance relevant to achieving these goals.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: HEME PROTEINS, MICROSPHERES AND SYNTHETIC ANALOGS**

  Principal Investigator & Institution: Suslick, Kenneth S.; Professor; Chemistry; University of Illinois Urbana-Champaign Henry Administration Bldg Champaign, Il 61820

  Timing: Fiscal Year 2002; Project Start 01-DEC-1992; Project End 30-NOV-2004

  Summary: The objectives of this research involve the characterization and application of heme proteins, heme protein microspheres, and synthetic analogs of heme proteins. The focus is on inter-molecular interactions in three areas: (1) molecular recognition in ligation, sensing and catalysis; (2) porphyrin assemblies, both as covalently linked and as molecular engineered solids, and (3) heme protein assemblies, specifically protein microspheres prepared sonochemically. The chemical reactivities of interest include ligand and peptide binding to heme proteins and metalloporphyrins, oxygen activation and hydrocarbon oxidation by metalloporphyrins, and the interactions between porphyrins as redox partners in organized media. The heme proteins are relevant to cardiovascular functioning; to drug, hormone, and exobiotic metabolism; to oxidant detoxification and substrate oxidation; and to biological electron transfer and photosynthesis. Some of this research provides a fundamental understanding of the molecular mechanisms of heme protein reactivity, using closely related model metalloporphyrins and peptide-heme complexes acting as synthetic heme proteins. The group is exploring molecular recognition and substrate specificity, the nature of heme-peptide and heme-heme interactions, and the chemical and photochemical generation of highly oxidized iron porphyrin complexes. In related work, it has been discovered that ultrasonic irradiation of various proteins (e.g., hemoglobin and serum albumin) creates micron-sized spheres. These microspheres have a very thin shell of crosslinked protein with either a gas- or liquid-filled core. These have been used with substantial success as biocompatible medical **diagnostic imaging** agents, e.g., as functional **magnetic resonance imaging** spin-label probes for in vivo O2 and temperature profiling. Microspheres made of Hb and of other proteins are currently under development and animal testing as O2 carrying pharmaceuticals. Continuation of efforts in these areas should lead to (1) the development of a new class of biocompatible microencapsulation for drug and O2 delivery and **diagnostic imaging,** (2) a quantitative understanding of the influences which modulate ligand binding in protein environments, (3) further characterization of the reactivity of high-oxidation state heme protein intermediates (4) a closer understanding of substrate selectivity and regiospecificity by monooxygenases, and (5) basic knowledge about porphyrin-porphyrin interactions in pi-overlapping systems such as the photosynthetic reaction center.

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- **Project Title: HIGH POWER ULTRASOUND PROBES USING MULTILAYER TECHNOLOGY**

  Principal Investigator & Institution: Zipparo, Michael J.; Tetrad Corporation 357 Inverness Dr S Englewood, Co 80112

  Timing: Fiscal Year 2003; Project Start 18-FEB-2003; Project End 31-JAN-2004

  Summary: (Provided by Applicant): The objective of the proposed work is to develop technology which results in probes ultrasound with performance at or near the level of probes designed for **diagnostic imaging** but with the increased efficiency and power handling capability which is necessary for some applications, such as acoustic radiation force impulse (ARFI) imaging and combined imaging / HIFU therapy. Probes with high bandwidth, sensitivity, and efficiency will enable ARFI to operate in real time and will improve the image guidance for HIFU applications. Development of multilayer multirow array technology will ultimately lead to better elevation focusing capability in both diagnostic and therapy modes, and open the possibility of electrically matched array elements without the need for a transformer. Thus resolution can be improved for imaging, and therapy devices can be easily focused at multiple depths for treatment of both near-surface and deep-lying ailments with a single device. The specific aims of Phase I are as follows. Experimentally validate through thermocouple measurements the relative power dissipation of probe components, such as the backing, piezoceramic, and lens materials. Compare the power dissipation and efficiency of probes designed for **diagnostic imaging** with that of probes designed for increased power handling capability using low loss piezoceramic and modified acoustic designs. Evaluate the properties of low loss piezoceramic multilayers by fabricating prototypes with an established process. Establish the feasibility of applying stacked multilayer technology to multirow arrays by extending established processes to individual multilayers with small elevation dimensions and to selectively plated full-elevation plates. In cooperation with researchers active in the field, determine probe configurations and performance specifications for high resolution high power arrays which can benefit from the technology developed in this program.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: IMAGING IN RISK ASSESSMENT OF PROSTATE CANCER PATIENTS**

  Principal Investigator & Institution: Hricak, Hedvig; Chairman; Sloan-Kettering Institute for Cancer Res New York, Ny 100216007

  Timing: Fiscal Year 2002; Project Start 07-JUL-1999; Project End 30-APR-2004

  Summary: Like breast cancer in women, prostate cancer is a major public health concern in American men. One of the major roadblocks to improving the outcome of this disease is a current lack of understanding of how to accurately determine the risk of disease progression. Without this information, it is difficult to make an informed decisions about what type of treatment is most appropriate, or whether any treatment is needed at all. Although there are many studies in the prostate cancer literature evaluating the diagnostic accuracy of imaging for pretreatment staging using standard pathologic endpoints, there is little data on the ability of imaging to predict tumor aggressiveness or patient outcomes. The broad, long-term objective of this proposed research is to improve the treatment of patients with prostate cancer by the judicious use of **diagnostic imaging** tests to accurately stage the disease and to help determine the risk

of disease progression. Our proposed research investigates a possible new tumor risk factor, which may be used in conjunction with existing risk factors to provide a more accurate assessment of tumor aggressiveness than is currently possible. We wish to test the hypothesis that the morphologic (MRI) and metabolic (MRSI) information provided by MR imaging allows more accurate determination of tumor aggressiveness and prediction of patient outcome than the use of clinical risk factors alone. The specific aims of our study are to: 1. Determine whether the severity of abnormality in metabolism in areas of prostate cancer identified by MRSI represents a significant new independent measure of tumor aggressiveness. 2. Compare the accuracy of MRSI, MRI, and TRUS in determining the local extent of tumor in patients who will undergo radical prostatectomy. 3. Determine the best way to combine the diagnostic information obtained from MRSI, MRI, TRUS, and clinical risk factors to provide more accurate risk assessment than the use of any diagnostic test alone.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: IMPROVED DETECTION OF CANCER USING BI SPECIFIC ANTIBODY**

  Principal Investigator & Institution: Sharkey, Robert M.; Director, Clinical Research Administrati; Garden St Cncr Ctr/Ctr Mol Med & Immunol for Molecular Med & Immunology Belleville, Nj 07109

  Timing: Fiscal Year 2002; Project Start 22-JUN-2001; Project End 31-MAY-2004

  Summary: (Verbatim from the Applicant's Abstract): **Diagnostic imaging** of cancer has been identified by the NCI as a priority program principally because of the commonly held belief that if cancer can be more accurately located in the body, then patient management and possible outcome will improve. This application will develop a new imaging modality, namely a bispecific antibody (BsMAb) approach that will be suitable for gamma and PET imaging. Since many positron-emitters have a shorter half-life than the gamma-emitters, the method must be able to provide images within a short time after the isotope injection. Preliminary results with the BsMAb approach used in this application indicate imaging will be possible with I to 3 hours. Thus, this methodology should be suitable for either a gamma- or a positron-emitting agent. With superior tumor/non/tumor ratios, this method could improve the sensitivity and specificity of diagnostic cancer imaging by gamma imaging or PET (ImmunoPET). This proposal includes preclinical studies that will continue to build on the methodology described in this application. F(ab')2 x Fab' and Fab' x Fab' BsMAb constructs will be explored to deterrnine the optimal agent for targeting. Clinical studies are proposed by the middle of the second year. The clinical studies will use a humanized anti-carcinoembryonic antigen (CEA) antibody (hMN-14) that is chemically coupled to a murine antiDTPA-(In) antibody to form a BsMAb fragment (i.e., Fab' x Fab' or F(ab')2 x Fab'). Preclinical studies have already shown this BsMAb targeting method together with a technetium-binding di-DTPA peptide can localize colon cancer xenografts within 1 hour of the peptide's injection. Clinical studies will first examine parameters designed to optimize this approach using 99mTc-peptide (gamma-imaging method). Once the methodology has been optimized clinically, future studies (not included in this application) will begin to focus on a larger cohort of patients to test the targeting efficacy using the 99mTc-labeled peptide, but we would also propose to initiate development of a PET imaging system using this same methodology and possibly 94TnTc.

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- **Project Title: INFLAMMATION AND IMMUNITY IN DILATED CARDIOMYOPATHY**

  Principal Investigator & Institution: Cooper, Leslie T.; Mayo Clinic Coll of Medicine, Rochester 200 1St St Sw Rochester, Mn 55905

  Timing: Fiscal Year 2004; Project Start 01-JUL-2004; Project End 30-JUN-2005

  Summary: (provided by applicant): This is an application for partial funding of an American Heart Association sponsored workshop on "Inflammation and Immunity in Dilated Cardiomyopathy" to be held in May 2004 at the Hyatt Hotel in Bethesda, Maryland. The objective of this meeting is to bring together internationally-recognized experts in the fields of virology, cardiac pathology, cardiac molecular immunology, **diagnostic imaging,** epidemiology, and clinical trial design to discuss the current understanding of the pathogenesis, diagnosis and treatment of dilated cardiomyopathy(DCM). Specific efforts have been made to ensure the participation of women and underrepresented minorities. The specific aims of this workshop are 1) to review the current understanding of cardiac inflammation and immunity as related to DCM at the cellular and molecular level, and to identify the most promising and critical areas for future clinical research efforts in the field. 2) To disseminate the workshop recommendations through publication and webcast. A copy of the final report will be provided to the NHLBI and Office of Rare Diseases (ORD) staff to help in the development of future programs. Dilated cardiomyopathy (DCM) is an important cause of heart failure with an estimated prevalence of 36 cases per 100,000 in the USA. Over the past 12 years since the last NHLBI-sponsored workshop on this subject, there has been increasing evidence that abnormalities in cellular and humoral immunity contribute to the pathogenesis of DCM. However, these advances in the understanding of the pathogenesis and pathophysiology of DCM have not affected clinical diagnosis and treatment. Therefore, it is timely to organize a workshop to review the advances of the past decade in cardiac immunopathology as they impact the diagnosis and treatment of DCM. The long-term overall goal of this workshop is to translate advances in molecular and cellular mechanisms of disease into improvements in the diagnosis and treatment of patients with DCM.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: LABELING OF OCTREOTIDE WITH POSITRON EMITTERS**

  Principal Investigator & Institution: Anderson, Carolyn J.; Associate Professor; Radiology; Washington University Lindell and Skinker Blvd St. Louis, Mo 63130

  Timing: Fiscal Year 2002; Project Start 18-JUL-1994; Project End 31-AUG-2003

  Summary: The goal of this proposal is to test two hypotheses regarding the use of radiolabeled peptide hormone receptor ligands for positron emission tomography (PET) imaging and targeted radiotherapy. We have demonstrated the effectiveness of 64Cu (T1/2 = 12.8 h) as a radionuclide for PET imaging and targeted radiotherapy in animal models. From the evaluation of a series of four somatostatin receptor (SSR) analogs, we have determined the optimal peptide sequence for high target uptake (Tyr3-octreotate (Y3-TATE)). In this proposal we will focus on how the structure of the bifunctional chelate (BFC) affects accumulation of activity in target and non-target organs. We will accomplish this by determining the metabolites of 64Cu-labeled BFC-Y3-TATE in vivo in non-target organs and in tumors, as well as the subcellular metabolism in xenografted tumors and tumor cells grown in culture. The first hypotheses we will address is that copper complexes that are the most difficult to reduce will demonstrate favorable clearance as Y3-TATE conjugates, compared to more easily reduced Cu(II) complexes.

Our second hypothesis is that dissociation of 64Cu from the BFC-SSR analog may be advantageous in tumor cells, since 64Cu binding to nuclear proteins or DNA may increase its effectiveness of cell killing. Understanding the factors governing the retention of 64Cu in target and non-target tissues will aid us in the design of agents that have either more rapid non-target organ clearance or longer residence time in target tissues, or both. Depending on the clinical situation, there is a need for various imaging/therapy radionuclide pairs for diagnosing and treating cancer, including 86Y/90Y, 124I/131I, and 64Cu/64Cu (or 61Cu/64Cu). The second objective of this proposal is to use PET imaging to determine dosimetry and tumor response of DOTA-D-Tyr1-octreotate (DOTA-DY1-TATE) labeled with therapeutic amounts of iodine, yttrium and copper isotopes. Using a microPET scanner, which is a high resolution, small-bore PET scanner specifically designed for small animal imaging, we can first determine tumor and normal organ dosimetry, and then monitor the therapeutic response to radiolabeled DOTA-DY1-TATE. Accomplishing this goal will allow us to compare three therapeutic radionuclides labeled to the same agent with respect to efficacy and tumor absorbed dose, and also enable the non-invasive monitoring of non-subcutaneous tumors, such as liver metastases. The research proposed here will provide an understanding of the biological behavior of Cu(II) complexes, which is of importance to the field of **diagnostic imaging** and targeted radiotherapy with copper radionuclides. The research proposed here will also contribute to the development of new radionuclides for PET and targeted radiotherapy, and further the use of PET as a diagnostic modality prior to and during radiotherapy.

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- **Project Title: LESION CHARACTERIZATION**

  Principal Investigator & Institution: Schnall, Mitchell D.; Associate Professor; University of Pennsylvania 3451 Walnut Street Philadelphia, Pa 19104

  Timing: Fiscal Year 2002; Project Start 06-SEP-2002; Project End 31-AUG-2003

  Summary: Current breast cancer screening includes mammography and clinical examination. Findings from screening that are referred to biopsy after final mammographic workup are malignant in approximately 20-30% of the cases. The low specificity of diagnostic mammography has led to the development of alternative imaging tools for distinguishing benign from malignant lesions in the breast. Tools such as digital mammography, ultrasound, MRI, optical imaging, and PET have been suggested and preliminary data suggest promise in improving diagnostic accuracy over film screen mammography alone in all cases. There are few data on the relative diagnostic performance of these newer studies. Furthermore, little is known about the correlation between findings from the different imaging modalities or the value of combinations of **diagnostic imaging** modalities. Research teams at the University of Pennsylvania have been developing **diagnostic imaging** protocols in all of these technologies. This proposal represents a unique collaboration between the individual modality teams to study the relative performance and interaction between proposed **diagnostic imaging** undergo an imaging battery consisting of Digital Mammography, Ultrasound, Optical Imaging, MRI and in years 3-5 PET performed with a dedicated breast scanner. Patients will be characterized with respect to mammographic density, presenting mammographic or clinical finding, compliance with mammographic screening and other characteristics relevant to breast cancer risk and imaging performance. In addition to quantifying the relative diagnostic performance of these modalities, individual features extracted by human observers will be studied for reliability and predictive value. Interpretation models for individual imaging modalities

and selected groups of imaging modalities will be developed. Strategies for multi-modality diagnostic work ups for different patient strata will be developed.

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- **Project Title: LIVER TRANSPLANTATION FOR HEPATOCELLULAR CARCINOMA**

  Principal Investigator & Institution: Freeman, Richard B.; Associate Professor of Medicine; New England Medical Center Hospitals 750 Washington St Boston, Ma 021111533

  Timing: Fiscal Year 2004; Project Start 01-JUL-2004; Project End 30-JUN-2006

  Summary: (provided by applicant): Surgery remains the only curative option for hepatocellular carcinoma (HCC) but most affected patients have underlying liver disease that limits the extent of resection. Thus, liver transplantation has become an attractive option for treatment of HCC and several single center studies have reported excellent survival rates. In response, the US liver allocation system was changed on February 27,2002 to give a higher priority to patients with HCC meeting entry criteria employed in these studies. Because liver allocation policy is now based on assigning priority to candidates with HCC according to their estimated risk of progression beyond the favorable stages (so called "drop out' rate), data describing the rate of progression, natural history, and appropriate diagnostic' modalities, are essential for formulating this policy. The new policy and data collection instruments make it possible to analyze a cohort of patients with HCC that is an order of magnitude larger than any previously examined. The overall goal of this proposal is to exploit this very large database to provide clinicians with an improved understanding of the accuracy of pre-operative staging for HCC, the efficacy of pre-transplant ablative treatments for HCC, as well as provide policy makers with much more accurate risk models on which to base better, evidence based liver allocation policy. To address the issues of pre-operative staging accuracy, we hypothesize that MRI defined HCC stage pre-operatively in liver transplant candidates has a better correlation with histologically defined stage compared with other imaging modalities. Our specific aim is to determine which **diagnostic imaging** test correlates best (as measured by area under the receiver operating curve [Az]) with pathologic stage using clinically based assessment of images. To address the efficacy of pre-transplant ablative procedures, we hypothesize that HCC liver transplant candidates with presenting tumors that were clinically down staged by application of ablative treatment within a ear of transplant have patient and graft survival rates equal to candidates who had no ablative treatments and met the clinical staging inclusion criteria. Our specific aim is to determine if tumors larger than clinical stage II that are down staged by pre-transplant ablative treatments behave as the downstaged tumor size. A secondary aim of this analysis is to determine if pre-transplant ablative treatments have any effect on drop out rates and/or post-transplant survival. Finally, the recent decrease in priority for HCC candidates will be used to assess drop out rates that will inform development of refined mathematical models that more accurately predict tumor progression and drop out rates from the liver transplant waiting list. Our specific aim is to improve the calculation of waiting list priority based on the risk of tumor progression using our established Markov Model techniques to more accurately assign priority for liver transplant candidates with HCC relative to candidates with chronic liver disease. Results from this project will improve the care of patients with HCC and provide evidence for more equitably allocating the scarce donor resource. Furthermore, these analyses will serve to support future developments of prospective clinical trials.

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- **Project Title: MAGNETIC RESONANCE ELASTOGRAPHY**

  Principal Investigator & Institution: Ehman, Richard L.; Professor; Mayo Clinic Coll of Medicine, Rochester 200 1St St Sw Rochester, Mn 55905

  Timing: Fiscal Year 2003; Project Start 05-JUL-1997; Project End 31-MAY-2008

  Summary: (provided by applicant): It has long been known that malignant tumors are often characterized by substantially different mechanical properties than surrounding normal tissue. This accounts for the efficacy of palpation as a clinical technique to detect cancer in accessible regions of the body. Indeed, most tumors of the thyroid, breast, and prostate are still first detected by this centuries-old diagnostic technique. Unfortunately, small or inaccessible lesions cannot be detected by touch, and conventional **diagnostic imaging** methods such as ultrasound, **computed tomography** (CT), and **magnetic resonance imaging** (MRI) do not provide information that is in any way analogous. The goal of this proposal is to continue to develop and validate a **diagnostic imaging** technique for quantitatively delineating mechanical properties of tissues. The technique applies mechanical waves to tissue and measures regional elasticity by analyzing the pattern of wave propagation. A critical component of this approach is sensitive MRI method for directly observing propagating acoustic waves in tissue, using an MRI sequence with synchronous motion-sensitizing gradients. The central hypothesis of this work is that the proposed technique can be successfully implemented as a practical scientific and clinical tool and that it will be useful for detecting and characterizing focal and diffuse disea.se processes that may be difficult to investigate by other methods. The research plan includes investigations in the following areas (1) improving the MR acoustic wave imaging technique, (2) developing effective methods for applying acoustic waves to tissue, (3) devising mathematical algorithms for processing the wave data, and (4) conducting pilot studies of selected applications of the new technology. The research plan in this continuation will again encompass theoretical work, basic MRI pulse sequence development, device engineering, studies of animal and human tissue specimens, and trials with normal and patient volunteers. Further progress is expected to provide an increasingly useful imaging tool with capabilities to: (1) noninvasively "palpate by imaging" regions of the body that are beyond the reach of the physician's hand, (2) delineate tumors before they are large enough to detect by touch, (3) provide greater sensitivity for assessing changes in tissue elasticity, and (4) provide a useful new quantitative scientific tool for characterizing tissue.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: MAGNETIC RESONANCE IMAGING OF BREAST CANCER**

  Principal Investigator & Institution: Daniel, Bruce L.; Radiology; Stanford University Stanford, Ca 94305

  Timing: Fiscal Year 2002; Project Start 01-AUG-1997; Project End 28-FEB-2006

  Summary: (provided by applicant): Contrast-enhanced **magnetic resonance imaging** (MRI) detects breast cancer with very high sensitivity. MRI is potentially very attractive as an adjunct screening method for detecting occult tumors in women who are identified with a high risk of breast cancer. The success of screening MRI hinges not only on its high sensitivity, but also on minimizing the complexity and duration of the exam. It must also achieve the highest possible specificity in order to minimize the number of false positive lesions that are detected and must be worked up. The long-term objective of our research is to develop a fast, practical screening MRI method that

delivers the highest performance, most accurate imaging method available. The major objective of this proposal is to develop and clinically evaluate an easily prescribed, quick bilateral version of a previously developed unilateral method of obtaining both rapid dynamic and high spatial resolution contrast-enhanced breast MRI data. The first specific aim, technology development, includes new methods for bilateral breast shimming, bilateral water-selective spectral-spatial excitations, and bilateral simultaneous image acquisition. Subsequently, an integrated acquisition will be developed to obtain both high spatial resolution and rapid dynamic images using the same spiral pulse sequence. Finally, a new web-based breast MRI interpretation tool will be developed that uses 3D volume rendering of high spatial resolution images that are colorized with pharmacokinetic measures of tumor angiogenesis to simplify and speed-up breast MR image interpretation by radiologists. The second specific aim, clinical evaluation, will measure the image quality and diagnostic accuracy of the new bilateral technique, compared to the benchmark unilateral method. In addition, a pilot screening trial will be started, with the limited objective of proving that the high performance integrated bilateral 3D spiral method generates fewer false positive lesions than current dynamic-only or high resolution-only screening approaches. When completed, these aims will produce a very powerful screening tool for breast cancer that is simple to perform. Data collected by this proposal will pave the way for future full-scale screening trials that will prove the superior efficacy of the technique. By simplifying the exam and minimizing the risk of false-positive lesions, this technology could potentially benefit a great number of women than current protocols that are targeted only at women at very high risk.

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- **Project Title: METHODS FOR QUALITY ASSURANCE OF LESION/CANCER MARKING**

  Principal Investigator & Institution: Qian, Jianzhong; President and Ceo; Edda Technology, Inc. 3 Oxford Ct Princeton Junction, Nj 085501810

  Timing: Fiscal Year 2004; Project Start 01-APR-2004; Project End 31-MAR-2005

  Summary: (provided by applicant): The NIH/NCI PAR-03-125 invites applications in system software methods that "could include a variety of image processing and data reduction techniques including temporal analysis of serial studies, close to real-time image processing, novel image display methods, and related imaging informatics for more cost-effective solutions for screening." The significance of such applications is also due to the fact that **diagnostic imaging** does not end at images from the imaging devices. A diagnostic report through the physicians viewing and interpreting the images is a much crucial part of the process and the quality of the cancer and lesion marking is the core of that part. There are needs to research, develop, and commercialize efficient software systems to improve the quality and consistency of the lesion/cancer marking process, either in clinical practice, cancer/lesion data base development, or educational training of radiologists. So far, however, there is no single system dedicated to meet the challenge these needs present. We proposed, therefore, a novel system and associated methods that integrate advanced real-time interactive and automatic image analysis technologies in both the temporal and spatial domains for improving the consistency of lesion/cancer marking and characterization. The research will advance the state of the art in computational technology applied cancer **diagnostic imaging** research, and is expected to have broad applications to cancer early detection and screening as well as quality assurance in cancer informatics applications. This research should also help to understand both the common behavior across and variations between radiologist's

decision making. This interdisciplinary research will benefit the radiology community, information science, and CAD technology developers in the health care industry. This research needs reasonable patient data for clinical experiments. The National Lung Image Database Consortium (LIDC) has generally expressed its interests in such R&D activities described above and will make its first data set available in the middle of the next year for our experiments, if the project is funded. The success of this project would be a good showcase for the LIDC and the useful system tools resulted from this project would be helpful for the quality assurance in the LIDC data base development. In this consideration, we are willing to share our clinical experimental results in this project with the community.

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- **Project Title: MULTISPECTRAL DIAGNOSTIC IMAGING OF THE IRIS**

  Principal Investigator & Institution: Lukic, Ana S.; Predictek, Llc. 4440 Edmund Blvd Minneapolis, Mn 55406

  Timing: Fiscal Year 2004; Project Start 01-JUL-2004; Project End 30-JUN-2005

  Summary: (provided by applicant): The objective of this project is to develop an initial prototype of a new **diagnostic imaging** device for use by eye care practitioners. Research in this Phase I SBIR project will focus on feasibility issues relating to technical development of the imaging instrumentation and image processing approaches required. If successful, the proposed instrument will permit visualization of eye disease in cases where detection is difficult or impossible by currently available technology. Specifically, the instrument we envision will detect, quantify, and report information obtained by multispectral imaging of the iris using visible and near-infrared transillumination (i.e., light directed through the skin, then reflected out through the iris from within the eye). Visible-light transillumination, with visual evaluation by the practitioner, is routinely used in clinical practice. However, this approach suffers from low sensitivity, especially when the subject has dark-colored irides and/or when the disease is in its early stages or is otherwise subtle. We propose that multispectral digital imaging, with automated image analysis, will be a major step forward for evaluation of diseases of the iris. The anticipated advantages of this approach lie not only in improved diagnostic performance, but also in the benefits offered by digital imaging, including automated image analysis, archiving and reporting of results, and longitudinal tracking of disease progression. The device is expected to have clinical importance for the following disorders: pigmentary dispersion syndrome and secondary glaucoma, Fuchs' heterochromic iridocyclitis, ocular albinism in infants, and iridociliary cysts.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: MULTIVARIATE METHODS FOR EVALUATING DIAGNOSTIC SYSTEMS**

  Principal Investigator & Institution: Toledano, Alicia Y.; Assistant Professor; Ctr for Statistical Science; Brown University Box 1929 Providence, Ri 02912

  Timing: Fiscal Year 2002; Project Start 01-JUL-1998; Project End 30-JUN-2004

  Summary: The proposed research will investigate and generate methods for the evaluation of multiple correlated diagnostic test results. The biostatistical methods themselves are applicable to diverse fields. This application will focus on analysis of receiver operating characteristic (ROC) curves generated from **diagnostic imaging** studies. ROC analysis is used to compare the capacities of imaging systems (i.e., combination of imaging modality and reader) to discriminate between actually positive

and actually negative cases. **Diagnostic imaging** studies commonly use designs in which each case is imaged with multiple modalities and each image is interpreted by several radiologists independently, to increase the power of comparisons of discrimination capacities across modalities and to learn about variation in discrimination capacity across readers. The discrimination capacity of an imaging system can also depend on characteristics of cases. The overall goal of this research is to create innovative statistical methods for evaluating medical diagnostic tests that will be practical for use in the real world. First, multivariate ordinal regression models will be developed that allow discrimination capacity to depend on characteristics of cases while allowing inferences to generalize to populations of readers (random effects). Second, multivariate ordinal regression methods that can accommodate the types of missing data that arise in repeated measurements studies will be developed. Finally, issues of study design and performance of multivariate ordinal regression models in studies with small to moderate sample sizes will be investigated. The ordinal regression models used in this research will employ a multiplicative predicator such that both the height and summetry of the ROC curve can depend on characteristics of cases and/or readers. The proposed research requires difficult innovations in biostatistical methodology for the analysis of multivariate ordinal categorical data. The development of new methods and generation of new ideas and insights will have a significant impact in both the medical and the biostatistical communities on research in methods for evaluating diagnostic tests.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: OPTICAL BIOPSY USING OPTICAL COHERENCE TOMOGRAPHY**

  Principal Investigator & Institution: Fujimoto, James G.; Professor of Pharmacology; Center for Cancer Research; Massachusetts Institute of Technology Room E19-750 Cambridge, Ma 02139

  Timing: Fiscal Year 2002; Project Start 05-SEP-1997; Project End 31-AUG-2004

  Summary: (Adapted from Applicant's Abstract): This is a multidisciplinary collaborative program involving researchers at the Massachusetts Institute of Technology, Harvard Medical School, Massachusetts General Hospital, Brigham and Women's Hospital, and the National Cancer Institute. The hypothesis of this proposal is that optical coherence tomography (OCT), an emerging biomedical **diagnostic imaging** technology for in situ imaging of tissue microstructure, can be developed and applied for "optical biopsy," the real time, in vivo differentiation and monitoring of early neoplastic changes. This program integrates the development of new technology with its application to fundamental and clinical studies in oncology. The applicants propose to: 1. Develop ultrahigh resolution, spectroscopic, and Doppler OCT technology which extends the current 10-15 (m image resolution to the 1-2 (m level. This is a quantum leap in performance which will significantly improve imaging of architectural morphology and facilitate imaging of cellular features for identifying early neoplastic changes. Spectroscopic and Doppler OCT could enable functional imaging of tissue on a micron scale. 2. Develop delivery instruments for OCT which allow noninvasive or minimally invasive clinical imaging. These include a catheter/endoscope, colposcope, hysteroscope, hand held probe, and needle. 3. Investigate OCT imaging of early neoplastic changes and cancer progression in an animal model to define markers of dysplasia and to develop quantitative assessments of vascular density. A noninvasive, real time technique for quantitating angiogenesis can be a powerful research tool for the development of anti-angiogenesis agents. 4. Investigate OCT imaging in the female reproductive tract including the cervix and endometrium. The cervix is an excellent in

vivo model system to establish markers of dysplastic change. Hysteroscopic OCT imaging of the uterus could improve the detection of endometrial dysplasia and cancer. 5. Investigate OCT imaging of dysplasia and leukoplakia of oral mucosa and chemoprevention treatment. Approaches to quantitatively assess response to chemoprevention would be important tools for pharmacological trials. 6. Investigate OCT imaging of the GI tract. Explore the feasibility of OCT for differentiating dysplasia and adenocarcinoma of the esophagus to guide conventional excisional biopsy and reduce false negative rates. Develop OCT as a low cost screening technique for Barrett's esophagus. Taken together, these studies will provide new imaging tools for oncology research and also develop new clinical diagnostic and screening techniques.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: PARTNERSHIP FOR MR SPECTROSCOPIC IMAGING DATA PROCESSING**

  Principal Investigator & Institution: Maudsley, Andrew A.; Professor; Radiology; University of Miami-Medical Box 248293 Coral Gables, Fl 33124

  Timing: Fiscal Year 2002; Project Start 01-JUL-2002; Project End 30-JUN-2007

  Summary: (provided by applicant): MR Spectroscopic Imaging (MRSI) enables non-invasive measurement of a number of tissue metabolite distributions and offers considerable potential as a **diagnostic imaging** technique. Widespread adoption of MRSI has been limited by complex requirements for data processing and analysis, which optimally require close integration of known spectral and spatial information, including MRI-derived tissue segmentation, morphological analysis, metabolite NMR characteristics, and detailed knowledge of normal tissue metabolite distributions. This Biomedical Research Partnership will address this limitation and increase the effectiveness of MRSI by developing an integrated set of data processing tools that emphasizes considerable automation and suitability for routine **diagnostic imaging** studies. This effort will combine multiple areas of expertise in MRSI and MRI data processing under 5 projects located at 4 institutions. Software tools will be developed for automated MRSI processing, tissue segmentation, brain region mapping, statistical analysis, and clinical presentation. The resultant technical developments will then be shared among several partners at collaborating medical research centers in the U.S.A., Europe, and Japan, where the package will be evaluated for diagnostic neuroimaging applications, with an emphasis on 1H MRSI of cancer, epilepsy and neurodegenerative disease. Results from metabolite imaging studies will be converted to standardized intensity units and transformed into normalized spatial coordinates, enabling the data to be pooled to form a database of MR-measured human metabolite values as a function of acquisition, spatial, and subject parameters. This information will then be used to enhance statistical analysis of individual MRSI studies. The developed methods will facilitate increased use of MRSI for **diagnostic imaging,** encourage the development of standardized MRSI acquisition, processing, and analysis methods, and map metabolite distributions in human brain.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: PATIENT MOTION DETECTION AND COMPENSATION IN SPECT**

  Principal Investigator & Institution: King, Michael A.; Professor of Radiology; Radiology; Univ of Massachusetts Med Sch Worcester Office of Research Funding Worcester, Ma 01655

  Timing: Fiscal Year 2003; Project Start 01-JUN-2003; Project End 31-MAY-2008

Summary: (provided by applicant): Patient motion is an ever-present potential cause of artifacts that can limit the accuracy of **diagnostic imaging.** The problem is especially significant for imaging modalities such as SPECT and PET, which require the patient to remain motionless for protracted periods of time. Compensation strategies for motion that rely exclusively on the emission data itself, although commercially available, are inadequate for robust clinical usage. The goal of the proposed investigations is to determine if information from a visual-tracking-system will provide a robust compensation for patient motion as part of iterative reconstruction. By visual-trackingsystem it is meant a computational system that processes stereo-images taken by optical cameras thereby providing a source of motion information that is independent of the SPECT system. Motion of the chest and abdomen will be determined by tracking the locations of a pattern that is part of a stretchy garment wrapped about these portions of the patient. The types of patient motion for which compensation will be investigated with the visual-tracking-system are rigid-body motion, non-rigid-body motion, respiratory motion, upward-creep of the heart, and motion between sequential emission and transmission, CT or MRI imaging. The ultimate test of the success of the visual-tracking-system based compensation will be physician-observer ROC studies comparing the detection accuracy of coronary artery disease with and without motion compensation for patients undergoing SPECT perfusion imaging. The first specific aim is to perfect the visual-tracking-system and determine its accuracy for tracking rigid-body motion. The second specific aim is to modify the visual-tracking-system to include compensation for respiratory motion, and upward-creep of the heart. The third specific aim is to investigate the need for non-rigid-body motion, and whether the motion of the locations in the pattern on the garment can predict the internal motion of structures when coupled with knowledge of the individual patient's anatomy from multi-modality imaging on the same imaging bed. The fourth specific aim is to develop a motion-compensation algorithm that employs the information from the visual-tracking-system to compensate for the above motions as part of list-mode iterative reconstruction. The fifth specific aim is to determine whether the visual-tracking-system and motioncompensation algorithm are able to improve the diagnostic accuracy of cardiac-perfusion SPECT imaging as determined by human-observer ROC studies with clinical images.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: PEDIATRIC ONCOLOGY GROUP**

  Principal Investigator & Institution: Castleberry, Robert P.; Professor of Pediatrics; Pediatrics; University of Alabama at Birmingham Uab Station Birmingham, Al 35294

  Timing: Fiscal Year 2002; Project Start 01-MAR-1979; Project End 31-DEC-2002

  Summary: The University of Alabama at Birmingham (UAB) is a leading contributor to the ongoing clinical and basic research activities of the Pediatric Oncology Group (POG) which are focused upon improving the care and cure for children with cancer. Current results of these trials are in some cases already published and are available in the Progress Report. The leadership from UAB in POG is evident in several areas: l) through enrollment of substantial numbers of assessable patients on Phase I, II and III therapeutic trials, including multidiscipline (surgery, chemotherapy, and radiotherapy) management studies; through participation in and development of Group-wide biological studies of selected hematopoietic and solid malignancies; through evolving, coordinating and reporting data from POG therapeutic trials; and by providing discipline and disease committee, and administrative leadership within the group. UAB will continue to enroll all eligible patients on active POG therapeutic and biological

studies, including phase I investigations, and maintain high evaluability. UAB investigators will continue to coordinate clinical trials for children with neuroblastoma, bone tumors, and juvenile chronic myelogenous leukemia (JCML) and to assess the therapeutic utility of IL6. Further, UAB investigators will be principal to the development of new studies in neuroblastoma, brain tumors, JCML and acute myelogenous leukemia. UAB will continue to supervise laboratories for POG in the following areas: 1) Banded chromosomal analysis in newly diagnosed patients with lymphoid leukemia; 2) A required reference laboratory for children with JCML (POG #9265) studying the pathogenesis of myeloproliferation; 3) A required serum/plasma repository (POG #9047) with clinical and demographic data referenced on a computer data base; and 4) A non- mandatory reference laboratory to evaluate the biological and clinical significance of rnicrotubular associated protein (MAP) and tubulin isotype expression in neuroblastoma. UAB investigators will continue their scientific and administrative leadership roles on the Neuroblastoma and Other Embryonal Tumors, Myeloid Disease Core, Biologic Response Modifier Core, Executive, Principal Investigator Core, Clinical Research Associate Core, and **Diagnostic Imaging** Core Committees.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: PHAGE DISPLAY FOR PROSTATE, BREAST, AND OVARIAN TUMOR IMAGING AGENTS**

  Principal Investigator & Institution: Deutscher, Susan L.; University of Missouri Columbia 310 Jesse Hall Columbia, Mo 65211

  Timing: Fiscal Year 2003; Project Start 01-AUG-2003; Project End 31-JUL-2008

  Summary: (Revised Abstract) (provided by applicant): Carcinomas, including those of the prostate, breast, and ovary account for over 80,000 annual fatalities in the United States. While treatable in their earliest forms, these cancers are difficult to detect early and are often lethal once metastasis has occurred. Thus, routine screening and early detection are critical practices. Existing screening and diagnostic methods do not detect a large proportion (over 30%) of these cancers. Thus, new means for diagnosis and therapy are essential in meeting this health care challenge. We propose that molecules able to specifically target surface antigens of prostate, breast, and ovarian carcinomas will lead to improved detection and treatment modalities. Molecules that target cancer cells have been identified previously; however, agents selected in vitro often behave poorly in vivo. We hypothesize that development of cancer imaging agents with optimal binding properties (i.e. affinity, specificity) as well as in vivo stability and targeting propensity will be effectively realized through a combination of synthetic and novel in vivo combinatorial chemical approaches. To this end, we previously exploited combinatorial bacteriophage (phage) display technologies to isolate an assortment of peptides that bind tumor-associated antigens. Targeted antigens include the Thomsen-Friedenreich (TF) glycoantigen and the ErbB-2 receptor - both overexpressed on the surface of prostate, breast, and ovarian adenocarcinomas, and prostate specific membrane antigen (PSMA), overexpressed on prostate carcinomas. The Specific Aims of this application involve convergent approaches to improve the efficacy of peptides that target the tumor-associated antigens TF, ErbB-2 and PSMA for in vivo **diagnostic imaging** applications. First, tumor-targeting ability of the peptides will be improved through chemical coupling of multi-valent peptides with specificities for different receptors such as the TF antigen and PSMA. Secondly, superior peptide sequences for in vivo applications will be defined through affinity maturation of phage display libraries enriched in tumor-avid consensus sequences in vivo in tumor-bearing mice. Peptides

with desirable stability and distribution properties will emerge due to the very nature of their selection from carcinomas in vivo. Lead peptides will be radiolabeled with 99mTc or 111In by incorporation of selected metal chelation moieties within the peptide structure. Alternatively, phage bearing the tumor-avid peptides will be labeled and explored as novel imaging agents. Pharmacokinetic evaluation of these peptides and phage in human tumor xenograft mouse models of prostate, breast, and/or ovarian cancer, coupled with diagnostic scintigraphic imaging, will identify the optimum tumor targeting radiolabeled peptide(s).

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: POSTMORTEM NEUROCHEMICAL STUDIES IN SUICIDE**

  Principal Investigator & Institution: Arango, Victoria; Associate Professor; New York State Psychiatric Institute 1051 Riverside Dr New York, Ny 100321098

  Timing: Fiscal Year 2002; Project Start 01-FEB-1990; Project End 30-JUN-2006

  Summary: (Verbatim from the Applicant's Abstract) Suicide has biological and psychosocial components. We have evidence consistent with lower serotonergic activity in the prefrontal cortex (PFC) of suicide victims and in individuals with a history of a Major Depressive Episode (MDE). We found fewe serotonin transporter (SERT) sites in the ventral PFC in suicides, while patients with MDE have a widespread reduction in SERT throughout the PFC. In suicide, 5-HT1A receptors are increased in the ventral PFC, but are not significantly altered in MDE. The dorsal raphe nucleus (DRN) contains the serotonin neurons that innervate the forebrain. We found that suicide victims have more serotonergic neurons in the DRN, suggesting the reduced serotonergic activity in suicides is not due to a loss of serotonin neurons. In depressed suicides, we observe less SERT and less 5-HT1A binding in the DRN. The reduction in SERT sites is accompanied by reduced SERT mRNA in the entire DRN of suicides and fewer neurons expressing SERT mRNA. Despite more neurons, there is evidence of hypofunction (lower brainstem and CSF 5-HIAA). In the next funding period we propose to further differentiate the anatomical distribution and molecular components o abnormalities associated with suicide compared with major depression. We have four specific aims: 1) To determine levels of the rate-limiting, 5-HT biosynthetic enzyme (TPH). We will do this by immunoautoradiography and HPLC analysis in the DRN. 2) Determine whether the amount of mRNA for the SERT and 5-HT1A receptor are altered and parallel the respective protein levels. We will measure both receptor binding and mRNA in the DRN. 3) Examine the integrity of 5-HTIA and 5-HT2A receptor G-protein coupling. We will measure agonist-stimulated GTPyS binding in PFC. 4) Quantify neuronal and glial elements in the PFC. We will use stereology to measure the cell density in the ventral PFC, thus obtaining SERT terminals/5-HT1A binding per cell. We will perform these studies in matched triplets of depressed suicides (n= 15), nondepressed suicides (n=1 5) and nonpsychiatric controls (n=15). To further separate the effects of MDE from suicide, we will examine a second group of matched triplets with depressed nonsuicide (n=8), depressed suicide (n=8) and normal controls (n=8). The studies proposed will be the first comprehensive examination of serotonergic receptors, neuronal integrity and gene expression in the PFC and brainstem in suicide and MDE. We propose to establish whether there is a localized, biochemically specific alteration in the serotonergic system underlying suicidal behavior, independent of Major Depression. Such a conclusion would have profound consequences for conceptualizing the basis of suicidal behavior as well as the development of **diagnostic imaging** tests and effective, specific pharmacotherapy of suicide, the cause of death of over 30,000 people per year in the United States.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: PROTON MR SPECTROSCOPIC IMAGING IN HUMAN BREAST CANCER**

  Principal Investigator & Institution: Barker, Peter B.; Associate Professor; Radiology; Johns Hopkins University 3400 N Charles St Baltimore, Md 21218

  Timing: Fiscal Year 2002; Project Start 01-SEP-2001; Project End 31-DEC-2003

  Summary: (provided by applicant): Breast cancer is the most common form of cancer in women. In the year 2000, it is predicted that approximately 180,000 new cases of breast cancer will be diagnosed in the United States, and 40,000 women will die from the disease. The key to successful treatment of breast cancer is early diagnosis, and the use of widespread mammography screening has resulted in significant improvements in breast cancer survival rates. However, a major problem with mammography is a lack of specificity; 70-80% of suspicious lesions on mammography referred for biopsy ultimately have a benign final diagnosis. These "unnecessary" biopsies represent a significant economic burden on health care systems, and are also invasive and unpleasant for the patient. Therefore, there is a need for the development of new non-invasive, cost-effective, and safe imaging procedures with enhanced specificity and sensitivity. Proton MR spectroscopic imaging (MRSI) is a non-invasive metabolic imaging technique, which has yet to be applied to human breast cancer. Preliminary data from our group and others, based on cell preparations, in vitro studies and single-voxel human spectroscopy, suggest that an elevated composite choline signal (detected in the proton MR spectrum) is a marker of malignant breast disease. Benign lesions and normal breast tissue have little or no detectable choline signal. However, technical developments are required before proton MRSI can become a clinical procedure for evaluating breast cancer. These include maximizing spatial resolution, optimizing water and lipid suppression techniques, development of quantitation methodology, and providing whole breast coverage within a clinically acceptable scan time. We will develop and test these techniques in years one and two of this proposal (phase I, R21), and in years 3 and 4 (phase II, R33) we will apply these techniques to a trial of proton MRSI in human breast cancer. Specifically, choline levels will be compared between histologically defined tissue types, in patients who are scheduled for breast biopsy. The sensitivity and specificity of proton MRSI in this patient group will be determined. The techniques developed in this proposal will also assist in the translation of proton MRSI to other organ systems and pathologies, and increase the acceptance of clinical proton MRSI as a **diagnostic imaging** modality.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: RADIATION DOSE REDUCTION IN X-RAY COMPUTED TOMOGRAPHY**

  Principal Investigator & Institution: Whiting, Bruce R.; Radiology; Washington University Lindell and Skinker Blvd St. Louis, Mo 63130

  Timing: Fiscal Year 2002; Project Start 08-APR-2002; Project End 31-MAR-2004

  Summary: X-ray **computed tomography** (CT) is invaluable in modern health care. Because of its relatively high radiation dose, CT now accounts for a disproportionate amount of medical-based radiation. Although a reduction in dose for CT examinations is possible and would reduce somatic and genetic risk, dose reduction results in the loss of some image quality. The degree of dose reduction possible without deleteriously affecting diagnostic performance for CT is unknown. This is because it is either practical

nor ethical to perform multiple exposures of patients to study how diagnostic performance varies with dose reduction. We plan to overcome this problem by developing a software-based simulator for evaluating dose reduction. With this simulation environment, we will use existing CT scans to retrospectively generated reduced-dose CT images, allowing expert observers to determine optimal dose levels. Our long- term goal is to reduce the radiation dose involved with CT. Our central hypothesis is that simulations will produce realistic low-dose CT images that can support a scientific framework for establishing lower-dose clinical protocols. Our objective in this application is to determine the feasibility of using our dose-reduction simulation software in studies of diagnostic performance. The following specific aims are proposed: 1) implement and validate dose-reduction simulation software for clinical CT imaging; 2) assess potential radiation dose reduction for CT while maintaining diagnostic confidence; 3) perform a pilot ROC study to establish the parameters required for measurements of diagnostic performance versus radiation dose level. The use of our dose-reduction software simulator is innovative in that currently there is no practical method available for studying the effects of CT dose reduction on diagnostic performance with clinical patients. Accomplishing these objectives will enable us to define a systematic research program for establish clinical dose-reduction protocols.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: RADIOPHARMACEUTICALS FOR BREAST TUMOR IMAGING & THERAPY**

  Principal Investigator & Institution: Katzenellenbogen, John A.; Professor; Chemistry; University of Illinois Urbana-Champaign Henry Administration Bldg Champaign, Il 61820

  Timing: Fiscal Year 2002; Project Start 01-JAN-1984; Project End 31-DEC-2003

  Summary: Most breast tumors contain estrogen receptors (ER) that regulate tumor cell growth and mediate the action of estrogen antagonists such as tamoxifen. Not all breast cancers, however, respond to hormone therapy. Therefore, it is important to have effective prognostic tools that will identify those patients most likely to be hormone responders, so that they can be treated with this well tolerated therapy, whereas those unlikely to respond can promptly begin regimens of radiation of chemotherapy. The presence of ER in most breast tumors provides a mechanism for selective localization of estrogens, which if labeled with suitable radionuclides, could be used for **diagnostic imaging** or radiotherapy or breast tumors. During past periods of support on this project, we have developed a series of estrogens labeled with fluorine-18 and carbon-11, some of which are effective agents of imaging estrogen receptor positive (ER+) tumors. Other investigators have developed other adiohalogenated estrogens for ER-mediated radiotherapy. Other investigators have developed other radiohalogenated estrogens for ER-mediated radiotherapy. Also, recent investigations have revealed that another estrogen receptor subtype, ERbeta, is present in some target tissues, including breast tissue and tumors. We have three goals of the next phase of this project: (1) We intend to develop ER ligands for breast tumor imaging that are labeled with the readily available radionuclide, technetium-99m, as well as its rhenium congener. To accomplish this, we will investigate novel aspects of technetium organometallic chemistry through the application of three new methods for the preparation of cyclopentadienyl tricarbonyl technetium and related systems. These functionalities will be incorporated are pendant and integral groups into steroidal and non-steroidal ER ligands. (2) Based on emerging differences in the structure-binding affinity relationships for ERalpha and ERbeta ligands, derived in part from our investigations, we will prepare ligands selective for

these receptors and develop them as tumor imaging agents. (3) We will utilize several radionuclides (iodine-123, and 124 and bromine-76, 77, the later three available to use through a collaboration to prepare ER ligands for radiotherapy, and we will have these tested in appropriate animal tumor model systems. These investigations should lead to substantial advances in the availability of **diagnostic imaging** gents for ER+ tumors and ER subtype- selective imaging agents, to the evaluation in vivo of radiotherapeutic ER ligands.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: REGISTRATION: ALGORITHMS USE IN IMAGE FUSION OF BRAIN**

  Principal Investigator & Institution: Jolesz, Ferenc A.; B. Leonard Holman Professor of Radiology; Brigham and Women's Hospital 75 Francis Street Boston, Ma 02115

  Timing: Fiscal Year 2002

  Summary: This proposal describes the core technology that is relevant to both rigid and non-rigid registration applications. We will use these registration methods for the purposes of image fusion (i.e. merging of multiple **diagnostic imaging** acquisitions of the same patient), as well as for template- driven segmentation TDS) (i.e. algorithms used to warp atlas data sets into the configuration of a new MR data set). In our proposal, the clinical significance this technology is demonstrated for surgical planning and visualization as well as for intraoperative image-guidance. Our prior related research on registration and deformable modeling has concentrated on manual information (MI)-based rigid registration and non-rigid registration for template-driven segmentation (TDS). Further improvement and development is necessary on engineering features of our existing rigid register methods, and to implement the non rigid registration for surgical applications and for template driven segmentation. One of our goals is to enhance the exploitation of the anatomic and functional information available in medical imagery for use in image-guided therapy. We will provide the surgeon with access to this information, registered across modalities and (in the case of procedures in the interventional or intraoperative MRI unit) registered to the anatomy of the patient. This information may enable the surgeon to more precisely identify and avoid critical structures and to more accurately locate pathological tissues. In the area of registration we will continue to develop clinically relevant registration methods and elastic matching algorithms. These algorithms are used both for image fusion, i.e. merging of multiple **diagnostic imaging** acquisitions of the same patient, and as part of template-driven segmentation algorithms that warp atlas data sets into the configuration of a patient's brain.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: SPECKLE-FREE ATTENUATION ULTRASOUND PROSTATE IMAGING**

  Principal Investigator & Institution: Lasser, Marvin E.; Imperium, Inc. 1738 Elton Rd, #218 Silver Spring, Md 20903

  Timing: Fiscal Year 2002; Project Start 20-SEP-2002; Project End 19-DEC-2003

  Description (provided by applicant): Imperium Inc. proposes to develop a speckle-free ultrasound camera to image normal and abnormal tissue structures in the prostate. The system will utilize a unique C-scan reflection mode imaging modality based our patented ultrasound technology. The basis of the technology is a fully populated, microelectronic detector array of piezoelectric pixels and read-out circuitry designed to generate C-scan images at TV frame rates. In this project, we will investigate the

feasibility of employing a reflection mode ultrasound modality in imaging the prostate. These studies will further our efforts in future projects to perform **diagnostic imaging** of human soft tissues including breast, connective tissues, vascular diseases, child and infant cartilage for study of bone formation. This system is capable of imaging soft tissue conditions and medical operations that require clear, speckle-free, non-distorted, real time imaging. The proposed imaging modality is low cost and free of ionizing radiation. Following the successful completion of this study we will fabricate a prostate probe and perform a clinical study. We will then demonstrate the system to the medical community and begin the commercialization and FDA approval process while concomitantly completing the design and developing a commercial version of a clinical prostate imager. PROPOSED COMMERCIAL APPLICATION: It would be a major commercial opportunity for Imperium to manufacture and market a low cost diagnostic tool for imaging of the prostate. Assuming a per unit price of $25,000, the total US market for this device for prostrate imaging is estimated at $575 Million. The worldwide market is estimated at $1.32 Billion. An approved prostrate diagnostic tool will also pave the way for additional clinical devices, including a low cost speckle free imaging system for breast cancer diagnosis and to use as a biopsy guidance tool.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: SPECTRALLY-RESOLVED FLUORESCENCE CORRELATION IMAGING**

  Principal Investigator & Institution: Geng, Lei; Chemistry; University of Iowa Iowa City, Ia 52242

  Timing: Fiscal Year 2003; Project Start 01-MAR-2003; Project End 28-FEB-2008

  Summary: (provided by applicant): Fluorescence imaging offers excellent sensitivity that is unparalleled by any other optical imaging techniques. It has thus been one of the most powerful tools in biomedical applications. The drawback of fluorescence intensity imaging, however, is the low information content and a lack of chemical specificity. This project aims to develop a novel technique, spectrally-resolved fluorescence correlation spectroscopy (FCS), for biomedical imaging. In this new imaging method, fluorescence response to an external field is collected at a range of wavelengths. Time correlation function is evaluated between wavelengths to yield a two-dimensional fluorescence correlation spectrum for each spatial location in an image. By coupling spectral and time resolution, spectrally-resolved FCS greatly enhances the information content and thus provides (1) high contrast in **diagnostic imaging** and (2) detailed information on the physicochemical environments of the fluorescent probe. The high contrast of spectrally-resolved fluorescence correlation imaging is applied to a model system of cancer diagnosis. Cancers are the second leading cause of death in the United States, accounting for 25% of the total fatalities. The key to timely treatment of cancers and improved survival rate is early diagnosis. We plan to use the new method to examine tissue samples in various pathological conditions, from healthy, hyperplastic, adenomatous to adenocarcenomatous. Spectroscopic measurements of tissue samples collected in surgery and biopsy procedures are conducted in vitro. Spectral libraries are established for normal and cancerous tissue through fiber optical examination of tissue samples. Computer programs are written for data treatment and statistical analysis of the library spectra. Various decision parameters are explored to establish the best diagnostic criteria. Coupling both spectral and temporal resolution of fluorescence, the new method provides significantly improved contrast between the normal and cancerous tissues compared to the existing method of steady-state fluorescence

spectroscopy. With the enhanced contrast, spectrally-resolved fluorescence correlation imaging holds excellent potential in noninvasive diagnosis of cancers.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: THROMBOSIS TARGETED MRI CONTRAST AGENT**

  Principal Investigator & Institution: Danilich, Michael J.; Senior Research Scientist; Luna Innovations, Inc. 2851 Commerce St Blacksburg, Va 24060

  Timing: Fiscal Year 2003; Project Start 22-AUG-2003; Project End 31-JUL-2004

  Summary: (provided by applicant): This proposal addresses the need for a minimally invasive diagnostic assay for the evaluation of pathological blood clots in patients suspected of developing intravascular blood clots that may manifest themselves as pulmonary embolism (PE), deep vein thrombosis (DVT) or thrombotic stroke. Indeed, thrombosis (the formation of blood clots) remains the leading cause of morbidity and mortality in the United States. Luna Innovations proposes to develop a trimetasphere based **magnetic resonance imaging** contrast agent for site directed thrombosis imaging. Luna Innovations will manufacture an appropriate trimetasphere nanomaterial (such as like Gd2ScN@C80) and functionalize it in preparation for conjugation to a monoclonal antibody with the highest specificity to a neo-epitope on the blood clot. Following this the trimetasphere-antibody complex will be evaluated in vitro experiments for the capability of the complex to target, image and destroy the blood clot. In phase I, Luna will demonstrate the ability of this complex to perform this task and optimize the complex for in vivo **diagnostic imaging** for phase II

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- **Project Title: TRAINING IN QUANTITATIVE MAGNETIC RESONANCE IMAGING**

  Principal Investigator & Institution: Wehrli, Felix W.; Professor; Radiology; University of Pennsylvania 3451 Walnut Street Philadelphia, Pa 19104

  Timing: Fiscal Year 2003; Project Start 25-AUG-1998; Project End 30-JUN-2008

  Summary: (provided by applicant): TRAINING IN QUANTITATIVE **MAGNETIC RESONANCE IMAGING Magnetic resonance imaging** (MRI) has, since its inception over two decades ago, been used mainly as a qualitative imaging technique practiced by radiologists utilizing predominantly qualitative criteria for establishing a diagnosis or excluding disease. This approach is fraught with problems, its main disadvantage being the subjective nature of the result, i.e., sensitivity to reader experience and judgment. Many problems in diagnostic medicine require a quantitative assessment. Among these are the sizing of vascular stenoses, the measurement of a perfusion deficit, or the evaluation of residual disease burden during regression of disease in response to therapeutic intervention in the treatment of tumors, white matter disease, etc. Moreover, for many diagnostic or staging problems, quantitation of an observation is not merely a better alternative to qualitative assessment, but the qualitative approach is entirely unsuited. Examples are non-focal systemic disorders such as osteoporosis where a quantitative measurement of some physiologic parameter, e.g., bone mineral density, has to be made. In **diagnostic imaging** in general, and MRI in particular, quantitative approaches require the tools of post-processing of arrays of images, typically performed off-line on workstations. This process is multidisciplinary, requiring close cooperation among physicians, MR physicists, and computer scientists, which is not possible without effective cross-training. Physicists, engineers and computer scientists usually lack an understanding of the medical problem and are often unable to translate abstract

concepts to the physician. The problem is exacerbated by language barriers since the members of the exact sciences often have difficulties in effectively communicating with physicians, as their terminology is outside the scope of medicine. This project aims to train basic science students at the pre- and post-doctoral level in quantitative magnetic resonance methodology and, conversely, medical science trainees in the use of quantitative MR imaging tools for diagnosis and treatment monitoring. Training modalities involve a combination of colloquia, structured teaching and hands-on laboratory training, with particular emphasis on preceptor-directed research. The training faculty consists of both basic scientists and physicians who have a record of successful multidisciplinary research training.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

E-Journals: PubMed Central[3]

PubMed Central (PMC) is a digital archive of life sciences journal literature developed and managed by the National Center for Biotechnology Information (NCBI) at the U.S. National Library of Medicine (NLM).[4] Access to this growing archive of e-journals is free and unrestricted.[5] To search, go to **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Pmc**, and type "diagnostic imaging" (or synonyms) into the search box. This search gives you access to full-text articles. The following is a sample of items found for diagnostic imaging in the PubMed Central database:

- **Autologous chondrocyte implantation for cartilage repair: monitoring its success by magnetic resonance imaging and histology.** by Roberts S, McCall IW, Darby AJ, Menage J, Evans H, Harrison PE, Richardson JB.; 2003; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&artid=154433
- **Breast imaging technology: Application of magnetic resonance imaging to angiogenesis in breast cancer.** by Leach MO.; 2001; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&artid=138673
- **Breast imaging technology: Application of magnetic resonance imaging to early detection of breast cancer.** by Schnall MD.; 2001; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&artid=138672
- **Cerebral activity associated with auditory verbal hallucinations: a functional magnetic resonance imaging case study.** by Ait Bentaleb L, Beauregard M, Liddle P, Stip E.; 2002 Mar; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&artid=161640
- **Complexity of terminal airspace geometry assessed by lung computed tomography in normal subjects and patients with chronic obstructive pulmonary disease.** by Mishima M, Hirai T, Itoh H, Nakano Y, Sakai H, Muro S, Nishimura K, Oku Y, Chin K, Ohi M, Nakamura T, Bates JH, Alencar AM, Suki B.; 1999 Aug 3; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&artid=17692

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[3] Adapted from the National Library of Medicine: **http://www.pubmedcentral.nih.gov/about/intro.html**.

[4] With PubMed Central, NCBI is taking the lead in preservation and maintenance of open access to electronic literature, just as NLM has done for decades with printed biomedical literature. PubMed Central aims to become a world-class library of the digital age.

[5] The value of PubMed Central, in addition to its role as an archive, lies in the availability of data from diverse sources stored in a common format in a single repository. Many journals already have online publishing operations, and there is a growing tendency to publish material online only, to the exclusion of print.

- **Different central manifestations in response to electroacupuncture at analgesic and nonanalgesic acupoints in rats: a manganese-enhanced functional magnetic resonance imaging study.** by Chiu JH, Chung MS, Cheng HC, Yeh TC, Hsieh JC, Chang CY, Kuo WY, Cheng H, Ho LT.; 2003 May; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&artid=227035
- **Evaluation of early abdominopelvic computed tomography in patients with acute abdominal pain of unknown cause: prospective randomised study.** by Ng CS, Watson CJ, Palmer CR, See TC, Beharry NA, Housden BA, Bradley JA, Dixon AK.; 2002 Dec 14; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&artid=138513
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The National Library of Medicine: PubMed

One of the quickest and most comprehensive ways to find academic studies in both English and other languages is to use PubMed, maintained by the National Library of Medicine.[6] The advantage of PubMed over previously mentioned sources is that it covers a greater number of domestic and foreign references. It is also free to use. If the publisher has a Web site that offers full text of its journals, PubMed will provide links to that site, as well as to sites offering other related data. User registration, a subscription fee, or some other type of fee may be required to access the full text of articles in some journals.

To generate your own bibliography of studies dealing with diagnostic imaging, simply go to the PubMed Web site at **http://www.ncbi.nlm.nih.gov/pubmed**. Type "diagnostic imaging" (or synonyms) into the search box, and click "Go." The following is the type of output you can expect from PubMed for diagnostic imaging (hyperlinks lead to article summaries):

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[6] PubMed was developed by the National Center for Biotechnology Information (NCBI) at the National Library of Medicine (NLM) at the National Institutes of Health (NIH). The PubMed database was developed in conjunction with publishers of biomedical literature as a search tool for accessing literature citations and linking to full-text journal articles at Web sites of participating publishers. Publishers that participate in PubMed supply NLM with their citations electronically prior to or at the time of publication.

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  Author(s): Oliphant M, Berne AS, Meyers MA.
  Source: Abdominal Imaging. 1999 May-June; 24(3): 211-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10227880

- **The use of diagnostic imaging to assess spinal arthrodesis.**
  Author(s): Hilibrand AS, Dina TS.
  Source: The Orthopedic Clinics of North America. 1998 October; 29(4): 591-601. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9756957

- **Thermal ablation therapy for focal malignancy: a unified approach to underlying principles, techniques, and diagnostic imaging guidance.**
  Author(s): Goldberg SN, Gazelle GS, Mueller PR.
  Source: Ajr. American Journal of Roentgenology. 2000 February; 174(2): 323-31. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10658699

- **Three hundred consecutive emergent celiotomies in general surgery patients: influence of advanced diagnostic imaging techniques and procedures on diagnosis.**
  Author(s): Rozycki GS, Tremblay L, Feliciano DV, Joseph R, DeDelva P, Salomone JP, Nicholas JM, Cava RA, Ansley JD, Ingram WL.
  Source: Annals of Surgery. 2002 May; 235(5): 681-8; Discussion 688-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11981214

- **Thyroiditis: clinical aspects and diagnostic imaging.**
  Author(s): Vitti P, Rago T, Barbesino G, Chiovato L.
  Source: Rays. 1999 April-June; 24(2): 301-14. Review. English, Italian.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10509132

- **Towards evidence based emergency medicine: best BETs from the Manchester Royal Infirmary. Diagnostic imaging of the hip in the limping child.**
  Author(s): Wright N, Choudhery V.
  Source: Journal of Accident & Emergency Medicine. 2000 January; 17(1): 48.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10658994

- **Trends in the use of diagnostic imaging in patients hospitalized with acute pulmonary embolism.**
  Author(s): Stein PD, Kayali F, Olson RE.
  Source: The American Journal of Cardiology. 2004 May 15; 93(10): 1316-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15135716

- **Ultrasound technology: the RADIUS (Routine Antenatal Diagnostic Imaging with Ultrasound) study & national policy.**
  Author(s): Huang L.
  Source: J Clin Eng. 1994 July-August; 19(4): 297-309. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10137111

- **Unilateral sinonasal disease without bone destruction. Differential diagnosis using diagnostic imaging and endonasal endoscopic biopsy.**
  Author(s): Ikeda K, Tanno N, Suzuki H, Oshima T, Kano S, Takasaka T.
  Source: Archives of Otolaryngology--Head & Neck Surgery. 1997 February; 123(2): 198-200.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9046289

- **Update on diagnostic imaging for melanoma.**
  Author(s): Grasee EA, Wagner JD.
  Source: Facial Plast Surg Clin North Am. 2003 February; 11(1): 49-60. Review. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15062287

- **Update: diagnostic imaging of the heart and its blood supply.**
  Author(s): Pohost GM.
  Source: Urban Health. 1985 April; 14(4): 25-7. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10274716

- **Ureteropelvic junction disease: diagnostic imaging.**
  Author(s): Maresca G, Maggi F, Valentini V.
  Source: Rays. 2002 April-June; 27(2): 79-82. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12696256

- **Urinary tract infection in paediatrics: the role of diagnostic imaging.**
  Author(s): Gordon I.
  Source: The British Journal of Radiology. 1990 July; 63(751): 507-11. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2202479

- **Usage of diagnostic imaging procedures: a nationwide hospital study.**
  Author(s): Bunge RE, Herman CL.
  Source: Radiology. 1987 May; 163(2): 569-73.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3550886

- **Use of diagnostic imaging during the 1997 Canada Summer Games.**
  Author(s): Harrison WD.
  Source: Clinical Journal of Sport Medicine : Official Journal of the Canadian Academy of Sport Medicine. 2000 January; 10(1): 49-51.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10695850

- **Use of diagnostic imaging procedures and fetal monitoring devices in the care of pregnant women.**
  Author(s): Moore RM Jr, Jeng LL, Kaczmarek RG, Placek PJ.
  Source: Public Health Reports (Washington, D.C. : 1974). 1990 September-October; 105(5): 471-5.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2120723

- **Use of diagnostic imaging services in the Central Region by general practitioners.**
  Author(s): Durham JA, McLeod DK.
  Source: N Z Med J. 1999 June 25; 112(1090): 233-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10448998

- **Use of metalloporphyrins in diagnostic imaging.**
  Author(s): Fawwaz R, Bohdiewicz P, Lavallee D, Wang T, Oluwole S, Newhouse J, Alderson P.
  Source: Int J Rad Appl Instrum B. 1990; 17(1): 65-72. Review. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2407694

- **Use of tumor receptors for diagnostic imaging. A review.**
  Author(s): Hirai H.
  Source: Acta Radiologica. Supplementum. 1990; 374: 57-64. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1726378

- **Usefulness of diagnostic imaging in primary hyperparathyroidism.**
  Author(s): Sekiyama K, Akakura K, Mikami K, Mizoguchi K, Tobe T, Nakano K, Numata T, Konno A, Ito H.
  Source: International Journal of Urology : Official Journal of the Japanese Urological Association. 2003 January; 10(1): 7-11; Discussion 12.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12534918

- **Uterine adenomyosis and tubal endometriosis: diagnostic imaging.**
  Author(s): Belli P, De Gaetano AM, Mirk P, Speca S, Valentini AL.
  Source: Rays. 1998 October-December; 23(4): 693-701. English, Italian.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10191665

- **Utility of diagnostic imaging in the staging of gestational trophoblastic disease.**
  Author(s): Williams AG Jr, Mettler FA Jr, Wicks JD.
  Source: Diagn Gynecol Obstet. 1982 Summer; 4(2): 159-63.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6284468

- **Utilization of outpatient diagnostic imaging. Does the physician's gender play a role?**
  Author(s): Rosen MP, Davis RB, Lesky LG.
  Source: Journal of General Internal Medicine : Official Journal of the Society for Research and Education in Primary Care Internal Medicine. 1997 July; 12(7): 407-11.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9229278

- **Venous thromboembolism, radiology by the organ, combined diagnostic imaging, clinical radiology.**
  Author(s): Marano P.
  Source: Rays. 1996 July-September; 21(3): 309-14. English, Italian. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9063051

- **Versatility of the subperiosteal implant utilizing CAD-CAM multiplanar diagnostic imaging.**
  Author(s): Benjamin LS.
  Source: J Oral Implantol. 1987; 13(2): 282-96. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3268687

- **What features of the pathological morphology of the liver increase the accuracy of diagnostic imaging for cirrhosis?**
  Author(s): Kage M.
  Source: Journal of Gastroenterology. 2003; 38(2): 202-3.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12640540

- **Which factors determine the use of diagnostic imaging technologies for gastrointestinal complaints in general medical practice?**
  Author(s): Busse R, Hoopmann M, Schwartz FW.
  Source: International Journal of Technology Assessment in Health Care. 1999 Fall; 15(4): 629-37.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10645104

- **Why the resistance to diagnostic imaging in childhood urinary tract infections.**
  Author(s): Dudley J, Chambers T.
  Source: Lancet. 1996 July 13; 348(9020): 71-2.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8676716

CHAPTER 2. NUTRITION AND DIAGNOSTIC IMAGING

Overview

In this chapter, we will show you how to find studies dedicated specifically to nutrition and diagnostic imaging.

Finding Nutrition Studies on Diagnostic Imaging

The National Institutes of Health's Office of Dietary Supplements (ODS) offers a searchable bibliographic database called the IBIDS (International Bibliographic Information on Dietary Supplements; National Institutes of Health, Building 31, Room 1B29, 31 Center Drive, MSC 2086, Bethesda, Maryland 20892-2086, Tel: 301-435-2920, Fax: 301-480-1845, E-mail: ods@nih.gov). The IBIDS contains over 460,000 scientific citations and summaries about dietary supplements and nutrition as well as references to published international, scientific literature on dietary supplements such as vitamins, minerals, and botanicals.[7] The IBIDS includes references and citations to both human and animal research studies.

As a service of the ODS, access to the IBIDS database is available free of charge at the following Web address: **http://ods.od.nih.gov/databases/ibids.html**. After entering the search area, you have three choices: (1) IBIDS Consumer Database, (2) Full IBIDS Database, or (3) Peer Reviewed Citations Only.

Now that you have selected a database, click on the "Advanced" tab. An advanced search allows you to retrieve up to 100 fully explained references in a comprehensive format. Type "diagnostic imaging" (or synonyms) into the search box, and click "Go." To narrow the search, you can also select the "Title" field.

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[7] Adapted from **http://ods.od.nih.gov**. IBIDS is produced by the Office of Dietary Supplements (ODS) at the National Institutes of Health to assist the public, healthcare providers, educators, and researchers in locating credible, scientific information on dietary supplements. IBIDS was developed and will be maintained through an interagency partnership with the Food and Nutrition Information Center of the National Agricultural Library, U.S. Department of Agriculture.

The following information is typical of that found when using the "Full IBIDS Database" to search for "diagnostic imaging" (or a synonym):

- **An in-phantom dosimetry system using pin silicon photodiode radiation sensors for measuring organ doses in x-ray CT and other diagnostic radiology.**
  Author(s): School of Health Sciences, Nagoya, University, Japan. aoyama@met.nagoya-u.ac.jp
  Source: Aoyama, T Koyama, S Kawaura, C Med-Phys. 2002 July; 29(7): 1504-10 0094-2405
- **Technetium-99m ECD single photon emission computed tomography in brain trauma: comparison of early scintigraphic findings with long-term neuropsychological outcome.**
  Author(s): Department of Nuclear Medicine, Trousseau University Hospital, Tours, France. fbaulieu@med.univtours.fr
  Source: Baulieu, F Fournier, P Baulieu, J L Dalonneau, M Chiaroni, P Eder, V Pottier, J M Legros, B J-Neuroimaging. 2001 April; 11(2): 112-20 1051-2284

Federal Resources on Nutrition

In addition to the IBIDS, the United States Department of Health and Human Services (HHS) and the United States Department of Agriculture (USDA) provide many sources of information on general nutrition and health. Recommended resources include:

- healthfinder®, HHS's gateway to health information, including diet and nutrition: **http://www.healthfinder.gov/scripts/SearchContext.asp?topic=238&page=0**
- The United States Department of Agriculture's Web site dedicated to nutrition information: **www.nutrition.gov**
- The Food and Drug Administration's Web site for federal food safety information: **www.foodsafety.gov**
- The National Action Plan on Overweight and Obesity sponsored by the United States Surgeon General: **http://www.surgeongeneral.gov/topics/obesity/**
- The Center for Food Safety and Applied Nutrition has an Internet site sponsored by the Food and Drug Administration and the Department of Health and Human Services: **http://vm.cfsan.fda.gov/**
- Center for Nutrition Policy and Promotion sponsored by the United States Department of Agriculture: **http://www.usda.gov/cnpp/**
- Food and Nutrition Information Center, National Agricultural Library sponsored by the United States Department of Agriculture: **http://www.nal.usda.gov/fnic/**
- Food and Nutrition Service sponsored by the United States Department of Agriculture: **http://www.fns.usda.gov/fns/**

Additional Web Resources

A number of additional Web sites offer encyclopedic information covering food and nutrition. The following is a representative sample:

- AOL: **http://search.aol.com/cat.adp?id=174&layer=&from=subcats**

- Family Village: **http://www.familyvillage.wisc.edu/med_nutrition.html**
- Google: **http://directory.google.com/Top/Health/Nutrition/**
- Healthnotes: **http://www.healthnotes.com/**
- Open Directory Project: **http://dmoz.org/Health/Nutrition/**
- Yahoo.com: **http://dir.yahoo.com/Health/Nutrition/**
- WebMD®Health: **http://my.webmd.com/nutrition**
- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,00.html**

The following is a specific Web list relating to diagnostic imaging; please note that any particular subject below may indicate either a therapeutic use, or a contraindication (potential danger), and does not reflect an official recommendation:

- **Vitamins**

  Vitamin K
  Alternative names: Menadione, Menaphthone, Menaquinone, Phylloquinone
  Source: Integrative Medicine Communications; www.drkoop.com

- **Minerals**

  Glucosamine/Chondroitin
  Source: Healthnotes, Inc.; www.healthnotes.com

- **Food and Diet**

  Sprains and Strains
  Source: Healthnotes, Inc.; www.healthnotes.com

CHAPTER 3. ALTERNATIVE MEDICINE AND DIAGNOSTIC IMAGING

Overview

In this chapter, we will begin by introducing you to official information sources on complementary and alternative medicine (CAM) relating to diagnostic imaging. At the conclusion of this chapter, we will provide additional sources.

National Center for Complementary and Alternative Medicine

The National Center for Complementary and Alternative Medicine (NCCAM) of the National Institutes of Health (**http://nccam.nih.gov/**) has created a link to the National Library of Medicine's databases to facilitate research for articles that specifically relate to diagnostic imaging and complementary medicine. To search the database, go to the following Web site: **http://www.nlm.nih.gov/nccam/camonpubmed.html**. Select "CAM on PubMed." Enter "diagnostic imaging" (or synonyms) into the search box. Click "Go." The following references provide information on particular aspects of complementary and alternative medicine that are related to diagnostic imaging:

- **"Cascade-release dendrimers" liberate all end groups upon a single triggering event in the dendritic core.**
  Author(s): de Groot FM, Albrecht C, Koekkoek R, Beusker PH, Scheeren HW.
  Source: Angewandte Chemie (International Ed. in English). 2003 September 29; 42(37): 4490-4.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14520746

- **Altered habituation in the auditory cortex in a subgroup of depressed patients by functional magnetic resonance imaging.**
  Author(s): Michael N, Ostermann J, Soros P, Schwindt W, Pfleiderer B.
  Source: Neuropsychobiology. 2004; 49(1): 5-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14730193

- **An investigation to dissociate the analgesic and anesthetic properties of ketamine using functional magnetic resonance imaging.**
  Author(s): Rogers R, Wise RG, Painter DJ, Longe SE, Tracey I.
  Source: Anesthesiology. 2004 February; 100(2): 292-301.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14739803

- **Applications of magnetic resonance imaging for cardiac stem cell therapy.**
  Author(s): Rickers C, Gallegos R, Seethamraju RT, Wang X, Swingen C, Jayaswal A, Rahrmann EP, Kastenberg ZJ, Clarkson CE, Bianco R, O'Brian T, Verfaillie C, Bolman RM 3rd, Wilke N, Jerosch-Herold M.
  Source: Journal of Interventional Cardiology. 2004 February; 17(1): 37-46.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15009770

- **Effect of stage 1 sleep on auditory cortex during pure tone stimulation: evaluation by functional magnetic resonance imaging with simultaneous EEG monitoring.**
  Author(s): Tanaka H, Fujita N, Takanashi M, Hirabuki N, Yoshimura H, Abe K, Nakamura H.
  Source: Ajnr. American Journal of Neuroradiology. 2003 November-December; 24(10): 1982-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14625220

- **Effects of amino acid supplementation on left ventricular remodeling in patients with chronic heart failure with decreased systolic function and diabetes mellitus: rationale and design of a magnetic resonance imaging study.**
  Author(s): Klein L, Gattis WA, Borrello F, Wu E, O'Connor CM, Gheorghiade M.
  Source: The American Journal of Cardiology. 2004 April 22; 93(8A): 44A-46A.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15094106

- **Effects of noise from functional magnetic resonance imaging on auditory event-related potentials in working memory task.**
  Author(s): Novitski N, Anourova I, Martinkauppi S, Aronen HJ, Naatanen R, Carlson S.
  Source: Neuroimage. 2003 October; 20(2): 1320-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14568500

- **Evidence of correlated functional magnetic resonance imaging signals between distant human brains.**
  Author(s): Standish LJ, Johnson LC, Kozak L, Richards T.
  Source: Alternative Therapies in Health and Medicine. 2003 January-February; 9(1): 128, 122-5.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14640097

- **Functional magnetic resonance imaging before and after aphasia therapy: shifts in hemodynamic time to peak during an overt language task.**

Author(s): Peck KK, Moore AB, Crosson BA, Gaiefsky M, Gopinath KS, White K, Briggs RW.
Source: Stroke; a Journal of Cerebral Circulation. 2004 February; 35(2): 554-9. Epub 2004 January 22.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14739418

- **Functional magnetic resonance imaging of activation in subcortical auditory pathway.**
Author(s): Yetkin FZ, Roland PS, Mendelsohn DB, Purdy PD.
Source: The Laryngoscope. 2004 January; 114(1): 96-101.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14710002

- **Functional magnetic resonance imaging of source versus item memory.**
Author(s): Fan J, Gay Snodgrass J, Bilder RM.
Source: Neuroreport. 2003 December 2; 14(17): 2275-81.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14625462

- **Functional magnetic resonance imaging of verbal fluency and confrontation naming using compressed image acquisition to permit overt responses.**
Author(s): Abrahams S, Goldstein LH, Simmons A, Brammer MJ, Williams SC, Giampietro VP, Andrew CM, Leigh PN.
Source: Human Brain Mapping. 2003 September; 20(1): 29-40.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12953304

- **Infarct remodeling after intracoronary progenitor cell treatment in patients with acute myocardial infarction (TOPCARE-AMI): mechanistic insights from serial contrast-enhanced magnetic resonance imaging.**
Author(s): Britten MB, Abolmaali ND, Assmus B, Lehmann R, Honold J, Schmitt J, Vogl TJ, Martin H, Schachinger V, Dimmeler S, Zeiher AM.
Source: Circulation. 2003 November 4; 108(18): 2212-8. Epub 2003 October 13.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14557356

- **Is functional magnetic resonance imaging capable of mapping transcranial magnetic cortex stimulation?**
Author(s): Bestmann S, Baudewig J, Siebner HR, Rothwell JC, Frahm J.
Source: Suppl Clin Neurophysiol. 2003; 56: 55-62. No Abstract Available.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14677382

- **Phase I trial of the antivascular agent combretastatin A4 phosphate on a 5-day schedule to patients with cancer: magnetic resonance imaging evidence for altered tumor blood flow.**
Author(s): Stevenson JP, Rosen M, Sun W, Gallagher M, Haller DG, Vaughn D, Giantonio B, Zimmer R, Petros WP, Stratford M, Chaplin D, Young SL, Schnall M, O'Dwyer PJ.

Source: Journal of Clinical Oncology : Official Journal of the American Society of Clinical Oncology. 2003 December 1; 21(23): 4428-38.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14645433

- **Phonological grammar shapes the auditory cortex: a functional magnetic resonance imaging study.**
  Author(s): Jacquemot C, Pallier C, LeBihan D, Dehaene S, Dupoux E.
  Source: The Journal of Neuroscience : the Official Journal of the Society for Neuroscience. 2003 October 22; 23(29): 9541-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14573533

- **Role of Magnetic Resonance Imaging in the prediction of tumor response in patients with locally advanced breast cancer receiving neoadjuvant chemo-therapy.**
  Author(s): Martincich L, Montemurro F, Cirillo S, Marra V, De Rosa G, Ponzone R, Aglietta M, Regge D.
  Source: Radiol Med (Torino). 2003 July-August; 106(1-2): 51-8. English, Italian.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12951551

- **Sequential effects of propofol on functional brain activation induced by auditory language processing: an event-related functional magnetic resonance imaging study.**
  Author(s): Heinke W, Fiebach CJ, Schwarzbauer C, Meyer M, Olthoff D, Alter K.
  Source: British Journal of Anaesthesia. 2004 May; 92(5): 641-50. Epub 2004 April 02.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15064248

- **Serial contrast-enhanced magnetic resonance imaging and spectroscopic imaging of acute multiple sclerosis lesions under high-dose methylprednisolone therapy.**
  Author(s): Schocke MF, Berger T, Felber SR, Wolf C, Deisenhammer F, Kremser C, Seppi K, Aichner FT.
  Source: Neuroimage. 2003 October; 20(2): 1253-63.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14568494

- **The use of contrast-enhanced computed tomography before neoadjuvant chemotherapy to identify patients likely to be treated safely with breast-conserving surgery.**
  Author(s): Akashi-Tanaka S, Fukutomi T, Sato N, Iwamoto E, Watanabe T, Katsumata N, Ando M, Miyakawa K, Hasegawa T.
  Source: Annals of Surgery. 2004 February; 239(2): 238-43.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14745332

- **The value of routine serum carcino-embryonic antigen measurement and computed tomography in the surveillance of patients after adjuvant chemotherapy for colorectal cancer.**
  Author(s): Chau I, Allen MJ, Cunningham D, Norman AR, Brown G, Ford HE, Tebbutt N, Tait D, Hill M, Ross PJ, Oates J.

Source: Journal of Clinical Oncology : Official Journal of the American Society of Clinical Oncology. 2004 April 15; 22(8): 1420-9. Epub 2004 March 08.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15007086

- **Thiamine deficiency in a dog: clinical, clinicopathologic, and magnetic resonance imaging findings.**
  Author(s): Garosi LS, Dennis R, Platt SR, Corletto F, de Lahunta A, Jakobs C.
  Source: J Vet Intern Med. 2003 September-October; 17(5): 719-23. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14529142

- **Usefulness of chest single photon emission computed tomography with technetium-99m methoxyisobutylisonitrile to predict taxol based chemotherapy response in advanced non-small cell lung cancer.**
  Author(s): Shih CM, Hsu WH, Huang WT, Wang JJ, Ho ST, Kao A.
  Source: Cancer Letters. 2003 September 10; 199(1): 99-105.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12963129

- **Using technetium-99m methoxyisobutylisonitrile lung single-photon-emission computed tomography to predict response to chemotherapy and compare with P-glycoprotein expression in patients with untreated small cell lung cancer.**
  Author(s): Changlai SP, Tsai CS, Ding HJ, Huang WT, Kao A, Hsu WH.
  Source: Medical Oncology (Northwood, London, England). 2003; 20(3): 247-53.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14514974

Additional Web Resources

A number of additional Web sites offer encyclopedic information covering CAM and related topics. The following is a representative sample:

- Alternative Medicine Foundation, Inc.: **http://www.herbmed.org/**
- AOL: **http://search.aol.com/cat.adp?id=169&layer=&from=subcats**
- Chinese Medicine: **http://www.newcenturynutrition.com/**
- drkoop.com®: **http://www.drkoop.com/InteractiveMedicine/IndexC.html**
- Family Village: **http://www.familyvillage.wisc.edu/med_altn.htm**
- Google: **http://directory.google.com/Top/Health/Alternative/**
- Healthnotes: **http://www.healthnotes.com/**
- MedWebPlus: **http://medwebplus.com/subject/Alternative_and_Complementary_Medicine**
- Open Directory Project: **http://dmoz.org/Health/Alternative/**
- HealthGate: **http://www.tnp.com/**
- WebMD®Health: **http://my.webmd.com/drugs_and_herbs**

- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,00.html**
- Yahoo.com: **http://dir.yahoo.com/Health/Alternative_Medicine/**

The following is a specific Web list relating to diagnostic imaging; please note that any particular subject below may indicate either a therapeutic use, or a contraindication (potential danger), and does not reflect an official recommendation:

- **General Overview**

Abdominal Wall Inflammation
Source: Integrative Medicine Communications; www.drkoop.com

Alopecia
Source: Integrative Medicine Communications; www.drkoop.com

Alzheimer's Disease
Source: Integrative Medicine Communications; www.drkoop.com

Amenorrhea
Source: Integrative Medicine Communications; www.drkoop.com

Amyloidosis
Source: Integrative Medicine Communications; www.drkoop.com

Angina
Source: Integrative Medicine Communications; www.drkoop.com

Appendicitis
Source: Integrative Medicine Communications; www.drkoop.com

Arteriosclerosis
Source: Integrative Medicine Communications; www.drkoop.com

Asthma
Source: Integrative Medicine Communications; www.drkoop.com

Atherosclerosis
Source: Integrative Medicine Communications; www.drkoop.com

Bone Infection
Source: Integrative Medicine Communications; www.drkoop.com

Brain Cancer
Source: Integrative Medicine Communications; www.drkoop.com

Breast Cancer
Source: Integrative Medicine Communications; www.drkoop.com

Candidiasis
Source: Integrative Medicine Communications; www.drkoop.com

Carpal Tunnel Syndrome
Source: Integrative Medicine Communications; www.drkoop.com

Chronic Obstructive Pulmonary Disease
Source: Integrative Medicine Communications; www.drkoop.com

Colorectal Cancer
Source: Integrative Medicine Communications; www.drkoop.com

Coronary Artery Disease
Source: Integrative Medicine Communications; www.drkoop.com

Depression
Source: Integrative Medicine Communications; www.drkoop.com

Diverticular Disease
Source: Integrative Medicine Communications; www.drkoop.com

Edema
Source: Integrative Medicine Communications; www.drkoop.com

Emphysema
Source: Integrative Medicine Communications; www.drkoop.com

Endocarditis
Source: Integrative Medicine Communications; www.drkoop.com

Fainting
Source: Integrative Medicine Communications; www.drkoop.com

Fever of Unknown Origin
Source: Integrative Medicine Communications; www.drkoop.com

Frostbite
Source: Integrative Medicine Communications; www.drkoop.com

Gout
Source: Integrative Medicine Communications; www.drkoop.com

Hair Loss
Source: Integrative Medicine Communications; www.drkoop.com

Heart Attack
Source: Healthnotes, Inc.; www.healthnotes.com

Hemophilia
Source: Integrative Medicine Communications; www.drkoop.com

Hirsuitism
Source: Integrative Medicine Communications; www.drkoop.com

Hyperparathyroidism
Source: Integrative Medicine Communications; www.drkoop.com

Hypoparathyroidism
Source: Integrative Medicine Communications; www.drkoop.com

Intestinal Parasites
Source: Integrative Medicine Communications; www.drkoop.com

Irritable Bowel Syndrome
Source: Integrative Medicine Communications; www.drkoop.com

Low Back Pain
Source: Integrative Medicine Communications; www.drkoop.com

Lung Cancer
Source: Healthnotes, Inc.; www.healthnotes.com

Lung Cancer
Source: Integrative Medicine Communications; www.drkoop.com

Lymphoma
Source: Integrative Medicine Communications; www.drkoop.com

Meningitis
Source: Integrative Medicine Communications; www.drkoop.com

Miscarriage
Source: Integrative Medicine Communications; www.drkoop.com

Multiple Sclerosis
Source: Healthnotes, Inc.; www.healthnotes.com

Multiple Sclerosis
Source: Integrative Medicine Communications; www.drkoop.com

Osteoarthritis
Source: Healthnotes, Inc.; www.healthnotes.com

Osteoarthritis
Source: Integrative Medicine Communications; www.drkoop.com

Osteomyelitis
Source: Integrative Medicine Communications; www.drkoop.com

Pancreatitis
Source: Integrative Medicine Communications; www.drkoop.com

Peptic Ulcer
Source: Integrative Medicine Communications; www.drkoop.com

Pericarditis
Source: Integrative Medicine Communications; www.drkoop.com

Peritonitis
Source: Integrative Medicine Communications; www.drkoop.com

Prostate Cancer
Source: Integrative Medicine Communications; www.drkoop.com

Pulmonary Edema
Source: Integrative Medicine Communications; www.drkoop.com

Radiation Damage
Source: Integrative Medicine Communications; www.drkoop.com

Rheumatoid Arthritis
Source: Integrative Medicine Communications; www.drkoop.com

Sarcoidosis
Source: Integrative Medicine Communications; www.drkoop.com

Scleroderma
Source: Integrative Medicine Communications; www.drkoop.com

Sinus Headache
Source: Integrative Medicine Communications; www.drkoop.com

Spastic Colon
Source: Integrative Medicine Communications; www.drkoop.com

Spontaneous Abortion
Source: Integrative Medicine Communications; www.drkoop.com

Stroke
Source: Integrative Medicine Communications; www.drkoop.com

Syncope
Source: Integrative Medicine Communications; www.drkoop.com

Tendinitis
Source: Integrative Medicine Communications; www.drkoop.com

TIAs
Source: Integrative Medicine Communications; www.drkoop.com

Transient Ischemic Attacks
Source: Integrative Medicine Communications; www.drkoop.com

Water Retention
Source: Integrative Medicine Communications; www.drkoop.com

Yeast Infection
Source: Integrative Medicine Communications; www.drkoop.com

- **Alternative Therapy**

Chelation Therapy
Source: WholeHealthMD.com, LLC.; www.wholehealthmd.com
Hyperlink:
http://www.wholehealthmd.com/refshelf/substances_view/0,1525,679,00.html

Chiropractic
Source: Healthnotes, Inc.; www.healthnotes.com

Magnet Therapy
Source: WholeHealthMD.com, LLC.; www.wholehealthmd.com
Hyperlink:
http://www.wholehealthmd.com/refshelf/substances_view/0,1525,715,00.html

Osteopathy
Source: Integrative Medicine Communications; www.drkoop.com

- **Herbs and Supplements**

Aloe
Alternative names: Aloe vera L.
Source: Alternative Medicine Foundation, Inc.; www.amfoundation.org

Antioxidants and Free Radicals
Source: Healthnotes, Inc.; www.healthnotes.com

Greater Celandine
Alternative names: Chelidonium majus
Source: Healthnotes, Inc.; www.healthnotes.com

Hydantoin Derivatives
Source: Integrative Medicine Communications; www.drkoop.com

Menadione
Source: Integrative Medicine Communications; www.drkoop.com

Menaphthone
Source: Integrative Medicine Communications; www.drkoop.com

Menaquinone
Source: Integrative Medicine Communications; www.drkoop.com

Methylsulfonylmethane
Source: Healthnotes, Inc.; www.healthnotes.com

Phylloquinone
Source: Integrative Medicine Communications; www.drkoop.com

Strontium
Source: Healthnotes, Inc.; www.healthnotes.com

General References

A good place to find general background information on CAM is the National Library of Medicine. It has prepared within the MEDLINEplus system an information topic page dedicated to complementary and alternative medicine. To access this page, go to the MEDLINEplus site at **http://www.nlm.nih.gov/medlineplus/alternativemedicine.html**. This Web site provides a general overview of various topics and can lead to a number of general sources.

CHAPTER 4. DISSERTATIONS ON DIAGNOSTIC IMAGING

Overview

In this chapter, we will give you a bibliography on recent dissertations relating to diagnostic imaging. We will also provide you with information on how to use the Internet to stay current on dissertations. **IMPORTANT NOTE:** When following the search strategy described below, you may discover non-medical dissertations that use the generic term "diagnostic imaging" (or a synonym) in their titles. To accurately reflect the results that you might find while conducting research on diagnostic imaging, we have not necessarily excluded non-medical dissertations in this bibliography.

Dissertations on Diagnostic Imaging

ProQuest Digital Dissertations, the largest archive of academic dissertations available, is located at the following Web address: **http://wwwlib.umi.com/dissertations**. From this archive, we have compiled the following list covering dissertations devoted to diagnostic imaging. You will see that the information provided includes the dissertation's title, its author, and the institution with which the author is associated. The following covers recent dissertations found when using this search procedure:

- **Design factors in Medicare prospective reimbursement of computerized tomography and magnetic resonance imaging in hospital outpatient departments** by Jackson, Terri Jurgens, PhD from BRANDEIS U., THE F. HELLER GRAD. SCH. FOR ADV. STUD. IN SOC. WEL., 1993, 350 pages
  http://wwwlib.umi.com/dissertations/fullcit/9316016
- **Dynamic commercialization: An organizational economic analysis of innovation in the medical diagnostic imaging industry** by Mitchell, William Gordon, PhD from UNIVERSITY OF CALIFORNIA, BERKELEY, 1988, 249 pages
  http://wwwlib.umi.com/dissertations/fullcit/8916800

Keeping Current

Ask the medical librarian at your library if it has full and unlimited access to the *ProQuest Digital Dissertations* database. From the library, you should be able to do more complete searches via **http://wwwlib.umi.com/dissertations**.

CHAPTER 5. PATENTS ON DIAGNOSTIC IMAGING

Overview

Patents can be physical innovations (e.g. chemicals, pharmaceuticals, medical equipment) or processes (e.g. treatments or diagnostic procedures). The United States Patent and Trademark Office defines a patent as a grant of a property right to the inventor, issued by the Patent and Trademark Office.[8] Patents, therefore, are intellectual property. For the United States, the term of a new patent is 20 years from the date when the patent application was filed. If the inventor wishes to receive economic benefits, it is likely that the invention will become commercially available within 20 years of the initial filing. It is important to understand, therefore, that an inventor's patent does not indicate that a product or service is or will be commercially available. The patent implies only that the inventor has "the right to exclude others from making, using, offering for sale, or selling" the invention in the United States. While this relates to U.S. patents, similar rules govern foreign patents.

In this chapter, we show you how to locate information on patents and their inventors. If you find a patent that is particularly interesting to you, contact the inventor or the assignee for further information. **IMPORTANT NOTE:** When following the search strategy described below, you may discover non-medical patents that use the generic term "diagnostic imaging" (or a synonym) in their titles. To accurately reflect the results that you might find while conducting research on diagnostic imaging, we have not necessarily excluded non-medical patents in this bibliography.

Patents on Diagnostic Imaging

By performing a patent search focusing on diagnostic imaging, you can obtain information such as the title of the invention, the names of the inventor(s), the assignee(s) or the company that owns or controls the patent, a short abstract that summarizes the patent, and a few excerpts from the description of the patent. The abstract of a patent tends to be more technical in nature, while the description is often written for the public. Full patent descriptions contain much more information than is presented here (e.g. claims, references, figures, diagrams, etc.). We will tell you how to obtain this information later in the chapter.

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[8]Adapted from the United States Patent and Trademark Office:
http://www.uspto.gov/web/offices/pac/doc/general/whatis.htm.

The following is an example of the type of information that you can expect to obtain from a patent search on diagnostic imaging:

- **Apparatus and method for transition between fluoro-mode and diagnostic mode magnetic resonance imaging**

  Inventor(s): Hawryszko; Christine (Redwood City, CA), Kaufman; Leon (San Francisco, CA)

  Assignee(s): Toshiba America MRI, Inc. (Tustin, CA)

  Patent Number: 6,690,961

  Date filed: May 12, 2000

  Abstract: The invention is an MRI imaging system that seamlessly switches between a fast imaging fluoro-mode and a **diagnostic imaging** mode. The fluoro-mode is used to quickly obtain an image which provides confirmation that the selection of MR imaging parameters are proper and to provide an opportunity to adjust these selections. After the selections have been confirmed and adjusted, the system is switched to a normal diagnostic image mode using the parameter selects as modified during fluoro-mode imaging.

  Excerpt(s): This invention relates generally to magnetic resonance (MR) imaging techniques. In particular, the invention relates to seamlessly switching between fast MR fluoro and MR **diagnostic imaging** modes. Magnetic Resonance Imaging (MRI) is a widely accepted and commercially available technique for obtaining digitized visual images representing the internal structure of objects (such as the human body) having substantial populations of atomic nuclei that are susceptible to nuclear magnetic resonance (MR) phenomena. In MRI, nuclei in the body of a patient to be imaged are polarized by imposing a strong main magnetic field (B.sub.0) on the nuclei. The nuclei are excited by a radio frequency (RF) signal at characteristic MR (Larmor) frequencies. By spatially distributing localized magnetic fields surrounding the body and analyzing the resulting RF responses from the nuclei, a map or image of these nuclei responses as a function of their spatial location is generated and displayed. An image of the nuclei responses provides a non-invasive view of a patient's internal organs and of other tissues. The MRI system operator controls the system through a computer workstation 22 with a keyboard, screen and other operator input/output devices. The MRI system operator positions the patient within the imaging volume using a movable table 20, and selects one or more imaging parameters, such as: (a) imaging technique, e.g., diagnostic MRI, fast-MRI, MR fluoroscopy, and MR vascular imaging; (b) pulse sequence, e.g., spin echo, field echo, inversion recovery, fast spin echo and fast field echo; (c) imaging modes, e.g., multi-slice MR scans, multi-slab three-dimensional (3D) scans, multi-echo scans, multi-coverage (to cover an area greater than that covered by a single scan), and multi-angle acquisition (multiple groups of slices with different angles in the same TR); (d) fat suppression and separation techniques, and (e) artifact suppression techniques.

  Web site: http://www.delphion.com/details?pn=US06690961__

- **Automatic liquid injection system and method**

  Inventor(s): Brochot; Jean (Feigeres, FR), Golay; Christophe (Les Eplanes, CH), Jakob; Laurent (Soral, CH), Mathieu; Christian (Remoray, FR), Schneider; Michel (Troinex, CH), Yan; Feng (Meyrin, CH)

  Assignee(s): Bracco Research S.A. (Geneva, CH)

  Patent Number: 6,726,650

  Date filed: December 3, 1998

  Abstract: A power assisted method and injector device for controllably delivering to patients a dispersion medicament or diagnostically active agent, the homogeneity of which is preserved throughout delivery. Diagnostically active agents disclosed are gas microbubble suspensions useful in ultrasonic **diagnostic imaging** and liposomal formulations in which liposome vesicles are loaded with iodinated compounds.

  Excerpt(s): The present invention concerns the administration by injection to patients of liquid compositions for therapeutic or diagnostic purposes. It more particularly concerns a power assisted method and device for controllably dispensing a liquid medicament or diagnostically active contrast agent, the homogeneity of which is preserved throughout delivery. Typically, the contrast agent is an aqueous suspension of gas filled microvesicles, namely microbubbles bounded by a surfactant stabilized gas/liquid interface, or microballoons bounded by a tangible material envelope. Power injectors and mechanically assisted infusion systems for controllably dispensing therapeutically active medications are well known in the art. Typically, such devices include an automatic injector for syringes containing an injectable liquid and a plunger or piston movable within the barrel of the syringe to expel said liquid through a tip thereof and injecting into a patient via a tubing connected to an injecting needle or catheter. For controlling the injections parameters, the plunger is driven by means of an electromechanical arrangement organised to push the plunger at a desired rate, continuously or at chosen intervals, so that the amount of medication is delivered to the patient's body under strictly determined conditions. For instance, in the case of intravenous dispensing contrast agent formulations for diagnostic purposes (X-ray, MRI or ultrasound), the rate and the mode of injection can be accurately controlled to match the requirements of the imaging methods and detector systems used to investigate the circulation or a specific organ in the body. Typical automated injection devices are illustrated and described in U.S. Pat. No. 5,176,646 incorporated herein by reference. Although the automated injectors known are highly sophisticated instruments capable of mastering most injection problems experienced in practice, there remains at least one variable factor not yet under control. Indeed the known power injectors have no control of the homogeneity of the liquid stored within the syringe barrel during the course of its application. This kind of problem is of course non-existent with "true solutions" (i.e. solutions to the molecular level) since in this case no concentration change can occur in the course of time; it however may become important when the injectable formulation is a suspension or dispersion of active particles which tend to settle, coalesce or segregate with time in the syringe. Indeed, even some modest separation of the particles by gravity or otherwise from the carrier liquid in the course of administration of the formulation may have very important influence on reproducibility and reliability of the tests. Hence, in this case, a method and means to keep the syringe content homogeneous during injection is highly desirable. The present method and device constitute a very effective solution to the aforediscussed problem.

  Web site: http://www.delphion.com/details?pn=US06726650__

- **Bioactivated diagnostic imaging contrast agents**

  Inventor(s): Dumas; Stephane (Cambridge, MA), Dunham; Stephen O. (Madison, NJ), Lauffer; Randall B. (Brookline, MA), McMurry; Thomas J. (Winchester, MA), Parmelee; David J. (Belmont, MA), Scott; Daniel M. (Acton, MA)

  Assignee(s): Epix Medical, Inc. (Cambridge, MA)

  Patent Number: 6,709,646

  Date filed: September 14, 2001

  Abstract: The present invention relates to improved diagnostic agents for **Magnetic Resonance Imaging** and optical imaging. In particular, this invention relates to MRI and optical imaging agents that allow for the sensitive detection of a specific bloactivity within a tissue. These agents are prodrug contrast agents which are bioactivated in vivo in the presence of the specific bioactivity. This invention also relates to pharmaceutical compositions comprising these agents and to methods of using the agents and compositions comprising the agents.

  Excerpt(s): This invention relates to improved diagnostic agents for **Magnetic Resonance Imaging** (MRI) and optical imaging. These agents permit the sensitive detection of a specific bioactivity within a tissue. This invention also relates to pharmaceutical compositions comprising these agents and to methods of using the agents and compositions comprising the agents. Diagnostic imaging techniques, such as MRI, **x-ray** imaging, nuclear radiopharmaceutical imaging, ultraviolet/visible/infrared light imaging, and ultrasound imaging, have been used in medical diagnosis for a number of years. Commonly used contrast materials include organic molecules, metal ions, salts or chelates, particles (particularly iron particles), or labeled peptides, proteins, polymers or liposomes. After administration, these agents may non-specifically diffuse throughout body compartments prior to being metabolized and/or excreted; these agents are generally known as non-specific agents. Alternatively, these agents may have affinity for a particular body compartment, cell, organ, or tissue component; these agents can be referred to as targeted contrast agents.

  Web site: http://www.delphion.com/details?pn=US06709646__

- **Computing by anticipation for nuclear medicine imaging**

  Inventor(s): Brack; Jerome W. (Solon, OH), Gagnon; Daniel (Twinsburg, OH)

  Assignee(s): Koninklijke Philips Electronics, N.V. (Eindhoven, NL)

  Patent Number: 6,553,248

  Date filed: November 9, 1999

  Abstract: A method for reconstructing an image representation of a subject from data sets collected using a medical **diagnostic imaging** apparatus is provided. The method includes defining operations which are performed in reconstructing desired types of image representations. The operations are applicable to data sets having particular formats. Data sets having particular formats are identified, and operations are selected from the defined operations based upon the particular format of the identified data sets. When a detected load on available image processing equipment is below a desired level, then selected operations are automatically performed on the identified data sets.

  Excerpt(s): The present invention relates to the art of medical **diagnostic imaging.** It finds particular application in conjunction with imaging apparatus such as nuclear or

gamma cameras of the type use in single photon emission **computed tomography** (SPECT), whole body nuclear scans, positron emission tomography (PET), etc., and will be described with reference thereto. However, it is to be appreciated that the present invention is also amenable to other like applications and other imaging modes. Diagnostic nuclear imaging is used to study a radionuclide distribution in a subject. Typically, in SPECT for example, one or more radiopharmaceuticals or radioisotopes are injected into a subject. The radiopharmaceuticals are commonly injected into the subject's blood stream for imaging the circulatory system or for imaging specific organs which absorb the injected radiopharmaceuticals. One or more gamma or scintillation camera detector heads, typically including a collimator, are placed adjacent to a surface of the subject to monitor and record emitted radiation. The camera heads typically include a scintillation crystal which produces a flash or scintillation of light each time it is struck by radiation emanating from the radioactive dye in the subject. An array of photomultiplier tubes and associated circuitry produce an output signal which is indicative of the (x, y) position of each scintillation on the crystal. Often, the heads are rotated or indexed around the subject to monitor the emitted radiation from a plurality of directions to obtain a plurality of different views. The monitored radiation data from the plurality of views is reconstructed into a three dimensional (3D) image representation of the radiopharmaceutical distribution within the subject. Generally, a complete diagnostic nuclear imaging study includes the coordination of several steps in order to achieve clinically significant and useful results. Those steps can be broken down as follows: preparing the subject including injecting the subject with the radioactive dye, positioning the subject properly in relation to the imaging apparatus, acquiring the data, processing and presenting the images, clinical interpretation, and optionally archiving of the images.

Web site: http://www.delphion.com/details?pn=US06553248__

- **Diagnostic and contrast agent**

  Inventor(s): Schroder; Ulf (Lund, SE)

  Assignee(s): Amersham Health AS (Oslo, NO)

  Patent Number: 6,544,496

  Date filed: June 7, 1995

  Abstract: The present invention relates to a method of contrast enhanced ultrasonic **diagnostic imaging** comprising administering to a subject a contrast enhancing amount of spherical particles comprising a matrix enclosing a gaseous contrast agent which reflects sound waves, said matrix being a biocompatible, biodegradable, non-immunogenic non-polyamino acid synthetic polymer; and generating an ultrasonic image of said subject. The polymer may be selected from the group consisting of carbohydrates, carbohydrate derivatives and non-polyamino acid synthetic polymers.

  Excerpt(s): The invention relates to response particles, preferably spheres, and their use as a diagnostic and contrast agent. In diagnostic medicine, contrast agents are today being used primarily in **X-ray** diagnostics where an increased contrast effect is obtained during examination of, for example, internal organs, such as the kidneys, the urinary tract, the digestive tract, the vascular system of the heart (angiography), etc. This contrast effect is based upon the fact that the contrast agent itself is less permeable to **X-rays** than the surrounding tissue, as a result of which a different blackening of the **X-ray** plate is obtained. X-raying implies certain radiation hazards, but during angiography the complication risk is associated in particular with the use of contrast agents.

Web site: http://www.delphion.com/details?pn=US06544496__

- **Diagnostic image capture**

  Inventor(s): de Jong; Elbert de Josselin (Bussum, NL), Van der Veen; Monique H. (Almere, NL), Waller; Elbert (Amsterdam, NL)

  Assignee(s): Inspektor Research Systems B.V. (Amsterdam, NL)

  Patent Number: 6,597,934

  Date filed: November 6, 2000

  Abstract: A novel medical **diagnostic imaging** system, method, and apparatus is disclosed. In one embodiment, a reference image is compared with each image in an image stream, and a similarity value is calculated to reflect the degree of similarity between them. If the similarity value is high enough, the image is saved for later use by the diagnostician.In other embodiments, a running list is maintained of the x best-matching frames from the video stream. Images from the list are displayed for the operator.

  Excerpt(s): The present invention relates to a system, method, and apparatus for **diagnostic imaging.** More specifically, a stream of images is compared to a reference image of the diagnostic subject, and image frames with a level of similarity to the reference image are stored for use by a diagnostician in comparison with the reference image. Imaging is used for diagnosis and analysis in various medical fields. In many such applications, a series of images of the diagnostic subject (e.g., a tooth, bone, tumor, or breast), typically including an initial baseline, or "reference," image and subsequent images, depict changes in a particular structure or structures. Similarities and differences between the baseline image and the later-acquired images are examined and interpreted to aid in the diagnosis or study. A major difficulty with these tools for diagnosis is acquisition of the baseline and later-acquired images from (at least approximately) the same angle, rotation, and zoom/distance with the same lighting conditions and (especially when soft tissues are involved) locations of structures within the subject. Rigid frames have been used in attempts to fix the camera and subject in the same relative position for each image acquisition. Such frames, however, often result in significant discomfort for the patient and may still yield images that are not very well matched with the baseline image. Poorly matched images are, of course, less useful than well matched images for diagnosis and study.

  Web site: http://www.delphion.com/details?pn=US06597934__

- **Diagnostic imaging method**

  Inventor(s): Grass; Michael (Hamburg, DE), Koehler; Thomas (Norderstedt, DE)

  Assignee(s): Koninklijke Philips Electronics N.V. (Eindhoven, NL)

  Patent Number: 6,654,444

  Date filed: January 24, 2002

  Abstract: The invention relates to a **diagnostic imaging** method for interventional radiology. According to this method layer images (1, 2) of the examination zone are reproduced in a three-dimensional view in such a manner that the trajectory of the interventional instrument (4) forms the common line of intersection (3) of the image

planes of the layer images (1, 2). In accordance with the visualization method of the invention, at the same time a target zone (6, 6') that is to be reached by the interventional instrument (4) is displayed at the same time, so that the operating surgeon can interactively guide the interventional instrument (4) towards the target zone (6, 6').

Excerpt(s): The invention relates to a **diagnostic imaging** method for the visualization of the position of an interventional instrument within an examination zone, in which method the position of the instrument is determined and reproduced in the form of an image simultaneously with at least two physiological layer images of the examination zone. The invention also relates to a CT apparatus for carrying out such a method and to a computer program for controlling a CT apparatus. In interventional radiology a surgical intervention is performed while being monitored by way of a **diagnostic imaging** apparatus. The position of an interventional instrument, for example, a biopsy needle, a catheter or a probe within an examination zone is then determined. C-arm **X-ray** apparatus, CT tomography apparatus or also MR apparatus are customarily used for imaging. During the entire execution of the intervention image data is continuously acquired and visualized in such a manner that the surgeon can see the exact position of the instrument and guide it such that accidental damaging of internal organs is avoided and the target area of the intervention is reliably reached. The anatomical details in the vicinity of the interventional instrument are reproduced with a high spatial resolution during on-line monitoring of the examination zone by the imaging diagnostic apparatus, so that interventional radiology enables exact and effective interventions to be performed with only minimum physiological and psychological stress for the patient. The cited known method has the drawback that, because of the limitation to two-dimensional layer images, the operating surgeon is offered no more than an inadequate spatial impression of the examination zone. Granted, the layer images reveal the anatomical details in the vicinity of the interventional instrument, but severe demands are made on the power of spatial imagination of the operating surgeon who must derive the spatial position of the instrument within the examination zone from the two-dimensional images in order to reach the target area of the intervention in a reliable manner and with the necessary foresight. According to the known method the interventional instrument can be guided in a controlled manner only when the exact trajectory of the instrument has already been defined in preparation of the intervention on the basis of pre-operative volume images of the examination zone.

Web site: http://www.delphion.com/details?pn=US06654444__

- **External patient contouring**

  Inventor(s): Carlson; Robert K. (Willoughby, OH), DeMeester; Gordon D. (Wickliffe, OH), Ruohonen; Jarmo O. (Vantaa, FI), Steckner; C. Michael (Richmond Heights, OH)

  Assignee(s): Koninklijke Philips Electronics, N.V. (Eindhoven, NL)

  Patent Number: 6,594,516

  Date filed: July 18, 2000

  Abstract: An open MRI or other **diagnostic imaging** system (A) generates a three-dimensional diagnostic image representation, which is stored in an MRI image memory (26). A laser scanner or other surface imaging system (B) generates a volumetric surface image representation that is stored in a surface image memory (34). Typically, the volume and surface images are misaligned and the magnetic resonance image may have predictable distortions. An image correlating system (C) determines offset, scaling, rotational, and non-linear corrections to the magnetic resonance image representation,

which are implemented by an image correction processor (48). The corrected magnetic resonance image representation and the surface image representation are combined (50) and stored in a superimposed image memory (52). A video processor (54) generates image representations from selected portions of the superimposed image representation for display on a human-readable monitor (56).

Excerpt(s): The present invention relates to the **diagnostic imaging** arts. It finds particular application in conjunction with **diagnostic imaging** in open MRI scanners for oncology treatment applications and will be described with particular reference thereto. It will be appreciated, however, that the invention is also applicable to other types of **diagnostic imaging** for oncological purposes and for **diagnostic imaging** for other purposes. In oncological planning, the oncologist typically determines a point of entry on the patient's skin and a trajectory through the patient. Typically, the oncologist plans a trajectory and the point of entry in conjunction with projection **x-ray** images, CT scanner images, or other diagnostic images. One of the difficulties encountered in oncological procedures is accurately aligning the **x-ray** beam with the internal tumor. If the selected trajectory is only slightly off, the **x-ray** beam will treat most of the tumor, but leave a small segment un-irradiated. Un-irradiated tumor tissue can survive the treatment.

Web site: http://www.delphion.com/details?pn=US06594516__

- **Focused point oversampling for temporally and spatially resolving dynamic studies**

  Inventor(s): Halamek; James A. (Independence, OH), Liu; Kecheng (Solon, OH)

  Assignee(s): Koninklijke Philips Electronics, N.V. (Eindhoven, NL)

  Patent Number: 6,597,936

  Date filed: November 14, 2000

  Abstract: A region of interest of a subject is disposed in an imaging region (10) of a **magnetic resonance imaging** apparatus. A contrast material (70) is injected into the subject. An operator initiates a series of fast scan imaging sequences to track the position for entry of the contrast material, into the region of interest. A trajectory through a k-space is selected for the fast scan imaging sequences that both generates data lines for the fast scan images and oversamples a common data point (76). A peak intensity of the oversampled common point (76) indicates that the bolus of contrast agent (70) has arrived. A sequence controller (40) initiates a **diagnostic imaging** sequence (80). The operator views the fast scan image and has the option to abort the diagnostic sequence (80) if the fast scan image does not verify that the contrast agent has arrived in the region of interest. The system continues to taking fast scan images until the arrival of the bolus of contrast agent has been verified.

  Excerpt(s): The present invention relates to the **diagnostic imaging** arts. It finds particular application in conjunction with magnetic resonance angiography and will be described with particular reference thereto. It is to be appreciated that the present invention is also applicable to tracking other types of moving objects using **magnetic resonance imaging** and is not limited to the aforementioned applications. In **magnetic resonance imaging,** a uniform main magnetic field is created through an examination region in which a subject to be examined is disposed. A series of radio frequency (RF) pulses are applied to the examination region to excite and manipulate magnetic resonance in hydrogen or other selected dipoles. Gradient magnetic fields are conventionally applied to encode information in the excited resonance. In contrast

enhanced magnetic resonance angiography or drug uptake studies, it is often desired to add a contrast agent to enhance the blood image. That is, the subject is injected with a material that enhances the blood signal. The contrast agent improves the visibility of the circulatory system or specific tissues that absorb the contrast agent in the MRI image.

Web site: http://www.delphion.com/details?pn=US06597936__

- **Fullerene (C60)-based X-ray contrast agent for diagnostic imaging**

  Inventor(s): Sagman; Uri (Toronto, CA), Wharton; John T. (Houston, TX), Wilson; Lon J. (Houston, TX)

  Assignee(s): William Marsh Rice University (Houston, TX)

  Patent Number: 6,660,248

  Date filed: November 9, 2001

  Abstract: An contrast agent for therapeutic or diagnostic treatment comprises a fullerene scaffold and an iodinated moiety bonded to the scaffold. The agent may further comprise a water solubilizing moiety bonded to the scaffold, which may be a serinol malonodiamide, hydroxyl, and 1,3-diol. The fullerene scaffold may comprise an empty fullerene or an endohedral fullerene. A method for making the agent includes a) synthesizing iodinating moieties, b) protecting serinols, forming protected serinols, c) attaching the protected serinols to the iodinated moieties, forming iodinated serinols, d) attaching the iodinated serinols to the fullerene scaffold, and, optionally, d) de-protecting the serinols. Also disclosed are a method for providing diagnostic treatment to a patient comprising administering to said patient a radiopaque effective amount of a contrast agent comprising a fullerene scaffold and an iodinated moiety, a method of making a blood pool agent.

  Excerpt(s): Not Applicable. This invention relates to a new contrast agent for medical use in diagnostic **x-ray** imaging and method for making the same. The compound comprises an **x-ray** contrast agent based on a fullerene (C.sub.60) scaffolding material. Since the fortuitous discovery of **X-rays** by Wilhelm C. Rontgen in 1895, **X-ray** radiography has evolved into the foundation of contemporary medical imaging. The term "X-ray radiography" can be taken to encompass all of the technology involved in the creation of medically useful images, from the production of **X-ray** radiation to the processing of raw photographic, or more recently, digital data. Although the past two decades have experienced an explosive growth in ultrasound and **magnetic resonance imaging** (MRI) modalities (due largely to the advent of the microchip), approximately 75-80% of all imaging procedures still entail the use of **X-rays.**

  Web site: http://www.delphion.com/details?pn=US06660248__

- **Inverse planning for intensity-modulated radiotherapy**

  Inventor(s): Johnson; Scott L. (Madison, WI), McNutt; Todd R. (Verona, WI), Tipton; R. Keith (Verona, WI), Ward; R. Terry (Madison, WI)

  Assignee(s): Koninklijke Philips Electronics N.V. (Eindhoven, NL)

  Patent Number: 6,735,277

  Date filed: May 23, 2002

Abstract: A radiation treatment apparatus (10) includes a **diagnostic imaging** scanner (12) that acquires a diagnostic image of a subject. A contouring processor (54) computes a radiation treatment objective based thereon. A radiation delivery apparatus (60) delivers radiation to the subject. An inverse planning processor (80) computes radiation beamlet parameters conforming with the radiation treatment objective by: grouping the beamlet parameters; assigning a weight to each group (82, 84, 86); optimizing a first group (82) to produce an intermediate dosage objective corresponding to the treatment objective weighted by a weight of the first group (82); and optimizing successive groups (84) to produce with the previously optimized groups (82) an increasing intermediate dosage objective corresponding to the treatment objective weighted by the combined weights of the previous and current groups (82, 84). A conversion processor (90) converts the optimized beamlet parameters into configuration parameters of the radiation delivery apparatus (60).

Excerpt(s): The present invention relates to the irradiating arts. It particularly relates to radiation treatment of a subject using spatially intensity-modulated radiation to deliver targeted and controlled dosage distributions, and will be described with particular reference thereto. However, the invention will also find application in conjunction with controlled delivery of radiation for other applications such as **diagnostic imaging** as well as in other radiation absorption analyses such as computation of light absorption for optical modeling. Oncological radiation therapy (sometimes called radiotherapy) is used for controlling, reversing, or sometimes even eliminating cancerous growths. Ionizing radiation such as high energy photons (e.g., **x-rays** or gamma rays), proton or neutron particles, or the like are applied to a cancerous tumor or other cancerous region. The ionizing radiation damages cellular DNA which can kill irradiated cells. Because growing and rapidly multiplying cancer cells are typically more readily damaged by the radiation and less able to repair such damage than are healthy cells, there is usually a beneficially built-in selectivity favoring elimination of cancerous tissue and survival of healthy tissue. However, irradiated healthy tissue is usually also damaged by the radiotherapy to at least some extent, and such radiation damage can produce highly detrimental side-effects to the therapy which are preferably minimized or avoided. To reduce damage to healthy tissue, radiotherapy typically includes a series of treatments performed over an extended period of time e.g., over several weeks. Serial treatment facilitates beneficial repair of damaged non-cancerous cells between treatments.

Web site: http://www.delphion.com/details?pn=US06735277__

- **Method and apparatus for reducing noise artifacts in a diagnostic image**

  Inventor(s): Lin; Zhongmin Steve (Solon, OH)

  Assignee(s): Koninklijke Philips Electronics N.V. (Eindhoven, NL)

  Patent Number: 6,697,663

  Date filed: November 9, 2000

  Abstract: A The medical **diagnostic imaging** apparatus includes a source (12) for generating **x-rays,** an image receptor (26) for receiving the **x-rays** and generating image data, and an image processing subsystem (6) for generating corrected image data from the image data acquired by the image receptor. The image processing subsystem includes a processor (46) that is programmed to generate noise image data (54) by high-pass filtering (52) uncorrected diagnostic image data acquired by the image receptor, to determine statistical data (64, 66) from a first subset (56) of the noise image data, and to correct a subset (36) of the uncorrected diagnostic image data based on the statistical

data, the subset of the uncorrected diagnostic image data corresponding to the subset of the noise image data.

Excerpt(s): The present invention relates to the medical **diagnostic imaging** arts. It finds particular application in conjunction with a method and apparatus for reducing, suppressing, and/or eliminating noise and/or other image artifacts that are present in a diagnostic image that is generated by a flat panel image receptor of a **diagnostic imaging** system, and will be described with particular reference thereto. However, it should be appreciated that the present invention may also find application in conjunction with other types of imaging systems and applications where reducing noise and other image artifacts is desired. The sensitivity of **x-ray** image detector devices, including flat panel image sensors or receptors, is limited by noise, i.e., random signal fluctuations that compete with data or other information that represents or otherwise defines a captured image. One type of noise that is characteristic of some flat panel image receptors, such as amorphous Silicon-based, flat panel image receptors, is line-correlated noise. Line-correlated noise can be defined as random fluctuations that affect a whole raster line of a video frame in a manner that causes all the picture elements ("pixels") of a raster line to commonly deviate from their actual captured image values. The manifestation of line correlated-noise in a video image displayed on a video monitor is stripes that fluctuate in intensity across the width of the image. This is an undesirable effect that is highly distracting to medical personnel, such as physicians, when using a **diagnostic imaging** system, such as a fluoroscopic, radiographic, computed tomographic (CT), magnetic resonance (MR) imaging system, nuclear camera, etc., to perform interventional procedures.

Web site: http://www.delphion.com/details?pn=US06697663__

- **Multi-layer x-ray detector for diagnostic imaging**

  Inventor(s): Mattson; Rodney A. (Mentor, OH), Shapiro; Olga (Haifa, IL)

  Assignee(s): Koninklijke Philips Electronics, N.V. (Eindhoven, NL)

  Patent Number: 6,553,092

  Date filed: March 7, 2000

  Abstract: X-rays from an **x-ray** tube (16) pass through an examination region (14) and are detected by a single or two-dimensional **x-ray** detector (20). The **x-ray** detector (20) includes an array (22) of photodiodes, CCD devices, or other opto-electrical transducer elements. A matching array (24) of transparent scintillator crystals, e.g., CdWO.sub.4, is supported on and optically coupled to the photoelectric transducer array. A layer (26) of a high efficiency scintillator with a good spectral match with the opto-electrical transducer array but with limited light transmissiveness is optically coupled to the transparent scintillator array. The layer (26) is preferably zinc selenide ZnSe (Te). Electrical signals from the transducer array are reconstructed (32) into an image representation and converted into a human-readable display (38). To reduce cross-talk, the zinc selenide layer is etched with pits (40), sliced into strips (26'), cut into rectangles (26"), or has channels (44) cut into it. Scatter grids (46) are advantageously received in the channels. Alternately, the zinc selenide can be powdered, encased in a transparent binder, and applied as a coating layer (26"') to the individual transparent scintillator elements.

  Excerpt(s): The present invention pertains to the **diagnostic imaging** and radiation-to-electrical signal conversion arts. It finds particular application in conjunction with a two-

dimensional detector for computerized tomographic scanners and will be described with particular attention thereto. It is to be appreciated, however, that the invention will also find application in conjunction with conventional **x-ray** diagnostic systems, fluoroscopic **x-ray** systems, and other radiation detection systems for medical and non-medical examinations. A third generation CT scanner includes an **x-ray** tube which projects a fan-shaped beam of radiation across an examination region. An array of **x-ray** detectors is disposed across the examination region from the **x-ray** tube to receive radiation which has passed through the subject. The **x-ray** source and detectors rotate concurrently around the examination region to collect **x-ray** attenuation data along a multiplicity of paths. The **x-ray** detectors have included scintillation materials which convert received **x-rays** into light. The scintillation crystals are optically coupled to photomultiplier tubes, photodiodes, or CCD arrays. In single slice scanners, the **x-ray** beam was collimated into a thin fan beam and the detector included a linear array of detector elements. For faster data acquisition, detectors using two-dimensional arrays have also been utilized. A variety of scintillators have been utilized. Common scintillators include doped cesium iodide (CsI(Tl)), cadmium tungstate (CdWO.sub.4), bismuth germanate (Bi.sub.4 Ge.sub.3 O.sub.2, also known as BGO), and various ceramic scintillators such as Gd.sub.2 O.sub.2 S(Pr), (YGd) O (Eu.sub.2) or.sub.3 Gd.sub.3 Ga.sub.5 O.sub.12 (Cr). Cesium iodide scintillators tend to have a relatively long after-glow which interferes with high-speed data collection. Bismuth germanate tends to have a relatively low light output with a less than optimal spectral match to most photodiodes. Cadmium tungstate has a higher output than bismuth germanate, but still higher outputs and better spectral matches to the photodiodes would be advantageous. Ceramic scintillators tend to absorb the emitted fluorescent light so that the optical quantum detection efficiency is low. Thicker layers give disappointingly low light output. Thinner layers do not absorb a very high proportion of the incident **x-rays,** so that they result in low **x-ray** quantum detection efficiency and expose the patient to high **x-ray** dosage.

Web site: http://www.delphion.com/details?pn=US06553092__

- **Non-axial body computed tomography**

  Inventor(s): Rauchut; James R. (Ivyland, PA), Shukla; Himanshu P. (Gates Mills, OH)

  Assignee(s): Koninklijke Philips Electronics, N.V. (Eindhoven, NL)

  Patent Number: 6,618,613

  Date filed: May 24, 2001

  Abstract: In pediatric **diagnostic imaging,** a patient is seated upright on a patient couch (10) of a large bore CT scanner. The patient is seated such that coronal or near coronal slices are taken as opposed to axial slices as in typical CT scanners. The patient is stationarily supported in this position during imaging. A back support member (14) supports the back and side restraint panels (18) limit lateral movement. Restraint straps (30) further secure selected parts of the patient. The angle of the support member (14) is adjusted to conform with a selected imaging region by angle adjustment grooves (20). A removable telescopic head rest (40) positions the patient leaning forward. The back support (14), the side restraint panels (18), and the headrest (40) are all constructed of radiolucent materials.

  Excerpt(s): The present invention relates to the **diagnostic imaging** arts. It finds particular application in non-axial pediatric diagnosis using computed-tomography (CT) and will be described with particular reference thereto. However, it is to be

appreciated that it is also applicable to non-pediatric applications and imaging scenarios, and is not limited to the aforementioned applications. In a slice mode, CT scanners procure image data by taking a plurality of contiguous slices of a subject and reconstructing them into a volumetric representation. Typically this is done by taking axial or near axial slices, that is, taking slices that are substantially perpendicular to a longitudinal (head to toe) axis of a subject. In a spiral mode, volume images are collected by moving the **x-ray** beam through a spiral trajectory around the longitudinal axis. Commonly, the source rotates continuously while the patient support moves longitudinally back and forth.

Web site: http://www.delphion.com/details?pn=US06618613__

- **Operator interface for a medical diagnostic imaging device**

  Inventor(s): Hess; Doron (Haifa, IL), Lifshitz; Ilan (Tel-Aviv, IL)

  Assignee(s): GE Medical Systems Global Technology Company, LLC (Waukesha, WI)

  Patent Number: 6,638,223

  Date filed: December 28, 2000

  Abstract: A method for providing operator control over a medical diagnostic device includes the steps of assigning each device function in a preselected device function set that implements a preselected medical diagnostic device to at least one function activation area on an image display. Subsequently, the method monitors a touchscreen for a touch, and determines a selected activation area based on the touch and the function activation area. Once the selected activation area is determined, the method performs a device function associated with the selected activation area.

  Excerpt(s): The present invention relates to medical **diagnostic imaging** systems. In particular, the present invention relates to a user interface for a medical **diagnostic imaging** device. Today, doctors and technicians have at their disposal a wide range of ultrasound, **X-ray,** nuclear, and other medical **diagnostic imaging** systems with which to examine patients. The capabilities of these medical **diagnostic imaging** systems have increased dramatically since their introduction. Spurred on by the development of inexpensive but very sophisticated, powerful, and fast processing circuitry, designers of medical **diagnostic imaging** systems continue to add and enhance a wide range of device functions for medical **diagnostic imaging** systems. Thus, for example, an ultrasound imaging system may include 2D or 3D imaging, Doppler overlay, Colorflow scans, image frame recording and playback capabilities, image annotation and archiving, zoom, panning, and the like. The number and complexity of the device functions performed by medical **diagnostic imaging** system have increased to the point where many such peripheral devices include a full-sized keyboard and trackball as part of the user interface. The peripheral devices, however, increase the cost, complexity, and space required by the medical **diagnostic imaging** system. The keyboard, for example, is similar to that used on a home computer, and is required to direct the operation of the medical **diagnostic imaging** system. Doctors and technicians, however, are not computer scientists. In other words, the valuable time spent trying to understand and operate the peripheral devices of a medical **diagnostic imaging** system is better spent actually using the device to help a patient.

  Web site: http://www.delphion.com/details?pn=US06638223__

- **Partial rayline volumetric scanning ultrasonic diagnostic imaging system**

  Inventor(s): Henderson; Derek (Mill Creek, WA)

  Assignee(s): Koninklijke Philips Electronics N.V. (Eindhoven, NL)

  Patent Number: 6,547,735

  Date filed: December 5, 2001

  Abstract: An ultrasonic **diagnostic imaging** system and method are described for more uniformly sector scanning a volumetric or planar image region. The acquired data set comprises raylines extending over the full depth of field and raylines for which near-field image data is omitted. This results in a more uniform spatial sampling of both the near- and far-field regions when scanning with radially steered beams. Processing and storage requirements of the ultrasound system are correspondingly lessened.

  Excerpt(s): This invention relates to ultrasonic **diagnostic imaging** systems and, in particular, to ultrasonic **diagnostic imaging** systems which efficiently scan a volumetric region for three dimensional imaging. When a volumetric region or three dimensional object is ultrasonically scanned for three dimensional imaging, it is desirable to completely and adequately sample or scan the region or object so that the resultant three dimensional image faithfully and completely represents the internal detail of the volumetric or three dimensional object. A number of techniques have been proposed for ultrasonically scanning volumetric regions with the array transducer scanheads widely in use today for conventional two dimensional planar imaging. One of these techniques is to rotate the scanhead about a pivot point. This technique will sweep the image plane through a cylindrical or conical volume of the body when the scanhead is rotated about the center of the image plane, depending upon whether the scan plane is linear or sector shaped. Both external and internally operating scanheads have been developed for performing this scanning. The article "Multidimensional Ultrasonic Imaging for Cardiology" by McCann et al., published in the Proceedings of the IEEE, vol. 76, no. 9 (September 1988) at pages 1063-73 illustrates the rotational scan plane technique and describes an externally applied scanhead which scans the heart trans-thoracically. The scan plane is rotated by rotating a phased array transducer in angular increments with a stepper motor. The use of the motor enables uniform control of the angular rotational increments; in an illustrated application the scan plane is stepped in increments of exactly 1.8.degree. The rotational volumetric scanning technique can also be performed internal to the body with a multiplane transesophageal echocardiography (TEE) probe as described in U.S. Pat. No. 5,181,514. Since a multiplane TEE probe inherently performs the function of rotating an array transducer about its center, successive scan planes can be acquired and stored as the array transducer is rotated and then used to form a three dimensional image. Another technique for radially scanning a volumetric region is with a two dimensional array transducer which electronically steers beams in different radial directions. With elements extending in two dimensions, the beams transmitted and received by a two dimensional array can be steered to electronically scan a conical or pyramidal volume by phased timing of the array elements. The use of a two dimensional array to scan a volumetric pyramid is shown in the article "A Two-Dimensional Array for B-mode and Volumetric Imaging with Multiplexed Electrostrictive Elements, by R. E. Davidsen et al., Ultrasonic Imaging, vol 19 at pp 235-250 (1997). A complete ultrasound system for electronically scanning a volume with radially steered beams is shown in U.S. patent application Ser. No. 09/919,681, entitled "Three Dimensional Ultrasonic **Diagnostic Imaging** With High Density Hexagonal Acquisition" by Cooley et al.

Web site: http://www.delphion.com/details?pn=US06547735__

- **Polychelants, their complexes with metal ions, their preparation and their uses**

  Inventor(s): Gozzini; Luigia (Milan, IT), Maisano; Federico (Milan, IT), Murru; Marcella (Milan, IT)

  Assignee(s): Dibra S.p.A. (Milan, IT)

  Patent Number: 6,719,958

  Date filed: September 11, 2000

  Abstract: A new class of polychelants, their chelates with metal ions and their physiologically acceptable salts, useful, either as they are or in association or formulation with other components, for **diagnostic imaging** as general or specific contrast agents for specific tissues, organs or body compartments.

  Excerpt(s): The present invention concerns a new class of polychelants, their chelates with metal ions and their physiologically acceptable salts, which can be used, either as they are or in association or formulation with other components, for **diagnostic imaging** as general or specific contrast agents for specific tissues, organs or body compartments. The new class of contrast agents is constituted by molecules or macromolecules obtained by covalently linking chelants or chelates of metal ions to a "carrier" composed of an organic "backbone" which carries at least two primary amino groups, to which said chelants/chelates are attached through alkylene bridges. This class is characterized by the fact that at least one or, preferably, more primary amino groups of the "carrier" have been bifunctionalised, (through reductive dialkylation) with alkylene residues carrying said chelants or metal chelates or their salts, while the other primary amino groups can be present either as such (i.e., non-functionalized salified or not), or monofunctionalized with said chelant/chelate residues, the total number of chelants/chelates moieties attached to said amino groups being at least three. This class of contrast agents usually contains a high number of chelant/chelate residues per molecule, which are attached to the primary amino groups present in the carrier. In fact, depending on the structure of this carrier, the reactivity of the amino groups and the reaction conditions, up to two chelant/chelate residues can be attached to each primary amino group. This invention concerns also a peculiar process for the preparation of these molecules, as well as their uses.

  Web site: http://www.delphion.com/details?pn=US06719958__

- **Prodrugs for liver specific drug delivery**

  Inventor(s): Erion; Mark D. (Del Mar, CA), Reddy; K. Raja (San Diego, CA)

  Assignee(s): Metabasis Therapeutics, Inc. (San Diego, CA)

  Patent Number: 6,752,981

  Date filed: September 8, 2000

  Abstract: The present invention is directed towards novel cyclic phosph(oramid)ate prodrugs of alcohol, amine-, and thiol-containing drugs, their preparation, their synthetic intermediates, and their uses. Another aspect of the invention is the use of the prodrugs to treat diseases that benefit from enhanced drug distribution to the liver and like tissues and cells that express cytochrome P450, including hepatitis, cancer, liver

fibrosis, malaria, other viral and parasitic infections, and metabolic diseases where the liver responsible for the overproduction of the biochemical end product, e.g. glucose (diabetes); cholesterol, fatty acids and triglycerides (hyperlipidemia) (atherosclerosis) (obesity). In one apsect, the invention is directed towards the use of the prodrugs to enhance oral drug delivery. In another aspect, the prodrugs are used to prolong pharmacodynamic half-life of the drug. In addition, the prodrug methodology of the current invention is used to achieve sustained delivery of the parent drug. In another aspect, the prodrugs are used to increase the therapeutic index of the drug. In another aspect of the invention, a method of making these prodrugs is described. In another aspect, the prodrugs are also useful in the delivery of **diagnostic imaging** agents to the liver.

Excerpt(s): The present invention is directed towards novel prodrugs of alcohol, amine, and thiol-containing compounds, to their preparation, to their synthetic intermediates, and to their uses. Prodrugs of the invention may be used to deliver drugs to the liver with high tissue specificity. The following description of the background of the invention is provided to aid in understanding the invention, but is not admitted to be, or to describe, prior art to the invention. All cited publications are incorporated by reference in their entirety. Drug induced toxicities and pharmacological side effects are often associated with interactions by the drug or drug metabolite in tissues not associated with the pharmacological benefits of the drug therapy. In other cases, the desired pharmacological effect is poorly achieved either because of dose-limiting toxicities or inadequate drug levels in the target tissues. Thus, there is a need to deliver drugs to specific tissues or organs. High organ specificity can be achieved by a variety of mechanisms including local administration to the target organ and drug-protein conjugates. Local administration to the target organ is an invasive procedure. Drug-protein conjugates exhibit poor oral bioavailability, limitations in carrier manufacturing and drug loading, a potential for diminished liver uptake due to down regulation of the receptor in diseased tissue, and a high incidence of antibody induction. A third approach entails use of prodrugs that are activated by enzymes highly enriched in the target organ.

Web site: http://www.delphion.com/details?pn=US06752981__

- **Rendering of diagnostic imaging data on a three-dimensional map**

  Inventor(s): Keidar; Yaron (Haifa, IL)

  Assignee(s): Biosense, Inc. (New Brunswick, NJ)

  Patent Number: 6,650,927

  Date filed: August 18, 2000

  Abstract: A method and apparatus for mapping a structure in a body of a subject includes capturing a three-dimensional (3D) image of the structure comprising diagnostic information, and generating a 3D geometrical map of the structure using a probe inserted into the structure. The image is registered with the map, such that each of a plurality of image points in the image is identified with a corresponding map point in the map. The map is displayed such that the diagnostic information associated with each of the image points is displayed at the corresponding map point.

  Excerpt(s): The present invention relates generally to systems and methods for three-dimensional mapping and reconstruction, and specifically to mapping and reconstruction of the interior of body organs, such as the heart. Various methods of

diagnostic imaging are known in the art. Methods used for imaging the heart, for example, include fluoroscopy, angiography, echocardiography, **computed tomography** (CT), **magnetic resonance imaging** (MRI), positron emission tomography (PET) and single photon emission tomography (SPECT). Many of these methods produce three-dimensional (3D) image information, which can then be rendered for viewing in the form of parallel slices through the heart, or as a pseudo-3D display on a video monitor. In order to administer treatment, the treating physician must build a 3D picture in his or her mind based on the two-dimensional pictures that are displayed. The transposition is particularly tricky when therapy is to be administered inside the heart, such as local electrical ablation of aberrant electrical pathways, or laser myocardial revascularization. It is also known in the art to map the heart using a mapping probe, typically a catheter, inside the heart chambers. Exemplary methods and devices for this purpose are described in U.S. Pat. Nos. 5,471,982 and 5,391,199 and in PCT patent publications WO94/06349, WO96/05768 and WO97/24981, whose disclosures are incorporated herein by reference. U.S. Pat. No. 5,391,199, for example, describes a catheter that includes both electrodes for sensing cardiac electrical activity and miniature coils for determining the position of the catheter relative to an externally-applied magnetic field. Using this catheter a cardiologist can collect data from a set of sampled points in the heart within a short period of time, by measuring the electrical activity at a plurality of locations and determining the spatial coordinates of the locations. Locations of the mapping catheter within the heart can be superimposed on a 3D reconstruction of an image of the heart, such as an ultrasound image, acquired prior to or during the catheter study. Color codes are used to represent electrical activity sensed by the catheter.

Web site: http://www.delphion.com/details?pn=US06650927__

- **System for assistance of parameter determination and diagnosis in MRI dynamic uptake studies**

  Inventor(s): Liu; Kecheng (Solon, OH)

  Assignee(s): Koninklijke Philips Electronics, N.V. (Eindhoven, NL)

  Patent Number: 6,597,938

  Date filed: August 16, 2001

  Abstract: A parameter compilation memory (62, 114) stores patient physiological information and contrast agent arrival or uptake times (t.sub.D, t.sub.A, t.sub.V) from past patients. A triggering or synchronizing window processor (64, 112) sets a triggering window, i.e. estimates the arrival time, based on the past patient information. A subject (16) disposed within an imaging region (12, 90) is injected with a contrast agent (66). Arrival of the contrast agent in the imaging region is detected (72, 110) with a real time tracking method. **Diagnostic imaging** is commenced on the first to occur of the detection of contrast agent arrival within the window and the end of the triggering window. The uptake times for the subject (16) are compared to those stored in the memory (62, 114) and analyzed to propose a diagnosis.

  Excerpt(s): The present invention relates to the **diagnostic imaging** arts. It finds particular application in conjunction with contrast agent enhanced angiography such as magnetic resonance and **computed tomography** angiography and will be described with particular reference thereto. It will be appreciated, however, that the invention is also applicable to other types of magnetic resonance flow imaging and contrast agent enhanced imaging in other modalities. Magnetic resonance angiography is used to view the blood vessels of the body. Dipoles in the blood of the subject are excited and imaged

as they propagate through vessels of interest. A clinician analyzes the images to identify various circulatory abnormalities, such as slow flow points, partial blockages within vessels in the image, complete occlusions, and the like. In magnetic resonance angiography, the dipoles being imaged are in motion. Advantageously, the dipoles move though an imaging region, traveling along in the bloodstream. Magnetic resonance angiography imaging can be enhanced with a contrast agent, which is injected into the blood. A sequence is selected that shows the contrast agent very well against other tissue in a magnetic resonance image. Thus, it is very useful for viewing the blood vessels of the body.

Web site: http://www.delphion.com/details?pn=US06597938__

- **Tumor-targeted optical contrast agents**

  Inventor(s): Achilefu; Samuel I. (St. Louis, MO), Bugaj; Joseph E. (St. Charles, MO), Dorshow; Richard B. (St. Louis, MO), Rajagopalan; Raghavan (Maryland Heights, MO)

  Assignee(s): Mallinckrodt Inc. (St. Louis, MO)

  Patent Number: 6,641,798

  Date filed: May 23, 2001

  Abstract: Cyanine dye bioconjugates useful for **diagnostic imaging** and therapy are disclosed. The conjugates include several cyanine dyes with a variety of bis- and tetrakis (carboxylic acid) homologes. The compounds may be conjugated to bioactive peptides, carbohydrates, hormones, drugs, or other bioactive agents. The small size of the compounds allows more favorable delivery to tumor cells as compared to larger molecular weight imaging agents. The various dyes are useful over the range of 350 to 1,300 nm, the exact range being dependent upon the particular dye. The use of dimethylsulfoxide helps to maintain the fluorescence of the compounds. The inventive compounds are useful for **diagnostic imaging** and therapy, in endoscopic applications for the detection of tumors and other abnormalities, for localized therapy, for photoacoustic tumor imaging, detection and therapy, and for sonofluorescence tumor imaging, detection and therapy.

  Excerpt(s): This invention relates generally to compositions of cyanine dye bioconjugates with bioactive molecules for diagnosis and therapy, and particularly for visualization and detection of tumors. Several dyes that absorb and emit light in the visible and near-infrared region of electromagnetic spectrum are currently being used for various biomedical applications due to their biocompatibility, high molar absorptivity, and/or high fluorescence quantum yields. The high sensitivity of the optical modality in conjunction with dyes as contrast agents parallels that of nuclear medicine, and permits visualization of organs and tissues without the undesirable effect of ionizing radiation. Cyanine dyes with intense absorption and emission in the near-infrared (NIR) region are particularly useful because biological tissues are optically transparent in this region (B. C. Wilson, Optical properties of tissues. Encyclopedia of Human Biology, 1991, 5, 587-597). For example, indocyanine green, which absorbs and emits in the NIR region, has been used for monitoring cardiac output, hepatic functions, and liver blood flow (Y-L. He, et al., Measurement of blood volume using indocyanine green measured with pulse-spectrometry: Its reproducibility and reliability. Critical Care Medicine, 1998, 26(8), 1446-1451; J. Caesar, et al., The use of Indocyanine green in the measurement of hepatic blood flow and as a test of hepatic function. Clin. Sci. 1961, 21, 43-57), and its functionalized derivatives have been used to conjugate biomolecules for diagnostic purposes (R. B. Mujumdar, et al., Cyanine dye labeling reagents:

Sulformdocyanine succinimidyl esters. Bioconjugate Chemistry, 1993, 4(2), 105-111; U.S. Pat. No. 5,453,505; WO 98/48846; WO 98/22146; WO 96/17628; WO 98/48838).

Web site: http://www.delphion.com/details?pn=US06641798__

- **Ultrasonic diagnostic imaging transducer with hexagonal patches**

  Inventor(s): Averkiou; Michalakis (Kirkland, WA), Bruce; Matthew (Seattle, WA), Cooley; Clifford R. (Seattle, WA), Entrekin; Robert R. (Kirkland, WA), Fraser; John D. (Woodinville, WA), Pesque; Patrick Rene' (Scottsdale, AZ), Powers; Jeffry E. (Bainbridge Is., WA), Robinson; Brent Stephen (Kirkland, WA), Roundhill; David N. (Bothell, WA), Schwartz; Gary Allen (Seattle, WA), Skyba; Danny M. (Bothell, WA)

  Assignee(s): Koninklijke Philips Electronics N.V. (Eindhoven, NL)

  Patent Number: 6,623,432

  Date filed: July 17, 2001

  Abstract: An ultrasonic imaging method and apparatus are described for imaging the coronary arteries of the heart. The vascular system is infused with an ultrasonic contrast agent. A volumetric region of the heart wall including a coronary artery is three dimensionally scanned. A projection image of the volumetric region is produced from the scanning, providing a two dimensional contrast image of the coronary artery with the appearance of an angiogram. Preferably the coronary artery signals are segmented from contrast signals emanating from the myocardium and the heart blood pool so that the coronary arteries are clearly highlighted and distinct in the ultrasonic angiogram.

  Excerpt(s): This invention relates to ultrasonic **diagnostic imaging** systems and, in particular, to the use of ultrasonic **diagnostic imaging** systems to image the coronary arteries. Early detection of coronary artery disease is important for the treatment and prevention of myocardial infarction, the primary cause of death of adults in the world. One of the principal methods of detection of coronary artery disease at present is the diagnostic angiogram. An angiogram is acquired by injecting a radiopaque dye into the vascular system, usually by means of a catheter. The radiopaque dye infuses the coronary arteries, and a radiological projection is made of the infused arteries onto a radiographic sensor. The resultant angiogram will reveal the lumens of the arterial vessels of the heart as the radiopaque dye flows through them. A narrowing of the infused lumen will provide an indication of an obstruction of a vessel and a potential condition for infarction. Ultrasound has been considered as a possible modality to use for coronary artery examinations, which would have the advantage of eliminating the exposure of the patient to the radiation used to form the angiogram, to radiopaque dyes, and the surgical catheterization procedure. However, ultrasonic imaging has its own limitations. One is that the major coronary arteries are located on the irregularly curved surface of the heart and traverse tortuously along the epicardial surface of the heart. Thus, the coronary arteries cannot be viewed in a single image plane, the most prevalent way ultrasonic imaging is done. Furthermore, imaging of the coronary arteries is impeded by the rib cage, which largely blocks ultrasound, and by the motion of the heart itself. Thus, even when a portion of the coronary arteries is accessible to ultrasound, the images of the coronaries are likely to be fleeting, blurred, and of relatively poor resolution.

  Web site: http://www.delphion.com/details?pn=US06623432__

- **Ultrasonic method and system for shear wave parameter estimation**

  Inventor(s): Bonnefous; Odile (Nogent-sur-Marne, FR)

  Assignee(s): Koninklijke Philips Electronics N.V. (Eindhoven, NL)

  Patent Number: 6,561,981

  Date filed: April 23, 2001

  Abstract: The invention relates to an ultrasonic **diagnostic imaging** method for determining propagation parameters of transient shear wave front, comprising steps of forming transient shear waves in a tissue (5), acquiring ultrasonic image data (S,S*) of the tissue, along image lines (l), during a time delay (T.sub.SW) for a transient shear wave front to propagate over a depth (z) in said tissue, estimating the tissue velocity (V) for each line, constructing a tissue velocity image sequence [I(V)] from the ultrasonic data (S,S*) and the tissue velocities (V) on the lines, and deriving the velocities (C.sub.SW) of the shear wave front at instants of the sequence. Tissue parameters such as elasticity are then calculated from said front velocity. The invention also relates to an ultrasonic **diagnostic imaging** system having processing means (100, PROCESSING1, PROCESSING2) for carrying out this method. The processing means may be a computer program product having instruction to this end.

  Excerpt(s): The invention relates to a an ultrasonic method and an ultrasonic system for determining local propagation velocity of transient shear waves in a tissue, for displaying a sequence of velocity images of the transient shear waves and for determining tissue elasticity information. The invention finds its application in using this information as a tool to diagnose abnormalities, such as tumors or edemas, in a patient tissue. These abnormalities are known to show changes of their mechanical properties with respect to sound background tissue. Shear wave propagation information permits of localizing said abnormalities. A method for determining tissue elasticity in various parts of a body is already known from Sarvazyan, U.S. Pat. No. 5,606,971. According to this known method, ultrasonic waves are focussed at different location of a tissue, using a focused ultrasonic source that transmits said ultrasonic waves to its focal region. The focused ultrasonic source is preferably an ultrasound transducer of the phased array kind. Said focussed ultrasonic waves are amplitude modulated for generating shear waves at said different locations of the tissue. Said shear waves are further detected by measuring their amplitude and phase on the surface of the tissue. At least one propagation parameter of the shear waves in the tissue is determined from the phase and amplitude measures such as shear wave velocity, attenuation coefficient, amplitude and velocity of shear displacement of tissue particles in the propagating shear wave. A calculation, based on these measures, is performed and at least one mechanical parameter of tissue is determined such as the shear elasticity modules, Young modulus, dynamic shear viscosity, using known relations. The steps of the method are repeated for all amplitude modulated focused ultrasound waves, which are focused at said various locations. The calculated values of dynamic shear viscosity and elasticity modulus are displayed in function of the coordinates of said locations.

  Web site: http://www.delphion.com/details?pn=US06561981__

- **Variable axial shielding for pet imaging**

  Inventor(s): Popilock; Robert M. (Hudson, OH)

  Assignee(s): Koninklijke Philips Electronics, N.V. (Eindhoven, NL)

  Patent Number: 6,661,865

  Date filed: February 21, 2001

  Abstract: A **diagnostic imaging** system includes a rotating gantry (16) which defines a subject receiving aperture (18). A rotatable source of high energy penetrating radiation (20) and corresponding high energy radiation detector (26) are disposed across the subject receiving aperture (18). A plurality of nuclear detector heads (30a, 30b) are movably attached to the rotating gantry (16) in order to detect low energy radiation emitted by a radiopharmaceutical injected into the subject (12). Each of the nuclear detector heads (30a, 30b) within the system include a variable axial radiation shield (40a, 40b) disposed adjacent a radiation receiving face (38) on the detector head. The variable axial radiation shield (40a, 40b) includes a plurality of substantially parallel vanes (42) pivotally connected to each nuclear detector head (30a, 30b) for movement between an open configuration (FIG. 2) and a closed, radiation blocking configuration (FIG. 3).

  Excerpt(s): The present invention relates to the art of **diagnostic imaging.** It finds particular application in conjunction with multi-headed positron emission tomography (PET) scanners and will be described with particular reference thereto. However, it is to be appreciated that the present invention is also applicable to combined **computed tomography** (CT) and SPECT scanners as well as other diagnostic modes in which nuclear detector heads may become saturated and/or damaged from impermissibly high levels of radiation. Diagnostic nuclear imaging is used to study a radionuclide distribution in a subject. Typically, one or more radiopharmaceutical or radioisotopes are injected into a subject. The radiopharmaceuticals are commonly injected into the subject's bloodstream for imaging the circulatory system or for imaging specific organs that absorb the injected radiopharmaceuticals. Sensitive scintillation crystal camera detector heads are placed adjacent to a surface of the subject to monitor and record emitted radiation. Typically, the detector heads are rotated or indexed around the subject in order to monitor the emitted radiation from a plurality of directions. In single photon emission **computed tomography** (SPECT), emission radiation is detected by one or more collimated detector heads. In positron emission tomography (PET), data collection is limited to emission radiation that is detected concurrently by a pair of oppositely disposed detector heads. The detected radiation data is then reconstructed into a three-dimensional image representation of the radiopharmaceutical distribution within the subject. One of the problems with both PET and SPECT imaging techniques is that photon absorption and scatter by portions of the subject or subject support between the emitting radionuclide and the detector heads, distort the resultant image. In order to obtain more accurate SPECT and PET radiation attenuation measurements, a direct transmission radiation measurement is made using transmission **computed tomography** techniques. In the past, transmission radiation data was commonly acquired by placing a radioactive isotope line or point source opposite to a detector head, enabling the detector head to collect transmission data concurrently with the other two detector heads collecting emission data. This transmission data is then reconstructed into an image representation using conventional tomography algorithms. From this data, regional radiation attenuation properties of the subject, which are derived from the transmission **computed tomography** images, are used to correct or compensate for radiation attenuation in the emission data.

Web site: http://www.delphion.com/details?pn=US06661865__

Patent Applications on Diagnostic Imaging

As of December 2000, U.S. patent applications are open to public viewing.[9] Applications are patent requests which have yet to be granted. (The process to achieve a patent can take several years.) The following patent applications have been filed since December 2000 relating to diagnostic imaging:

- **Amyloid plaque aggregation inhibitors and diagnostic imaging agents**

  Inventor(s): Kung, Hank F.; (Wynnewood, PA), Kung, Mei-Ping; (Wynnewood, PA), Zhuang, Zhi-Ping; (Lansdale, PA)

  Correspondence: Sterne, Kessler, Goldstein & Fox Pllc; 1100 New York Avenue, N.W.; Washington; DC; 20005; US

  Patent Application Number: 20040131545

  Date filed: December 19, 2003

  Abstract: This invention relates to a method of imaging amyloid deposits and to labeled compounds, and methods of making labeled compounds useful in imaging amyloid deposits. This invention also relates to compounds, and methods of making compounds for inhibiting the aggregation of amyloid proteins to form-amyloid deposits, and a method of delivering a therapeutic agent to amyloid deposits.

  Excerpt(s): This application is a continuation of U.S. patent application Ser. No. 10/127,678, filed Apr. 23, 2002, which claims the benefit of U.S. Provisional Application No. 60/285,282, filed Apr. 23, 2001, the contents of which are entirely incorporated by reference herein. This invention relates to novel bioactive compounds, methods of **diagnostic imaging** using radiolabeled compounds, and methods of making radiolabeled compounds. Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by cognitive decline, irreversible memory loss, disorientation, and language impairment. Postmortem examination of AD brain sections reveals abundant senile plaques (SPs) composed of amyloid-.beta. (A.beta.) peptides and numerous neurofibrillary tangles (NFTs) formed by filaments of highly phosphorylated tau proteins (for recent reviews and additional citations see Ginsberg, S. D., et al., "Molecular Pathology of Alzheimer's Disease and Related Disorders," in Cerebral Cortex: Neurodegenerative and Age-related Changes in Structure and Function of Cerebral Cortex, Kluwer Academic/Plenum, NY (1999), pp. 603-654; Vogelsberg-Ragaglia, V., et al., "Cell Biology of Tau and Cytoskeletal Pathology in Alzheimer's Disease," Alzheimer's Disease, Lippincot, Williams & Wilkins, Philadelphia, Pa. (1999), pp. 359-372). Familial AD (FAD) is caused by multiple mutations in the A precursor protein (APP), presenilin 1 (PS1) and presenilin 2 (PS2) genes (Ginsberg, S. D., et al., "Molecular Pathology of Alzheimer's Disease and Related Disorders," in Cerebral Cortex: Neurodegenerative and Age-related Changes in Structure and Function of Cerebral Cortex, Kluwer Academic/Plenum, NY (1999), pp. 603-654; Vogelsberg-Ragaglia, V., et al., "Cell Biology of Tau and Cytoskeletal Pathology in Alzheimer's Disease," Alzheimer's Disease, Lippincot, Williams & Wilkins, Philadelphia, Pa. (1999), pp. 359-372).

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[9] This has been a common practice outside the United States prior to December 2000.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Automatic optimization of doppler display parameters**

  Inventor(s): Christopher, Donald; (Everett, WA), Johnson, Keith; (Lynnwood, WA), Morsy, Ahmed; (Bellevue, WA), Pesque, Patrick Rene; (Scottsdale, AZ), Robinson, Marshall; (Snohomish, WA), Routh, Helen; (Seattle, WA), Simon, Claudio; (Seattle, WA)

  Correspondence: Atl Ultrasound; P.O. Box 3003; 22100 Bothell Everett Highway; Bothell; WA; 98041-3003; US

  Patent Application Number: 20040102706

  Date filed: October 27, 2003

  Abstract: In an ultrasonic **diagnostic imaging** system, the parameters which govern the display of Doppler information are automatically optimized to make better use of the display range or area. Spectral Doppler information may be used to optimize a spectral display or a colorflow display, and colorflow Doppler information may be used to optimize a spectral display or a colorflow display. The optimization may be invoked by a manual user control which automatically optimizes one or a plurality of display parameters. Automatic optimization may be invoked only when called for by the user, or periodically after a time interval, a given number of heart cycles, or when the user has made a change to the display or imaging mode. Preferably the optimization processor runs continuously in the background so that optimized parameters are available immediately when called for. The optimization processor may utilize "hidden" Doppler data which has been acquired but is not used for display purposes.

  Excerpt(s): This invention relates to ultrasonic **diagnostic imaging** systems and, in particular, to ultrasonic **diagnostic imaging** systems in which Doppler display parameters are automatically optimized. Doppler imaging is performed when a clinician desires to acquire information about the flow of blood or moving tissues of a patient. The display of flow or motion velocity may be done by means of a spectral Doppler display in which velocities are displayed graphically, or by a color Doppler display in which velocities are displayed in shades or hues of color. In both cases the range of velocities displayed is bounded by graphical or color limits set by the continuous wave (cw) Doppler sampling rate, or the pulsed wave (pw) pulse repetition frequency (PRF). In many cases the range of blood or tissue velocities cannot be accurately predicted before the exam begins, and hence the clinician must make a number of adjustments as the exam commences and progresses in order to maximize the range of Doppler frequencies in the display and the resolution of the different velocities, and to minimize aliasing. Generally the clinician must adjust two or three controls in order to obtain the optimal display in the system's display area. It would be desirable to automate this adjustment process so that an optimal display is produced with little or no need for manual adjustment, enabling the clinician to gather optimized data upon commencement and progression of the exam. In accordance with the principles of the present invention an ultrasonic **diagnostic imaging** system is provided in which Doppler settings such as the Doppler PRF and the display baseline (position and polarity) are automatically optimized by the ultrasound system. The clinician can decide whether to have one, several, or all of the Doppler display parameters optimized automatically, and the periodicity with which optimization is updated. The spectral Doppler PRF and baseline offset and inversion can be automatically optimized using data within the spectral trace or color data of a corresponding color M-mode trace or color Doppler image. The color Doppler image PRF and baseline can be automatically

optimized using its own color Doppler estimation data or data within a corresponding spectral Doppler trace or color M-mode display. The color M-mode PRF and baseline can be automatically optimized using its own Doppler estimation data or data within a corresponding spectral Doppler trace or color Doppler display. This optimization can be performed on either live, real time displays or on displays of stored data such as Doppler Cineloop.RTM. information. The optimization calculations can be made using only displayed data, or data which is acquired and "hidden" from the user. These optimization techniques can be applied to all relevant Doppler targets such as blood flow, moving tissue, and contrast agents, and can be applied in all color Doppler modes such as velocity colorflow, color power imaging, tissue Doppler imaging, and power motion imaging, and in all spectral Doppler modes such as continuous wave, pulse wave, single angle, and vector Doppler.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Correction of local field inhomogeneity in magnetic resonance imaging apparatus**

  Inventor(s): Conolly, Steven; (Palo Alto, CA), Fahrig, Rebecca; (Palo Alto, CA), Pelc, Norbert J.; (Los Altos, CA)

  Correspondence: Beyer Weaver & Thomas Llp; P.O. Box 778; Berkeley; CA; 94704-0778; US

  Patent Application Number: 20040021464

  Date filed: August 5, 2002

  Abstract: Perturbations in a static magnetic field of **magnetic resonance imaging** apparatus are compensated by creating magnetic fields near an object creating the perturbations with the magnetic fields adjusted to offset the perturbations in the static magnetic field. In an embodiment where the perturbations are caused by an **x-ray** detector in a combined modality imaging apparatus, the coils are positioned to surround the **x-ray** detector and create magnetic fields in the static magnetic field outside of the detector which compensate for the perturbations caused by the **x-ray** detector.

  Excerpt(s): This invention relates generally to **magnetic resonance imaging** (MR), and more particularly, the invention relates to correction of local field inhomogeneity in MR apparatus. Conventionally, MR apparatus includes shim coils to correct main field, B.sub.0, inhomogeneity due to manufacturing tolerances and the like which can disturb the field. It is also known to provide external coils around the MR coils to counteract fields external to the MR apparatus. See U.S. Pat. No. 4,595,899, for example. These prior art shim coils are generally placed around the entire imaging volume. A problem has been recognized by applicants herein due to the presence of the **x-ray** detector in close proximity to the static magnetic field and resulting in an inhomogeneity in the static magnetic field near the detector which can adversely affect MR imaging. The problem can similarly occur with other components placed within or near to the imaging volume. The present invention is directed to overcoming this problem.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **DECOUPLING CIRCUIT FOR MAGNETIC RESONANCE IMAGING LOCAL COILS**

  Inventor(s): Jevtic, Jovan; (West Allis, WI), Menon, Ashok; (Milwaukee, WI), Seeber, Derek; (Wauwatosa, WI)

  Correspondence: Quarles & Brady Llp; 411 E. Wisconsin Avenue; Suite 2040; Milwaukee; WI; 53202-4497; US

  Patent Application Number: 20040100260

  Date filed: November 22, 2002

  Abstract: A decoupling circuit for decoupling an local coil during the application of an RF excitation signal in a **magnetic resonance imaging** system includes a passive switching circuit for switching an inductor in parallel with a capacitive circuit in the local coil, and a discharge circuit for discharging residual currents from the circuit, therefore allowing for rapid coupling and decoupling of the local coil.

  Excerpt(s): The field of the invention is **magnetic resonance imaging** (MRI) and in particular decoupling circuits for local coils for use in receiving MRI signals. In MRI, a uniform magnetic field B.sub.0 is applied to an imaged object along the z-axis of a Cartesian coordinate system, the origin of which is approximately centered within the imaged object. The effect of the magnetic field B.sub.0 is to align the object's nuclear spins along the z-axis. where.omega. is the Larmor frequency, and.gamma. is the gyromagnetic ratio which is constant and a property of the particular nuclei.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Diagnostic imaging**

  Inventor(s): Eriksen, Morten; (Oslo, NO), Frigstad, Sigmund; (Trondheim, NO), Ostensen, Jonny; (Oslo, NO)

  Correspondence: Amersham Health; 101 Carnegie Center; Princeton; NJ; 08540; US

  Patent Application Number: 20040052728

  Date filed: April 1, 2003

  Abstract: A method of contrast agent-enhanced imaging involving induction of vasomodification, e.g. by physical or pharmacological means, in which pre- and post-vasomodification images in respect of free-flowing contrast or tracer agent in a substantially steady state distribution are recorded as part of a single imaging sequence and are compared to identify any local variations resulting from changes in vascular volume caused by the vasomodification. Imaging techniques which may be employed include ultrasound imaging, **magnetic resonance imaging, X-ray** imaging and nuclear tracer techniques such as scintigraphy.

  Excerpt(s): This invention relates to **diagnostic imaging,** more particularly to use of **diagnostic imaging** in visualising tissue abnormalities. These include abnormalities in tissue perfusion, especially cardiac perfusion, for example such as may result from arterial stenoses. In the field of ultrasound imaging it is well known that contrast agents comprising dispersions of gas microbubbles are particularly efficient backscatterers of ultrasound by virtue of the low density and ease of compressibility of the microbubbles. Such microbubble dispersions, if appropriately stabilised, may permit highly effective ultrasound visualisation of, for example, the vascular system and tissue microvasculature, often at advantageously low doses of the contrast agent. Whilst

existing ultrasound contrast agent imaging techniques may provide information as to whether particular organs or regions thereof are perfused or not, they in general do not have the sensitivity to detect abnormalities in tissue perfusion (which may be defined as blood flow per unit of tissue mass) caused by moderate arterial stenoses. Such information, which is valuable in assessing areas of potential infarction and whether a patient may benefit from preventative methods and/or treatment, is currently obtained using imaging techniques such as scintigraphy, positron emission tomography or single photon emission **computed tomography,** employing radioisotopic perfusion tracers.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Diagnostic imaging apparatus for obtaining characteristic quantity based on positional relationship between positions of interest in images of object**

  Inventor(s): Arakawa, Satoshi; (Kanagawa-ken, JP)

  Correspondence: Sughrue Mion, Pllc; 2100 Pennsylvania Avenue, N.W.; Suite 800; Washington; DC; 20037; US

  Patent Application Number: 20040091140

  Date filed: October 31, 2003

  Abstract: In a **diagnostic imaging** apparatus: a position-of-interest determination unit determines a plurality of positions in a plurality of images of a predetermined part of an object which are taken during movement of the predetermined part, to be positions of interest in the plurality of images, where the determined positions in the plurality of images correspond to a predetermined position in the predetermined part; and a characteristic-quantity calculation unit calculates a characteristic quantity indicating a positional relationship between the positions of interest in the plurality of images.

  Excerpt(s): The present invention relates to a **diagnostic imaging** apparatus which outputs information on a predetermined part of an object based on a plurality of images of the predetermined part which are taken during movement of the predetermined part. The following documents (1) and (2) disclose information related to the present invention. Conventionally, various radiographic-image recording apparatuses have been proposed, where those radiographic-image recording apparatuses apply radiation to an object such as a human body, and record a radiographic image by exposing a film or the like to the radiation which has passed through the object.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Evaluating disease progression using magnetic resonance imaging**

  Inventor(s): Beaudoin, Gilles; (St. Lambert, CA), Berthiaunme, Marie-Josee; (Ville Mont-Royal, CA), de Guise, Jacques A.; (Montreal, CA), Godbout, M.Benoit; (Montreal, CA), Kauffmann, M.Claude; (Montreal, CA), Pelletier, Jean Pierre; (Saint-Lambert, CA), Pelletier, Johane M.; (Saint-Lambert, CA), Raynauld, Jean-Pierre; (Boucherville, CA)

  Correspondence: Kristofer E. Elbing; 187 Pelham Island Road; Wayland; MA; 01778; US

  Patent Application Number: 20040015072

  Date filed: May 6, 2003

  Abstract: An orthopedic **magnetic resonance imaging** system is disclosed. This system includes a source of **magnetic resonance imaging** data sets resulting from successive

magnetic resonance imaging acquisitions from a diseased joint of a patient. A segmentation module segments surfaces in the joint based on information contained within at least one of the data sets, and a registration module spatially registers, in three dimensions, information represented by a first of the data sets with respect to information represented by one or more further data sets for the same patient. A comparison module detects differences between information represented by the data sets caused by progression of the disease in the joint of the patient between acquisitions. A cross-patient comparison module can compare detected differences for the patient with detected differences for at least one other patient.

Excerpt(s): This application is a continuation of U.S. Ser. No. 09/704,269, filed Nov. 1, 2000, which claims the benefit of U.S. Provisional Application No. 60/162,871, filed Nov. 1, 1999, both of which are herein incorporated by reference. This invention relates to methods and apparatus for tracking disease progression using **magnetic resonance imaging,** including methods and apparatus for efficiently and precisely tracking the progression of rheumatic diseases affecting cartilage. Clinical osteoarthritis is now understood to be a complex interaction of degradation and repair of the cartilage, bone, and synovium, with secondary components of inflammation. The biochemical changes of osteoarthritis affect several cartilage components, including major matrix constituents, proteoglycans, and collagens. Decreased proteoglycan content in conjunction with damaged collagen structure leads to functional loss of normal matrix physiologic properties. Although the etiology of osteoarthritis is multiple and includes mechanical and biochemical factors, it appears that these culminate in an increased synthesis of proteolytic enzymes by the chondrocytes, which in turn leads to cartilage destruction.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Gradient coil apparatus for magnetic resonance imaging**

  Inventor(s): McKinnon, Graeme Colin; (Hartland, WI), Schaefer, Daniel Joseph; (Waukesha, WI), Vavrek, Robert Michael; (Waukesha, WI)

  Correspondence: Cantor Colburn, Llp; 55 Griffin Road South; Bloomfield; CT; 06002

  Patent Application Number: 20040075434

  Date filed: October 16, 2002

  Abstract: A gradient coil assembly for a **magnetic resonance imaging** system comprising: a first gradient coil configured to generate a first gradient field in a first field of view; a second gradient coil configured to generate a second gradient field orthogonal to the first gradient field in a second field of view; and a third gradient coil configured to generate a third gradient field orthogonal to the first gradient field and the second gradient field in a plurality of fields of view.

  Excerpt(s): The field of the invention is nuclear **magnetic resonance imaging** methods and systems. More particularly, the invention relates to a method and apparatus system for formation of a gradient coil to allow for increased gradient slew rates and reduced peripheral nerve stimulation. It will be appreciated, however, that the--invention is also amenable to other like applications. MR tomography is a known technique for acquiring images of the inside of the body of a living examination subject. To this end, rapidly switched magnetic gradient fields of high amplitude, which are generated by gradient coils, are superimposed on a static basic magnetic field. In the process of generating MR images, stimulations can be triggered in living examination subjects by the switching of

the gradient fields. The gradient fields that influence the examination subject are characterized by a magnetic flux density that varies over time. The time-varying magnetic field generates eddy or induction currents in the examination subject. Their nature depends primarily on the shape and size of the microscopic structures. Due to electromagnetic interaction with tissue in the examination subject, these currents influence physiological currents, for instance potentials at cells. All cells have a resting potential. At resting potential, all membrane currents of a cell are in balance. When the membrane potential is depolarized by an additional membrane current, which is introduced into the cell by an outside influence, for example, this causes a potential change, known as an action potential. The actuating potential for an action potential is called a threshold. At the threshold, the balance of the membrane currents changes. Additional currents temporarily appear, which depolarize the membrane. An action potential is accompanied by an action. Thus, for example, each contraction of a muscle fiber is accompanied by an action potential in the muscle fiber, and each reaction of a sensory cell to a sensory stimulus is relayed by action potentials. Accordingly, due to the triggering of action potentials, switched gradient fields can lead to stimulations that are experienced as uncomfortable by the examination subject. Due to the abovementioned physiological effects on the patient, constraints are placed on maximum gradient amplitudes and switching speeds (slew rate) for the gradient fields. As stated above, time-varying magnetic fields induce currents in conductive materials and rapidly changing magnetic field gradients can induce currents in a patient being imaged. Under some circumstances, these induced currents can stimulate nerves, a phenomenon known as peripheral nerve stimulation (PNST). Therefore, every MRI employed for human patients must conform to one or more magnetic field amplitude and rate of change limitations in accordance with FDA regulations. Thus, current MRI systems, therefore, assume the worst possible circumstances and limit the gradient slew rates amplitudes accordingly.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Integrated fluoroscopic surgical navigation and workstation with command protocol**

  Inventor(s): Hanover, Barry Keith; (Salt Lake City, UT), Harrawood, Larry E.; (Sandy, UT), Jensen, Vernon Thomas; (Draper, UT), Lloyd, Gregory Scott; (Boise, ID)

  Correspondence: Mcandrews Held & Malloy, Ltd; 500 West Madison Street; Suite 3400; Chicago; IL; 60661

  Patent Application Number: 20040076259

  Date filed: November 25, 2003

  Abstract: In a medical **diagnostic imaging** system, a communication protocol for providing bi-directional communication between a medical imaging subsystem and a medical navigational subsystem, the communication protocol including a plurality of navigation subsystem to imaging subsystem messages; and a Begin Imaging and an End Imaging message for synchronizing image acquisition with navigation coordinate determination, the Begin Imaging and End Imaging messages included in imaging subsystem to the navigation subsystem messages.

  Excerpt(s): The present application is a division of U.S. Ser. No. 09/649,071, filed Apr. 26, 2000, entitled "Integrated Fluoroscopic Surgical Navigation and Workstation with Command Protocol," which is hereby incorporated by reference in its entirety. The preferred embodiments of the present invention relate to surgical navigation systems and techniques. In particular, the preferred embodiments of the present invention relate

to an integrated surgical navigation system and fluoroscopic **X-ray** system. Medical imaging techniques including **X-ray,** CAT (Computerized Axial Tomography), MRI (Magnetic Resonance Imaging), and ultrasound are well established. These techniques provide an examining physician with high resolution images useful for subsequent detailed study and diagnosis. Recently, however, surgical navigation techniques have been proposed that use pre-operative images for improving inter-operative visualization of patient anatomy. To that end, one or more of the pre-operative images are displayed for the surgeon during an operation, with a surgical tool superimposed on the image in the correct location.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Macrocyclic chelants for metallopharmaceuticals**

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  Patent Application Number: 20040067200

  Date filed: September 15, 2003

  Abstract: This invention relates to macrocyclic chelants comprised of one or two heteroatom-containing bridges, compositions containing them and their use in medicine, particularly in **diagnostic imaging** and radiotherapy. This invention relates especially to the use of metal chelates of the macrocyclic chelants as metallopharmaceuticals in **Magnetic Resonance Imaging** (MRI) and radiopharmaceuticals. This invention also relates to macrocyclic chelants as bifunctional chelating agents (BFC's) for the labeling of biologically active targeting molecules such as proteins, peptides, peptidomimetics, and non-peptide receptor ligands, with metal ions and radioisotopes.

  Excerpt(s): This application is a divisional of U.S. application Ser. No. 09/660,377, filed Sep. 12, 2000 (now allowed), which in turn claims priority of U.S. provisional application Serial No. 60/153,512, filed Sep. 13, 1999. The disclosures of these prior applications are incorporated herein in their entirety for all purposes. This invention relates to new macrocyclic chelants and metal chelates thereof, methods of preparing the chelants and metal complexes, and pharmaceutical compositions comprising the macrocyclic chelants and metal complexes. This invention relates particularly to the use of the new metal chelates as contrast agents in **X-ray** imaging, **magnetic resonance imaging** (MRI) and radiopharmaceuticals. This invention also relates to new bifunctional chelants (BFC's) for attaching diagnostic and therapeutic isotopes to biologically active targeting molecules such as proteins, peptides, peptidomimetics, and non-peptide receptor ligands. In addition, the macrocyclic chelants are useful for heavy metal detoxification. Medical imaging modalities, such as MRI, **X-ray,** gamma scintigraphy, and CT scanning, have become extremely important tools in the diagnosis and treatment of various diseases and illness. Imaging of internal body parts relies on the contrast between the targeted organ and the surrounding tissues. The targeted organs or tissues are visible by the use of a particular metallopharmaceutical contast agent. In **X-ray** diagnostics, increased contrast of internal organs, such as kidney, the urinary tract, the digestive tract, the vascular system of the heart, tumor, and so forth is obtained by administering a contrast agent which is substantially radioopaque. In conventional proton MRI diagnostics, increased contrast of internal organs and tissues may be obtained by administrating compositions containing paramagnetic metal

species, which increase the relaxivity of surrounding protons. In ultrasound diagnostics, improved contrast is obtained by administering compositions having acoustic impedances different than that of blood and other tissues. In gamma scintigraphy, improved contrast of internal organ is obtained by the specific localization of a radiopharmaceutical.

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- **Magnetic pole magnet device using the magnetic pole, and magnetic resonance imaging apparatus**

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  Patent Application Number: 20040124839

  Date filed: January 15, 2004

  Abstract: The present invention is intended to provide a magnetic pole, a magnet apparatus, and a **magnetic resonance imaging** apparatus that the magnetic structure of the magnet apparatus for generating a uniform magnetic field is formed in a lower burst mode, and the profitability is increased, and at the same time, the uniformity of the magnetic field is improved.According to the present invention, the magnetic poles arranged opposite to each other across a measuring space have at least one of a plurality of hollows and a single hollow having a shape continuously changing on the section perpendicular to the direction of the magnetic field formed in the measuring space and particularly in order to make the magnetic field uniform, the arrangement of the plurality of hollows and the shape of the single hollow are adjusted. The magnet apparatus and **magnetic resonance imaging** apparatus of the present invention are structured as mentioned above.

  Excerpt(s): The present invention relates to a new magnetic pole, a magnet apparatus using it, and a **magnetic resonance imaging** apparatus. In recent years, in the field of a nuclear **magnetic resonance imaging** (MRI) apparatus, an MRI apparatus using the so-called open type magnet that static magnetic field generation sources are arranged opposite to each other vertically or horizontally across a scanning space is under-development. Such an MRI apparatus has a sufficient open character, permits the so-called IVR (interventional radiology), and greatly expands medical possibilities. It is essential for a magnet for an MRI apparatus to produce a uniform static magnetic field of several ppm in a scanning space. The method for making the magnetic field of the scanning space uniform is broadly divided into two ways such as a method for using a plurality of coils and optimizing the arrangement thereof and a method for using the so-called magnetic pole and optimizing the surface shape thereof.

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- **Magnetic resonance imaging apparatus**

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  Patent Application Number: 20040064035

  Date filed: September 26, 2003

  Abstract: For the purpose of providing a **magnetic resonance imaging** apparatus for capturing water/fat-separated images free of banding artifacts in an SSFP state, an apparatus comprises: acquiring means (202) for acquiring echo data of a plurality of views in which a phase difference between water and fat is 2.pi./m with spins within a subject brought to the SSFP state and repeating the acquisition for k=0 through M-1 with a step difference in a phase of an RF pulse of 2.pi.multidot.k/M; transforming means (204) for conducting Fourier transformation on the echo data based on the phase step difference; separating means (206) for separating water data and fat data respectively in F(0) term and F(1) term of the Fourier-transformed data using the phase difference between water and fat; adding means (208') for obtaining a sum of absolute values of at least the water data or fat data in the F(0) term and F(1) term; and image producing means (210') for producing an image based on the sum data.

  Excerpt(s): The present invention relates to a **magnetic resonance imaging** apparatus, and more particularly to an apparatus for conducting **magnetic resonance imaging** with spins within a subject brought to an SSFP (steady state free precession) state. One conventional technique for conducting **magnetic resonance imaging** is a method of conducting **magnetic resonance imaging** with spins within a subject brought to an SSFP state. The method produces an image based on a sum of or a difference between echo data acquired with an RF (radio frequency) pulse having an invariant phase and echo data acquired with an RF pulse having a phase alternating between 0 and.pi. (see, for example, Patent Document 1). Conventional techniques for suppressing fat signals in **magnetic resonance imaging** include a method employing a fat suppression pulse (see, for example, Non-patent Document 1), and a method employing FEMR (fluctuating equilibrium magnetic resonance) (see, for example, Non-patent Document 2).

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Magnetic resonance imaging apparatus assembly method**

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  Patent Application Number: 20040045155

  Date filed: September 8, 2003

  Abstract: A method of assembling a **magnetic resonance imaging** apparatus includes stacking a plurality of segments of a first plate member and connecting the segments together to thereby assemble the first plate member, fixing a plurality of segments of support-post members to the first plate member and connecting the support-post segments to thereby assemble the support-post members, providing a magnet device assembly by connecting a first magnet device and a second magnet device together by a connection pipe, fixing the magnet device assembly to the first plate member and to the

support-post members and sequentially fixing and stacking a plurality of segments of a second plate member on the second magnet device to thereby assemble the second plate member.

Excerpt(s): The present invention relates to a **magnetic resonance imaging** apparatus (hereafter referred to as an MRI apparatus), and more particularly to a large-scale MRI apparatus having magnetostatic-field-generating magnets for generating strong fields and a magnetic shield for insulating the high fields. The MRI apparatus to obtain tomographic images of a human body by using the nuclear magnetic resonance phenomenon are widely used in medical institutions. In an examination using the MRI apparatus, magnets are required which generate uniform field strength in a space, where an examined region of an examinee is placed, to produce images reflecting the internal structure of the examined region. For the magnets of the MRI apparatus, permanent magnets, normal conducting magnets and superconducting magnets have been put into practical use. The superconducting magnets, which can achieve higher magnetostatic field strength, are finding wider applciations than permanent magnets and normal conducting magnets. With MRI apparatus using superconducting magnets capable of providing uniform and high magnetostatic field strength, it has become possible to obtain high-quality images also in examinations by various methods of high-speed photography.

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- **Magnetic resonance imaging capable catheter assembly**

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Patent Application Number: 20040116800

Date filed: February 19, 2003

Abstract: A catheter assembly which is provided with a distally positioned **magnetic resonance imaging** coil, comprising a cable assembly having a proximal end and a distal end, the cable assembly further comprising an outer tube, a first electronics assembly disposed within the distal end of the cable assembly, a first fiber optic strand disposed within the tube, and connected to the first electronic assembly; and a tip assembly connected to the distal end of the cable assembly further comprising a thin structural wall forming a cavity, and a coil assembly disposed within the cavity. The catheter assembly enables high resolution **magnetic resonance imaging** of tissue proximate to the assembly, as well as other beneficial diagnostic and therapeutic procedures.

Excerpt(s): This application claims the benefit of the filing date of U.S. provisional patent application Serial No. 60/357,935 filed Feb. 19, 2002. This invention relates in one embodiment to a catheter assembly, and more particularly to a catheter assembly that includes the capability to perform **magnetic resonance imaging.** A catheter assembly which is provided with a distally positioned **magnetic resonance imaging** coil, thereby enabling high resolution **magnetic resonance imaging** of tissue proximate to the assembly.

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- **Magnetic resonance imaging device and method**

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  Patent Application Number: 20040010191

  Date filed: February 11, 2003

  Abstract: A **magnetic resonance imaging** method for fully automatically forming a water/fat separated image by calculation after acquiring data on images of different echo times, wherein the unwrapping of a phase map showing the distribution of the phase rotation due to the inhomogeneous static magnetic field is repeated so as to determine the distribution of the inhomogeneous static magnetic field by using an index used for judging whether or not the unwrapping is properly being performed, and wherein during the formation of a water/fat separated image with correction of the static magnetic field, the unwrapping is automatically and properly performed in correcting the static magnetic field, and the water/fat images are automatically discriminated.

  Excerpt(s): The present invention relates to a **magnetic resonance imaging** device (hereinafter will be referred to as MRI device) and method, and, more particularly, relates to an MRI device and method which achieves an automatic separation between water imaging and fat imaging. An imaging object of an MRI device which becomes widespread in clinical application is protons which are a major constituent material of an inspection subject. Through imaging such as a spatial distribution of proton density and a spatial distribution of relaxation attenuation of excitation state, configurations or functions of such as a human head, abdomen and extremity are imaged in two dimension or three dimension. Protons exist such as in water and fat in human tissue, however, their chemical shifts differ depending on their combination configurations. By making use of such chemical shift difference many approaches of drawing separately an image of protons in water and an image of protons in fat have been proposed. For example, as an example method of acquiring a fat suppressed image, a method, in which a plurality of images having different echo times (TE) are obtained and then water and fat separated images are acquired through computation thereof, is enumerated. A typical method therefor is disclosed in "Simple Proton Spectroscopic Imaging" by W. Thomas Dixon et al., (RADIOLOGY Vol. 153, pp 189-194 (1984)), which hereinbelow will be referred to as Dixon method. Methods of acquiring water and fat separated images through computation other than Dixon method are known and disclosed, for example, in the following papers "Water-Fat Imaging with Three-Point Direct Phase Encoding" by Qing-San Xiang and Li An, (Proc., SMR 3rd Meeting. p 658 (1995)), "Quadrature 2-point Water-Fat Imaging", by Li An and Qing-San Xiang, (Proc., ISMRM 4th Scientific Meeting, p 1541 (1996)), and "Water-Fat Imaging with Three-Orthogonal-Phase Acquisitions" by Li An and Qing-San Xiang, (Proc., ISMRM Scientific Meeting, p 1866 (1998)).

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Magnetic resonance imaging fixture mounting**

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  Patent Application Number: 20040030241

  Date filed: May 1, 2003

  Abstract: A fixture such as a local receiver coil is secured to the patient support of a **magnetic resonance imaging** system so that the fixture remains in position relative to the support even when the support is in a vertical orientation. The positioning apparatus is arranged to allow adjustment of the fixture position, but to limit such adjustment so that the fixture cannot interfere with the poles or other elements defining the patient-receiving gap of the magnet during movement of the patient support.

  Excerpt(s): The present application is a continuation-in-part of U.S. patent application Ser. No. 10/131,843, filed on Apr. 25, 2002 and entitled "Magnetic Resonance Imaging Fixture Mounting," the disclosure of which is incorporated by reference herein in its entirety. The present invention relates to the art of **magnetic resonance imaging.** In **magnetic resonance imaging** ("MRI"), the body of a subject to be imaged as, for example, the body of a medical patient, is subjected to a strong static magnetic field. Radio frequency ("RF") excitation signals are applied to the subject. This causes the tissues of the subject's body to emit minuscule radio frequency signals referred to herein as "magnetic resonance signals." During the procedure, magnetic field gradients are applied so that, during different portions of the procedure, the strength of the static magnetic field varies with distance along various axes. The resulting magnetic resonance signals are spatially encoded. Thus, the magnetic resonance signals are typically generated only in a limited region as, for example, a single point, a line or a two dimensional "slice." Moreover, the signals from different portions of a line or a slice differ in frequency or phase from one another. If the procedure is repeated numerous times, it is possible, using known techniques, to recover an image data set having data elements, each representing one or more properties of the magnetic resonance signals generated within a single, small volume element or "voxel." Because properties of magnetic resonance signals vary with the composition of the material generating the signal, the signals generated by different tissues within the body will differ from one another. Thus, data elements representing voxels in different tissues will have different values. Such a data set can be used, for example, to provide a visually perceptible image such as a screen display or a printed picture showing different tissues within the body with different brightness or color.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Magnetic resonance imaging needing a long waiting time between pre-pulses and imaging pulse train**

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  Patent Application Number: 20040049106

  Date filed: September 12, 2003

Abstract: In the black blood method using a double inversion pulse, images in the systole of the cardiac cycle can be captured in a reliable manner even in the presence of a cycle-to-cycle variance in the heart beat cycle. A pulse sequence of the black blood method composed of a double inversion pulse DIV and an imaging pulse train SEQ.sub.ima is used. This sequence is applied in sync with an ECG signal of a subject to be imaged, and **magnetic resonance imaging** is thereby performed. The double inversion DIV is applied in sync with an R-wave:R1 appearing on the ECG signal at a given timing, with a first delay time td1 (fixed value), and the imaging pulse train SEQ.sub.ima is applied in sync with the following R-wave:R2 with a second delay time td2 (fixed value: set in accordance with the systole). A variance of the cardiac cycle is absorbed in an inversion time BBTI.

Excerpt(s): The present invention relates to **magnetic resonance imaging** (MRI) for imaging the internal of a subject to be imaged with an imaging sequence containing a pre-pulse, and more particularly to MR imaging using an imaging sequence in which a waiting time until the application of an imaging pulse train is started after a pre-pulse was applied is relatively long in comparison with a cardiac cycle as with the black blood method or the like. Magnetic resonance imaging is presently used in many cases as one of imaging methods for medical use. **Magnetic resonance imaging** is an imaging method that gives rise to magnetic excitation of nuclear spins in a subject to be imaged positioned in a static magnetic field with a high frequency signal at the Larmor frequency and then reconstructs an image of the internal of the subject to be imaged using an MR signal induced in association with the excitation. **Magnetic resonance imaging** includes various types, and the type is also divided according to pulse sequences used for magnetic excitation and signal acquisition. In the case of **magnetic resonance imaging** for imaging a region in the heart, ghost-like artifacts (blood flow artifacts) readily appear on a reconstructed image in a phase-encoding direction from a portion where a number of blood flows are present due to influences of a pulse beat of blood. In order to suppress the artifacts, the cardiac synchronization imaging method is generally used, by which RF excitation and echo acquisition are synchronized with electrocardiographic waveforms. According to this method, a variance of an echo signal occurring in each shot (excitation) can be suppressed, and the aforementioned blood flow artifacts can be thereby reduced.

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- **Magnetic resonance imaging system**

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  Patent Application Number: 20040039277

  Date filed: March 11, 2003

  Abstract: A **magnetic resonance imaging** apparatus is provided with a sequencer 4 for executing a rapid imaging sequence of up to 100 ms at a full scan, a parallel measurement system 101 for executing a partial encoding measurement in which the number of phase encoding operations performed for the measurement is reduced, an image processing system 102 for reconstructing images from the information obtained though the parallel measurements and composing reconstructed images of a plurality of areas to make one image, a display system 103 for displaying the obtained images at a

rate of 50 frame/second or more, and image renewal system 104 for taking in coordinate information of the cross-section to be imaged from devices 52 and 53 at intervals of about 0.1 second, and renewing the cross-section to be imaged in real time. By constructing the apparatus in this manner, imaging on the cross-sections indicated by a device can be performed in real time with high spatial and high time resolution while guiding the device, and thus, the three-dimensional position of the device can be easily understood.

Excerpt(s): The present invention relates to a **magnetic resonance imaging** apparatus for obtaining a tomogram of a desired region of an object to be examined, utilizing a nuclear magnetic resonance (hereinafter referred to as NMR) phenomenon; and more particularly, the invention relates to a **magnetic resonance imaging** apparatus for guiding a device inserted in the body for therapy under observation of an image, and to a **magnetic resonance imaging** apparatus for displaying a moving image representing time-sequential change of the region with sufficient time resolution, so as to monitor therapeutic effect. A **magnetic resonance imaging** apparatus is designed to measure density distribution, distribution of relaxation time and the like of nuclear spins (hereinafter referred to as spins) in a desired region of an object to be examined utilizing the NMR phenomenon, and to display an image of any cross-section of the object according to the measurement data thereof. Such a **magnetic resonance imaging** apparatus has been increasingly used in surgery and other therapies. For use in the surgery or other therapy, there is a **magnetic resonance imaging** apparatus of open type, which is constituted of magnets of the vertical magnetic field type (opposing type). The magnets of the vertical magnetic field type do not make the object feel trapped in comparison with magnets of the horizontal magnetic field type, that is, magnets having cylindrical shape. Further, it also gives released feeling to an operator. Therefore, the magnet of the vertical magnetic field type is employed.

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- **Magnetic resonance imaging system and methods for the detection of brain iron deposits**

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  Correspondence: General Electric Company; Global Research; Patent Docket RM. BLDG. K1-4a59; Schenectady; NY; 12301-0008; US

  Patent Application Number: 20040102692

  Date filed: November 27, 2002

  Abstract: A method and system for detecting iron using **magnetic resonance imaging** (MRI) is provided. The method comprises acquiring magnetic resonance (MR) images by a selected pulse sequence to enhance brain iron deposits using a MRI system having a substantially high magnetic field strength and characterizing regions of interest within the MR images having statistically relevant quantities of iron deposits to indicate a given disease.

  Excerpt(s): The invention relates to **magnetic resonance imaging** (MRI) and image processing methods. More particularly, the invention relates to detection of brain iron deposits using MRI and image processing techniques. It has been known for some time that specific regions of the brain contain deposits of iron in a storage pool consisting of

iron atoms in a mineral matrix associated with and largely surrounded by associated proteins. The total complex of mineralized iron and proteins is referred to as ferritin or in other cases as hemosiderin. It has also been recognized that these deposits are to some extent capable of being visualized on MR images because of the tendency of the magnetized iron atoms to alter the local magnetic field and to thereby to reduce the MR signal from protons in water molecules and other compounds in their vicinity of the iron deposits. This effect is referred to as iron-dependent shortening of the local T2 relaxation time. It is known that this effect is more prominent and more easily observed at higher magnetic field strengths. However, this imaging phenomenon has not been widely used for diagnostic purposes because of the difficulty in making diagnostic inferences due to the limited sensitivity of standard MR scanners and the complex and irregular shapes of the affected brain regions. Consequently, there is a need for an invention to improve the sensitivity of MR imaging to the presence of brain iron deposits and to improve the methods of analysis of the MR images to detect disease-related changes. One urgent need in neurology is an imaging method capable of detecting abnormal deposits in the brain, such as amyloid plaques and neurofibrillary tangles, which are associated with Alzheimer's disease and related diseases. It is known that iron in the form of ferritin or related proteinaceous compounds is often associated with these deposits. Although these deposits are often too small to be imaged as individual structures within the brain by MRI, the presence of several such deposits within an MR imaging voxel may lead to reduced overall signal strength for this voxel because of the iron content. Thus, by a process of signal averaging across a single voxel, this technique may be used to establish the presence of these pathological structures. Furthermore, a number of degenerative brain diseases (e.g., Parkinson's disease, Hallervorden Spatz disease and many others) have been found to be associated with increased regional iron deposition. To date, most efforts to utilize brain-iron dependent contrast have utilized relatively thick slice (e.g., 3-5 mm), low-field (e.g., 1.5 T) images analyzed by visual inspection or by measurements of the image intensity variation or T2 relaxation of individual voxels. This method is cumbersome and time-consuming and, unless high-resolution imaging is used, local details of the iron distribution are not resolved.

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- **Magnetic resonance imaging systems and methods**

  Inventor(s): Blezek, Daniel; (Niskayuna, NY), Dhawale, Paritosh; (Selkirk, NY), Dixon, William; (Clifton Park, NY)

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  Patent Application Number: 20040032259

  Date filed: August 15, 2002

  Abstract: Magnetic resonance imaging ("MRI") systems and methods for acquiring multi-slice gradient echo images having a substantially constant T1-weighting including selecting a first scan having a desired contrast associated with T1-weighting and, given a first repetition time, TR1, and a first flip angle, flip1, associated with the first scan, selecting an effective repetition time, TReff, that provides the desired contrast. The MRI systems and methods also including holding the effective repetition time, TReff, substantially constant in relation to a second scan. The MRI systems and methods further including, given a second repetition time, TR2, determining a second flip angle,

flip2, and, given the second flip angle, flip2, determining the second repetition time, TR2. The MRI systems and methods still further including performing the second scan using the second repetition time, TR2, and the second flip angle, flip2, and maximizing a signal-to-noise ratio, S/N, of the second scan.

Excerpt(s): The present invention relates generally to **magnetic resonance imaging** ("MRI") systems and methods. More specifically, the present invention relates to a simplified MRI set-up and collection protocol for acquiring multi-slice gradient echo images with a T1-weighting target. Magnetic resonance imaging ("MRI") is a widely accepted and commercially available technique for obtaining digitized visual images representing the internal structures of objects, such as the tissues of the human body, having substantial populations of atomic nuclei that are susceptible to nuclear magnetic resonance ("NMR") phenomena. In MRI, the nuclei in a structure to be imaged are polarized by imposing a strong, uniform magnetic field, B.sub.0, on the nuclei. Selected nuclei are then excited by imposing B.sub.1, a radio frequency ("RF") signal at a predetermined NMR frequency. By doing this repeatedly while applying different magnetic field gradients and suitably analyzing the resulting RF responses from the nuclei, a map or image of the relative NMR responses as a function of nuclei location may be determined. Data representing the NMR responses in space may be displayed. Each voxel of an image of the human body contains one or more tissues. These tissues contain primarily fat and water, which, in turn, include a plurality of hydrogen atoms. In fact, the human body is approximately 63% hydrogen atoms. Because hydrogen nuclei have a readily discernible NMR signal, MRI of the human body primarily images the NMR signal from the hydrogen nuclei.

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- **Mechanical damper for air pad instability**

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Correspondence: Thomas E. Kocovsky, ESQ.; Fay, Sharpe, Fagan; Minnich & Mckee, Llp; 1100 Superior Avenue, Seventh Floor; Cleveland; OH; 44114-2518; US

Patent Application Number: 20040062356

Date filed: October 1, 2002

Abstract: In a **diagnostic imaging** apparatus, a stationary gantry (24) and a rotating gantry (22) are interfaced by a plurality of air bearing elements (40). Lower air bearing elements bear the weight of the rotating gantry (22) which induce air hammering phenomena at a characteristic vibration frequency. To counteract the air hammering, a damping assembly (44) is mounted to at least one lower bearing element (40). The damping assembly (44) includes a damping mass (46) and an elastomeric connector (48) that are tuned to a frequency near the air hammer frequency to absorb the vibrational energy and damp the air hammer vibrations.

Excerpt(s): The present invention relates to medical imaging arts. In particular, it relates to a rotating gantry such as those found in 3.sup.rd and 4th generation CT scanners, and will be described with particular reference thereto. However, the invention will also find application in conjunction with other systems, such as nuclear cameras that use rotating gantries, and is not limited to the aforementioned application. Typically, 3.sup.rd and 4.sup.th generation CT scanners are equipped with mechanical ball or roller bearing systems. Because there is physical contact between the bearings and the rotating gantry, there is friction and wear that occurs over usage of the scanner. Additionally, functional

speeds of the rotating gantry are limited by mechanical the bearings. In an effort to overcome the limitations of mechanical bearing systems for such medical imagers, fluid bearing systems are being used. Some fluid bearing systems include porous bearing pads that fit snugly to bearing races of the rotating gantry. When the bearing system is charged, a micro-thin layer of fluid is ejected from the porous bearing pads between the pads and the bearing races. This provides a virtually frictionless support for the rotating gantry.

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- **Medical diagnostic imaging system and method for efficient access of data**

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  Patent Application Number: 20040044666

  Date filed: August 29, 2002

  Abstract: The preferred embodiments described herein provide a medical **diagnostic imaging** system and method for efficient access of data. In one preferred embodiment, a medical **diagnostic imaging** system is provided comprising a software application, a text file, and a software component that binds to the software application at runtime. The text file and the software component store common data. If the medical **diagnostic imaging** system is being used in a first mode of operation (e.g., during the manufacturing process at the factory), data is read from the text file. If the medical **diagnostic imaging** system is being used in a second mode of operation (e.g., during normal workflow of the ultrasound system in the field), data is read from the software component. These preferred embodiments can be used to provide fast access to stored data during the manufacturing process without incurring performance penalties. Other preferred embodiments are provided, and each of the preferred embodiments described herein can be used alone or in combination with one another.

  Excerpt(s): A portion of the disclosure of this patent document contains material which is subject to copyright protection. The copyright owner has no objection to the facsimile reproduction by anyone of the patent document or the patent disclosure, as it appears in the Patent and Trademark Office patent file or records, but otherwise reserves all copyright rights whatsoever. This application contains one compact disc submitted in duplicate. The material on that compact disc is hereby incorporated by reference. The following is a listing of the names of the files on the compact disc, their dates of creation, and their sizes in bytes. Medical **diagnostic imaging** systems often store read-only data that is accessed during the normal workflow of the system. For example, ultrasound imaging systems can store imaging performance data sets in text files on a hard disk. By storing the data in a text file, the manufacturer can effectively "tune" the data without having to write and re-write software. However, because these data sets are quite large, runtime performance becomes sluggish due to inefficiencies in reading data from the hard disk. To combat this, the data can be cached during system start-up so that the data is accessed from random access memory, which is much more efficient than disk access. This approach moves the performance penalty from the user's normal workflow to system start-up. However, lengthening start-up time is often not acceptable, especially in portable systems.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **METHOD AND APPARATUS FOR ALIGNING A MAGNETIC FIELD MODIFYINGSTRUCTURE IN A MAGNETIC RESONANCE IMAGING SCANNER**

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  Patent Application Number: 20040070396

  Date filed: October 15, 2002

  Abstract: In a method for aligning a magnetic field-modifying structure (74) in a magnet bore (12) of a **magnetic resonance imaging** scanner (8), a reference magnetic field map of the magnet bore (12) is measured without the magnetic field-modifying structure (74) inserted. The magnetic field-modifying structure (74) is inserted into the magnet bore (12). A second magnetic field map of the magnetic bore (12) is measured with the magnetic field-modifying structure (74) inserted. At least one odd harmonic component of the first and second magnetic field maps is extracted. The magnetic field-modifying structure (74) is aligned in the magnet bore (12) based on a comparison of the odd harmonic component of the first and second magnetic field maps.

  Excerpt(s): The following relates to the **magnetic resonance imaging** (MRI) arts. It particularly relates to a short bore horizontal magnet for an MRI scanner, and will be described with particular reference thereto. However, the following also relates to other MRI scanner magnets such as long bore magnets, open magnets, and vertical magnets, and to magnets of various types for applications both inside and outside the **magnetic resonance imaging** arts. In a typical MRI scanner, a cylindrical bore electromagnet is arranged to receive a subject such as a patient, or any item which exhibits magnetic resonance properties, within the magnet bore. For medical imaging, the electromagnet is arranged with the cylindrical axis oriented horizontally to readily accommodate a patient arranged in a prone or supine position on a horizontal patient support. However, MRI scanners that employ electromagnets of other geometries such as "open" magnets are also known. In the past, long-bore cylindrical electromagnets with a plurality of axially spaced annular windings have been employed to achieve a large, highly uniform magnetic field oriented along the cylindrical axis. However, such magnets are large and inhibit patient access. Additionally, in medical imaging it has been found that claustrophobic or nervous patients are often intimidated by being placed in a long-bore electromagnet. Hence, there is a demand for shorter bore magnets for MRI scanners.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Method and apparatus for lesion localization, definition and verification**

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  Patent Application Number: 20040034301

  Date filed: August 25, 2003

  Abstract: A method and apparatus for lesion or organ definition for the purpose of radiation treatment planning localization and treatment position verification. The

apparatus uses a combination of an ultrasound imaging system and a **diagnostic imaging** system to acquire localization ultrasound images referenced in the coordinate space of the **diagnostic imaging** system through the use of a position sensing system. The method compares the location of the lesion in the localization ultrasound images with the position of the lesion in ultrasound images taken while the patient lies on the treatment table of a therapy treatment unit, suggests corrective measures to place the lesion in its intended treatment position and executes the correction upon confirmation from qualified personnel.

Excerpt(s): The invention relates to a method wherein the shape, form, position and configuration of a lesion or tumour, to be treated by a radiation therapy device, may be ascertained with greater definition, in order to better design a treatment plan for its eradication. In accordance with a further aspect, the invention also relates to method and apparatus for verification of the position of the lesion with respect to the radiation beam or beams prior to the execution of a radiation treatment. The invention relates to a method wherein the size, location and disposition of a tumour may be determined, updated and tracked prior to and during treatment therefor. The goal of modem day radiation therapy of cancerous tumours or lesions, is to eradicate the tumour while avoiding to the maximum extent possible damage to healthy tissue and organs in the vicinity of the tumour. Since the large majority of tumours are radioresponsive, they can be controlled or eradicated completely if a sufficient radiation dose is delivered to the tumour volume. However, the delivery of the necessary tumourcidal dose may result in certain complications due to damage of healthy tissue that surround the tumour, or due to damage to other healthy body organs located in the proximity of the tumour. Conformal therapy is a radiation treatment approach which attempts to combine accurate target localization with focused radiation delivery in order to conform the high dose region closely to the region defined by the outer surface of the tumour while minimizing the dose to surrounding healthy tissue or adjacent healthy organs. Various conformal therapy techniques are well known in the art. Conformal radiation therapy employs dedicated radiation units capable of producing highly energetic radiation beams of photons, electrons or other charged particles. The radiation unit typically has a radiation source, which is typically mounted on a rotatable gantry of the radiation treatment unit. Through gantry rotation, the radiation source is rotated about the patient who is typically placed on a treatment table and the radiation beam is directed towards the tumour or lesion to be treated. Various types of devices are used to conform the shape of the radiation treatment beam to encompass tightly the outline of the tumour as seen by the radiation treatment beam as it traverses the patient's body into the tumour. An example of such a device is a multileaf collimator, which consists of a set of computer-controlled movable leaves or fingers, which can be positioned individually in and out of the radiation beam in order to shape it to the tumour outline. Various types of radiation treatment planning systems can create a radiation treatment plan which, once implemented will deliver a specified dose to the tumour while sparing the surrounding healthy tissue or adjacent healthy organs.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Method and device for acquiring data for diffusion-weighted magnetic resonance imaging**

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  Patent Application Number: 20040071324

  Date filed: August 28, 2003

  Abstract: The invention relates to a **magnetic resonance imaging** method which is characterized in that the transversal magnetization excited in the object to be imaged is diffusion-weighted before the useful echo (E) used for the reconstruction of an image is induced. When the object is moved, phase changes in the diffusion-weighted transversal magnetization can occur that lead to artifacts in the reconstructed image. These disturbing phase changes are measured by analyzing a navigation signal (N.sub.1, N.sub.2) that is generated before the useful signal is generated. The result of the measurement is used to change the phase characteristics of the transversal magnetization online by a correctional intervention (C.sub.0, C.sub.1, C.sub.2) in such a way that the measured phase changes are compensated. The invention further relates to a magnetic resonance device for carrying out said method.

  Excerpt(s): The present invention relates to the locally resolved examination of objects by means of magnetic resonance (MR) and relates specifically to a method for acquiring data for the illustration of an image which shows the spatial distribution of the MR-behaviour of an object within a selected local area, thus highlighting diffusion phenomena, according to the preamble of claim 1. The invention further relates to a device for performing the method. [1] E. O. Stejskal, J. E. Tanner. "Spin diffusion measurements: spin echoes in the presence of a time-dependent field gradient". J Chem Phys, 42:288-292, 1965. [2] V. Waluch, W. G. Bradley. "NMR even echo rephasing in slow laminar flow". J Comput Assist Tomogr, 8:594-8, 1984.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Method for assembling magnetic members for magnetic resonance imaging magnetic field generator**

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  Patent Application Number: 20040016108

  Date filed: July 25, 2002

  Abstract: Disclosed herein is a magnetic field generator and method for assembling the same for a **magnetic resonance imaging** system, the method comprising: establishing a layout for a permanent magnet of a magnet assembly comprising a pole piece, a ferromagnetic plate yoke and a permanent magnet. The method also includes populating the layout with a plurality of mock-up sticks and block retainers to form a mock layout for the permanent magnet; and installing a magnet block in place of at least one mock-up stick of the plurality of mock-up sticks. Installing the magnet blocks includes pushing the magnet block along a selected slot formed by the displacement of at least one mock-up stick of the plurality of mock-up sticks.

Excerpt(s): This invention relates to a magnetic field generator for an MRI, a method for assembling the same, and a method for assembling a magnet unit for the same. More specifically, this invention relates to a magnetic field generator for MRI incorporating permanent magnets, a method for assembling the same, and a method for assembling a magnet unit for the same. It will be appreciated, however, that the-invention is also amenable to other like applications for complex assembly of components exhibiting large interaction forces between the members to be assembled. A magnetic field generator for MRI uses permanent magnets. The magnets used in such an apparatus are often formulated from a plurality of magnet blocks. It is very difficult to place material blocks first and then magnetize each block. Therefore, in actual manufacturing, the blocks are fabricated and then magnetized. The magnetized blocks are then arranged on a plate yoke so that each of the magnet blocks has a same magnetic pole facing upward. Such arrangement on a plate yoke is difficult due to the interaction of the large magnetic forces between each of the magnet blocks. Conventionally, when placing the magnet blocks on the plate yoke, a surface of the plate yoke or magnet block is first applied with adhesive, and then magnet blocks are bonded or attached to the surface, as disclosed in the Japanese Patent No. 2,699,250 for example. According to such a bonding method, upper surfaces of respective magnet blocks bonded to the plate yoke surface are not flush with each other, making an uneven surface. A magnetic field generator incorporating the permanent magnets made of such magnet blocks is apt to produce non-uniform magnetic field between a pair of piece poles opposed to each other. Further, pole pieces for correcting the non-uniformity of the magnetic field may be tilted to produce non-uniformity in the magnetic field. Generally, after a step of mounting a pair of permanent magnets to oppose each other, a step of adjustment for uniformly distributing the magnetic field is indispensable. However, if the magnet blocks are mounted according to the above method, the non-uniformity of the magnetic field is so large that the adjustment becomes very time consuming.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Method for using chlorin and bacteriochlorin-based aminophenyl DTPA and N2S2 conjugates for MR contrast media and radiopharmaceuticals**

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  Patent Application Number: 20040022737

  Date filed: March 17, 2003

  Abstract: A method for MR imaging that comprises conducting the MR imaging after injecting compositions that are chemical combination of porphyrins, chlorins, bacteriochlorins, and related tetra-pyrrolic compounds with radioactive elements such as Technetium.sup.99, Gadolinium, Indium.sup.111 and radioactive iodine. When the element can form cations, the compound is usually a chelate with the porphyrin or chlorin structure. When the element forms anions, the compound is usually a direct chemical combination of the radioactive element into the porphyrin or chlorin structure. The method uses the compounds of the invention for **diagnostic imaging** of hyperproliferative tissue such as tumors and new blood vessel growth as is associated with the wet form of age related macular degeneration and methods of making the compounds. Compounds for MRI contrast imaging of the invention are usually Tc.sup.99, In.sup.111 or Gd(III) complexes of compounds of the formula: 1.

Excerpt(s): This application is a continuation-in-part of U.S. patent application Ser. No. 09/739,155 filed Dec. 18, 2000 which in turn claims priority from Provisional Patent Application No. 60/171,961 filed Dec. 23, 1999. Cancer is the second most common cause of death in the United States, accounting for 20% of all deaths. Until now, medicine has tried to overwhelm the cancer cell with brute force, slicing it out with surgery, zapping it with radiation, or poisoning it with chemotherapy. All too often, however, a few cells survive the onslaught and germinate, sometimes years later, into tumors that are impervious to treatment. If tumors can be diagnosed at early stages, it will certainly increase the survival rate of the cancer patients. Therefore, efforts are currently underway in our and various other laboratories to develop efficient tumor **diagnostic imaging** agents. For many years, in vivo imaging of human anatomy was dependent upon the intravenous administration of radioactive atoms (nuclear medicine) or non-radioactive iodinated contrast media (various **x-ray** tests and computed tomography). However, over the last decade **magnetic resonance imaging** (MRI) has assumed a critical role in imaging, and, unlike **x-rays** or **computed tomography,** MR uses contrast media that contain paramagnetic ions, particularly Gadolinium [Gd(III)]. Paramagnetic ions are not themselves "seen" by the MR scanner. Rather, they affect the water in body tissue so as to increase the "signal" emitted by tissue when it is placed in a magnetic field.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Method of using a matched filter for detecting QRS complex from a patient undergoing magnetic resonance imaging**

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  Patent Application Number: 20040073124

  Date filed: July 24, 2003

  Abstract: The invention relates to methods and systems for detecting QRS complex in a ECG of a patient undergoing **magnetic resonance imaging** and automating data acquisition in the **magnetic resonance imaging** machine upon detection. The method and system operates by recording an ECG signal sample from the patient, receiving a real-time ECG signal from a patient undergoing MRI and correlating the real-time ECG signal with a previously determined QRS complex template derived from the ECG signal received from the patient before undergoing MRI.

  Excerpt(s): The present invention relates generally to a method for the detection of the initiation of a heartbeat as a patient undergoes **magnetic resonance imaging,** and relates particularly to the use of a matched filter that synchronizes the initiation of the readings of the **magnetic resonance imaging** machine with the readings of the detected QRS complex in the matched filter. The term "electrocardiogram" is defined as a test that measures the electrical activity of the heart. An electrocardiogram measures the rate and regularity of the heartbeat as well as the size and position of the chambers, any damage to the heart, and the effects of any drugs or devices that regulate the heart. Through the use of an electrocardiogram, various actions of the heart can be recorded. The term "cardiac cycle" comprises atrial depolarization, ventricular depolarization, and ventricular re-polarization. The heart comprises at least two atria and two ventricles. The cardiac cycle involves the left atrium and left ventricle taking oxygenated blood from the pulmonary system and pumping it into the rest of the body and the right

atrium and right ventricle taking deoxygenated blood from the body and pumping it to the lungs. The first step in the cardiac cycle comprises atrial depolarization. During atrial depolarization, the atrium contracts, pushing blood into the ventricle to fill it. The second step in the cardiac cycle comprises ventricular depolarization. After ventricular depolarization, the ventricle contracts, pushing blood into the aorta. The final step in the cardiac cycle comprises ventricular re-polarization. After ventricular depolarization, the ventricle relaxes and refills with blood. By means of an electrocardiogram, each step in the cardiac cycle can be recorded.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Methods & apparatus for magnetic resonance imaging**

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  Patent Application Number: 20040044280

  Date filed: May 20, 2003

  Abstract: A parallel **magnetic resonance imaging** (MRI) apparatus configurable to image a physical entity comprises:a main magnetic flux source for providing a uniform fixed magnetic field, B.sub.alpha.;an RF array system comprising a plurality of RF coils and receivers, said RF system configured for:generating rotating RF excitation magnetic fields B.sub.1; andreceiving RF signals due to precessing nuclear magnetization on multiple spatially distinct radio frequency coils and associated receiver channels, said RF system being configured to operate in accordance with a B.sub.1 sensitivity encoding technique;a control processor for controlling imaging functionality, collecting image data and effecting data processing of the captured image data the control processor being configured with post processing capability for the B.sub.1 sensitivity encoding technique;an image display means for displaying processed image data as resultant images; andan auxiliary magnetic field means capable of producing at least one auxiliary uniform B.sub.o step magnetic field imaging region within the main B.sub.0 magnetic field;wherein:the auxiliary magnetic field, means is configured to operate in combination with the RF coil system and the B.sub.1 sensitivity encoding technique, the imaging apparatus thereby providing faster image acquisition than that attributed to the speed up factor provided solely by the B.sub.1 sensitivity encoding technique.The invention also includes a method of imaging using this apparatus.Furthermore, the invention also includes a method and apparatus for three-dimensional MR imaging using a 1D Multiple Acquisition Micro B.sub.o array coupled with a 2D Multiple Acquisition Micro B.sub.o array.

  Excerpt(s): This is a continuation-in-part of U.S. patent application Ser. No. 10/195,756, filed Jul. 15, 2002. The present invention relates to methods and apparatus for **magnetic resonance imaging** (MRI) of a physical entity. The invention more particularly relates to improved MRI methods and apparatus that provide fast imaging and particularly, but not exclusively the invention relates to parallel MRI and three-dimensional MRI. It is known in the field of nuclear magnetic resonance (NMR) imaging that it is desirable to reduce image scan times. In order to generate an NMR signal the net magnetic moment (M) of a sample comprising many nuclei is manipulated with suitable RF pulses. A variety of commonly used pulse sequences are known such as free induction decay (FID), inversion recovery and the well-known spin-echo sequence. In traditional **magnetic resonance imaging** systems a uniform magnetic field B.sub.o is applied across

the physical entity being imaged. By physical entity it is meant any object or other entity that is the subject of imaging such as for example a part of the human or animal body, fluid flow in the human or animal body or an industrial fluid flow. Typically a super conducting magnet is employed and uniformity in the magnetic field is achieved using a plurality of shim coils, which superimpose small high-order magnetic fields on B.sub.o, proportional to x, y, z, z.sup.2, z.sup.2y, etc.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Methods of diagnostic image analysis using bioconjugates of metal complexes of nitrogen-containing macrocyclic ligands**

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  Patent Application Number: 20040057904

  Date filed: April 1, 2003

  Abstract: The present invention is directed to bioconjugates of complexes represented by the formula: 1wherein R, R', R.sub.1, R'.sub.1, R.sub.2, R'.sub.2, R.sub.3, R'.sub.3, R.sub.4, R'.sub.4, R.sub.5, R'.sub.5, R.sub.6, R'.sub.6, R.sub.7, R'.sub.7, R.sub.8, R'.sub.8, R.sub.9, R'.sub.9, M, X, Y, Z and n are defined herein for use as contrast agents in **diagnostic imaging.**

  Excerpt(s): This invention relates to compounds effective as contrast agents in **diagnostic imaging.** In one aspect, this invention relates to **magnetic resonance imaging** (MRI) of human or non-human animal subjects using metal complexes of substituted nitrogen-containing fifteen-membered macrocyclic ligands which are conjugated to a targeting biomecule as contrast agents. In another aspect, this invention relates to manganese(II) complexes of substituted nitrogen-containing fifteen-membered macrocyclic ligands which are conjugated to a targeting biomolecule as MRI contrast agents. X-rays have long been used to produce images of human and non-human animal tissue, e.g. the internal organs of a patient, the patient being positioned between a source of **X-rays** and a film sensitive to the rays. Where organs interfere with the passage of the rays, the film is less exposed and the resulting developed film is indicative of the state of the organ. More recently, nuclear magnetic resonance (NMR) has been developed as an imaging technique, i.e. MRI. MRI avoids the harmful effects sometimes attending **X-ray** exposure. For improved imaging with **X-rays,** patients have been given enhancers prior to imaging, either orally or parenterally. After a predetermined time interval for distribution of the enhancer through the patient, the image is taken. To obtain a good image it is desirable that the time after the taking of enhancer be kept to a minimum. On the other hand there is a decrease in effectiveness with time, so desirably the decay should be relatively slow so as to provide a substantial time interval during which imaging can be done.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Non-invasive diagnostic imaging technology for mitochondria dysfunction using radiolabeled lipophilic salts**

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  Patent Application Number: 20040033197

  Date filed: February 6, 2003

  Abstract: The invention provides a series of lipophilic phosphonium cations (PhCs) labeled with.sup.18F for non-invasive assessment of.DELTA.PSI.m, lipophilic ammonium cation analogs of the PhCs, and methods of using same for imaging and detection of mitochondrial-related pathologies in patients using PET or SPECT.

  Excerpt(s): This application claims the benefit of U.S. Provisional Application Serial No. 60/354,563 filed Feb. 6, 2002, the teachings of which are incorporated herein by reference. The present invention provides novel radiolabeled lipophilic salts, particularly radiolabeled lipophilic phosphonium and ammonium salts, which are capable of measuring mitochondrial surface potential (.DELTA.PSI.m). This invention also provides pharmaceutical compositions comprising such radiolabeled lipophilic salts. Additionally this invention provides imaging methods for identifying tissues or cells having aberrant levels of mitochondrial activity by selectively localizing radiolabeled lipophilic salts of the invention into dysfunctional mitochondria. The invention also provides on-invasive methods for an early and sensitive detection of tumor response to chemotherapy agents. The invention further provides treatment methods comprising administration of a high energy radiolabeled lipophilic salts to a patient, particularly patients suffering from diseases or disorders associated with mitochondrial dysfunction. Measurement of the mitochondrial membrane potential (.DELTA.PSI.m) provides the single most comprehensive reflection of mitochondrial bio-energetic function primarily because it directly depends on the proper integration of diverse metabolic pathways that converge at the mitochondria. Numerous diseases are associated with mitochondria dysfunction, including cancer, cardiovascular and liver diseases, degenerative and autoimmune disorders as well as aging and new pathologies related to mitochondria are identified each year.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Non-invasive plaque detection using combined nuclear medicine and x-ray system**

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  Patent Application Number: 20040076262

  Date filed: October 18, 2002

  Abstract: A **diagnostic imaging** system (20) comprising a computer workstation (26) for controlling the imaging system, interfacing with an operator and generating images. A coordinate system (100) is in data communication with the computer workstation. The coordinate system (100) is adapted to describe relative position of components in the

diagnostic imaging system (20). A subject support (30) is describable within the coordinate system and an **X-ray** sub-system (22) is positionable around the subject support (30). Position sensors (44a) are operatively connected to the **x-ray** sub-system (22) and they provide signals to the workstation (26) indicative of the position of components of the **x-ray** sub-system (22) within the space represented by the coordinate system. A nuclear camera sub-system (24) is positionable around the subject support (30). Position sensors (44b) are operatively connected to the nuclear camera sub-system (24) and provide signals to the workstation (26) indicative of position of components of the nuclear camera sub-system within the coordinate system. The workstation (100) includes a region of Interest position determination function (108) for determining the position within the imaging system of a region of interest (40) in an image generated by the **x-ray** sub-system (22). The region of interest (40) is precisely targeted using the control console (26) for imaging by the nuclear camera (50).

Excerpt(s): The present invention relates to an apparatus and method for detection of plaque and is related to an apparatus and method that is useful to non-invasively locate and identify vulnerable plaque. The present invention finds application in conjunction with a **diagnostic imaging** system having a nuclear **diagnostic imaging** sub-system in combination with an **x-ray** imaging sub-system and will be described with particular respect thereto. Atherosclerotic cardiovascular disease, especially some aspects of coronary heart disease (CHD), has been thought to develop gradually. In recent years, it has become known that occlusion may occur suddenly, potentially resulting in thrombus formation and angina, myocardial infarction (MI) or sudden death. This shift in study of one operative mechanism for CHD is related to evolving understanding of different types of plaque in coronary arteries that may cause acute coronary syndromes. Present study of plaque in CHD involves identification, characterization and location of plaque including, more specifically, the roles of stabilized plaque and vulnerable plaque in CHD. Stable plaque is characterized as having a fibrous rich cap over a liquid core. A vulnerable plaque, which may be more likely to erode or suddenly and unpredictably rupture, is less fibrous, has less muscularity, more lipids and inflammatory cells. Particularly vulnerable plaque is characterized as having a thin fibrous coating over a large, lipid rich core that contains numerous inflammatory cells. Vulnerable plaque includes various high-risk plaques thereby predisposing patients to develop acute thrombotic coronary syndrome.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Pole pieces for magnetic resonance imaging systems**

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  Correspondence: General Electric Company; Global Research Center; Patent Docket RM. 4a59; PO Box 8, BLDG. K-1 Ross; Niskayuna; NY; 12309; US

  Patent Application Number: 20040019271

  Date filed: July 29, 2002

  Abstract: Pole pieces for **magnetic resonance imaging** systems comprise a plurality of laminated sheets of an alloy comprising iron and aluminum. Such an alloy can comprise up to about 17 weight percent aluminum and can further comprise cobalt, nickel, and/or silicon. A sheet of iron-aluminum alloy for such pole pieces has a resistivity

greater than about 60 mico-ohm.cm. A sheet is formed in a process comprising hot forging, hot rolling, and cold rolling. The process can further comprise annealing before and/or after the step of cold rolling.

Excerpt(s): The present invention relates to pole pieces for **magnetic resonance imaging** systems. In particular, the present invention relates to such pole pieces comprising laminates of magnetic materials comprising an iron alloy containing aluminum. The present invention also relates to methods for making such pole pieces. Magnetic resonance imaging ("MRI") is a technique for obtaining a tomographic image of an internal portion of a person or an object. It is necessary to form a stable and intense magnetic field in the magnetic field generating device of a MRI system in order to obtain a clear tomographic image. Therefore, there is a continued need to provide materials that can be formed into thinner sheets from materials having higher resistivity, thereby, having low eddy current loss for MRI pole pieces. In addition, it is very desirable to provide such pole pieces to improve the image quality of MRI systems.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Radiometal complexes of 2-pyrrolylthiones and their use as radiopharmaceuticals for imaging and therapy**

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  Patent Application Number: 20040044065

  Date filed: August 29, 2003

  Abstract: Novel 2-pyrrolylthione derived metal chelate compounds are disclosed as imaging and therapeutic agents. Compositions and methods for their preparation and use as **diagnostic imaging** and therapeutic agents are also disclosed.

  Excerpt(s): The present application claims benefit of priority from U.S. Provisional Patent Application No. 60/198,615 filed Apr. 20, 2000, which is hereby incorporated by reference in its entirety as if fully set forth. The invention is in the field of **diagnostic imaging** and therapeutics. It relates to novel metal chelates containing metal species bound by 2-pyrrolylthione core in N.sub.2S.sub.2 fashion. Methods for the preparation of the chelate complexes are provided. The invention also provides pharmaceutical compositions comprising the metal chelate, and the use of this composition as a **diagnostic imaging** or therapeutic agent. Kits comprising the compounds and compositions of the invention are also provided. The art of **diagnostic imaging** employs contrasting agents that in binding or accumulating site-specifically within the body help to resolve the image of diagnostic interest.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Radiopharmaceutical for diagnostic imaging containing a technetium-99m nitride heterocomplex**

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  Patent Application Number: 20040018147

  Date filed: September 4, 2003

  Abstract: A radiopharmaceutical for **diagnostic imaging** containing as an active ingredient a technetium-99m nitride heterocomplex comprising technetium-99m nitride and two different ligands coordinated therewith, i.e., a bisphosphinoamine compound as a.pi. electron acceptor and a bidentate ligand as a.pi. electron donor and represented by the following formula (I): [.sup.99mTc(N)(PNP)(XY)].sup.+ (I)wherein.sup.99mTc(N) is technetium-99m nitride, PNP is a bisphosphinoamine compound and XY is a bidentate ligand, is markedly accumulated in heart and adrenal glands and hence is useful for radiodiagnostic imaging of heart and adrenal glands.

  Excerpt(s): The present invention relates to a radiopharmaceutical for **diagnostic imaging** containing a technetium-99m nitride heterocomplex as an active ingredient. More particularly, the present invention relates to a radiopharmaceutical for **diagnostic imaging** which contains as an active ingredient a technetium-99m nitride heterocomplex comprising technetium-99m nitride and two different ligands coordinated therewith, i.e., a diphosphine compound as a.pi. eletron acceptor and a bidentate ligand as a.pi. electron donor, and is suitable especially for radiodiagnostic imaging of heart and adrenal glands. Of radioactive transition metals used in radiopharmaceuticals, Tc-99m is a nuclide most often used in the field of radiodiagnostic imaging because it is advantageous, for example, in that since the energy of.gamma.-rays emitted by Tc-99m is 141 keV and the half-life of Tc-99m is 6 hours, Tc-99m is suitable for imaging, and that Tc-99m can easily be obtained by means of a.sup.99Mo--.sup.99mTc generator. It is considered that if a physiologically active substance or the like can be attached to this nuclide without impairing the activity, the resulting compound is useful as a diagnostic agent or a therapeutic agent. The attempts described below were made to achieve such attachment. Transition metal nitride complexes are excellent in stability to hydrolysis. Therefore, when a transition metal nitride complex is subjected to exchange reaction with any of various ligands having a useful physiological activity, when used in a pharmaceutical, the nitride group of the nitride complex can remain bonded strongly to the metal atom. Accordingly, technetium nitride complexes having various substituents have been proposed. For example, WO 90/06137 discloses diethyl bisdithiocarbamate-Tc nitride complex, dimethyl bisdithiocarbamate-Tc nitride complex, di-n-propyl bisdithiocarbamate-Tc nitride complex, N-ethyl-N-(2-ethoxyethyl) bisdithiocarbamate-Tc nitride complex, etc. In addition, WO 89/08657, WO 92/00982, WO 93/01839 and the like disclose processes for producing a technetium nitride complex which comprises reacting a polyphosphine or the like as a reducing agent for technetium with technetium oxide, then reacting a nitride of a metal or ammonium as a nitrogen source for nitride with the reaction product to convert it to the corresponding nitride, and then coordinating a physiologically active monoclonal antibody or the like with this nitride.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Skin diagnostic imaging method and apparatus**

  Inventor(s): Cahill, John; (Tenafly, NJ), Eddowes, Miles Hugh; (Edgewater, NJ), Kennedy, Christine Elizabeth; (Torrington, CT), Shirsat, Sanjay Arvind; (Hackensack, NJ)

  Correspondence: Unilever; Patent Department; 45 River Road; Edgewater; NJ; 07020; US

  Patent Application Number: 20040125996

  Date filed: February 21, 2003

  Abstract: A method and apparatus is provided for identifying imperfections in a person's facial, forearm or hand skin and for recommending an appropriate remedial cosmetic. The method includes providing an apparatus having a programmable computer, a camera connected to the computer, at least one visible wavelength light source for separately generating at least two different color images and at least one ultraviolet wavelength light source for an ultraviolet light image. Further, the method includes placing the ultraviolet and color images into a program of the computer and processing the images for pinpointing areas of skin requiring preventative treatment including those with skin damage. A remedial set of cosmetic products can thereby be recommended.

  Excerpt(s): The invention concerns a method and apparatus for identifying imperfections in a person's skin and for recommending appropriate remedial cosmetics. Cosmetic shelves are filled with a plethora of skin treatment products. Consumers suffer from in-store confusion in selecting the product most effective for their face and hands. Systems have been developed to educate consumers in selecting their optimum product. For instance, U.S. Pat. No. 5,622,692 (Rigg et al.) describes an in-store system developed by the Elizabeth Arden Company called Custom Color.RTM. for identifying a customer's perfect matching facial foundation. A spectrophotometer first reads the natural color of the skin. Information from this reading is transmitted to a computer which operates a machine dispensing a liquid foundation matching the measured color.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Supersensitive nuclear magnetic resonance imaging apparatus**

  Inventor(s): Aihara, Katsuzou; (Mito, JP), Kakugawa, Shigeru; (Hitachi, JP), Morita, Hiroshi; (Hitachi, JP), Okada, Michiya; (Mito, JP), Wakuda, Tsuyoshi; (Hitachi, JP)

  Correspondence: Antonelli, Terry, Stout & Kraus, Llp; 1300 North Seventeenth Street; Suite 1800; Arlington; VA; 22209-9889; US

  Patent Application Number: 20040046556

  Date filed: September 8, 2003

  Abstract: A supersensitive nuclear **magnetic resonance imaging** apparatus includes a superconducting magnet, a gradient magnetic field coil, a high frequency emitting coil, and a receiving coil, wherein a biosample, including at least one of cells, organic tissues, and laboratory small animals, is inserted in a sample chamber of generally 1 to 30 mm in diameter. The superconducting magnet is formed of laterally divided split magnets, and the direction of the magnetic field generated by the magnet is generally horizontal. The receiving coil is in the form of a solenoid coil, and the biosample is inserted from a direction orthogonal to the direction of the magnetic field in a generally vertical

direction. The spatial resolution in imaging of the biosample is not more than one-tenth of a cell that forms the biosample.

Excerpt(s): This is a continuation of U.S. application Ser. No. 10/326,085, filed Dec. 23, 2002, the subject matter of which is incorporated by reference herein. The present invention relates to a supersensitive nuclear **magnetic resonance imaging** apparatus; and, more particularly, the invention relates to an apparatus for effecting a high resolution imaging of biosamples, such as cells, organic tissues, laboratory small animals, or the like, and to growth of a high-grade protein crystal using high resolution imaging, on-site observation of the process of growth, and a method of growth. In recent years, rapid advances have been made in an imaging method utilizing nuclear magnetic resonance (NMR) imaging. If an analysis of the metabolism of cells or a protein information network in living organisms, such as human bodies, small animals, or cellular structures, can be made possible in the future by combining the NMR method and a powerful superconducting magnet technology, it will be possible for the structure or function of the protein in cells to be revealed. Thus, there are great hopes that this technology may play a great roll in the study of life science, such as the prevention of disease or the development of new drugs. In recent years, effective analysis of the structure of an organic compound, such as a protein, which has a complicated molecular structure, at the bioatomic level, became possible by the use of nuclear magnetic resonance spectroscopy.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Surgical positioning system**

  Inventor(s): Cosman, Eric R.; (Belmont, MA)

  Correspondence: Douglas E. Denninger, ESQ.; U.S. Surgical; A Division OF Tyco Healthcare Group, LP; 150 Glover Avenue; Norwalk; CT; 06856; US

  Patent Application Number: 20040122311

  Date filed: December 8, 2003

  Abstract: A system for positioning and repositioning of a portion of a patient's body with respect to a treatment or imaging machine includes multiple cameras to view the body and the machine. Index markers, either light-emitting, passive, geometric shapes, or natural landmarks, are identified and located by the cameras in 3D space. In one embodiment, such reference or index markers are in a determinable relationship to analogous markers used during previous image scanning of the patient. Anatomical targets determined from image scanning can be located relative to reference positions associated with the treatment or diagnostic machine. Several forms of camera, index markers, methods and systems accommodate different clinical uses. **X-ray** imaging of the patient further refines anatomical target positioning relative to the treatment or **diagnostic imaging** reference point. Movements of the patient based on comparative analysis of imaging determined anatomical targets relative to reference points on treatment or diagnostic apparatus are controlled by the system and process of the invention.

  Excerpt(s): Ser. No. 08/482,213, filed Jun. 7, 1995 by Eric R. Cosman for "An Optically Coupled Frameless Stereotactic Space Probe," which is a continuation of Ser. No. 08/299,987, filed Sep. 1, 1994 by Eric R. Cosman for "An Optically Coupled Frameless Stereotactic Space Probe," now abandoned, which is a continuation of Ser. No. 08/047,879, filed Apr. 15, 1993 for "An Optically Coupled Frameless Stereotactic Space

Probe," now abandoned, which is a continuation of Ser. No. 07/941,863, filed Sep. 8, 1992 by Eric R. Cosman for "An Optically Coupled Frameless Stereotactic Space Pro," now abandoned, which is a continuation of Ser. No. 07/647,463, filed Jan. 28, 1991 by Eric R. Cosman for "An Optically Coupled Frameless Stereotactic Space Probe," now abandoned. Ser. No. 08/710,587, filed Sep. 16, 1996 by Eric R. Cosman for "A Stereotactic Target Localization and Alignment System for the Body," which is a continuation of Ser. No. 08/275,041, filed Jul. 13, 1994 by Eric R. Cosman for "A Stereotactic Target Localization and Alignment System for the Body," now abandoned. Ser. No. 08/795,241, filed Feb. 19, 1997 by Eric R. Cosman for "A Head and Neck Localizer System," which is a Continuation of Ser. No. 08/382,226, filed Jan. 31, 1995, by Eric R. Cosman for "A Head and Neck Localizer System," now abandoned.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Synthetically focused ultrasonic diagnostic imaging system for tissue and flow imaging**

  Inventor(s): Robinson, Brent S.; (Kirkland, WA)

  Correspondence: Atl Ultrasound; P.O. Box 3003; 22100 Bothell Everett Highway; Bothell; WA; 98041-3003; US

  Patent Application Number: 20040068188

  Date filed: October 3, 2003

  Abstract: A synthetic focus ultrasound system is described which is operated in a hybrid fashion. System operation alternates between synthetic focus acquisition and conventional focused beam acquisition. This makes possible, for example, the acquisition and display of harmonic images. Speckle artifacts in the synthetic focused ultrasound images may be reduced by combining signals from different sub-apertures which view the image field from different look directions. In a described embodiment, sets of motion maps are be produced for different sub-apertures of the array transducer, then compounded to reduce speckle. One or more identified regions of interest within a synthetic focused ultrasound image may be processed differently from other regions of the image to highlight or better define particular motional characteristics within the regions of interest, such as turbulent flow or different velocities of flow or motion.

  Excerpt(s): This application is a continuation in part of U.S. patent application Ser. No. 10/136,880 of the same title, which was filed on Apr. 30, 2002. This invention relates to ultrasonic **diagnostic imaging** systems and, in particular, to synthetically focused ultrasonic **diagnostic imaging** systems which image tissue, flow, and flow spectra. Today's conventional ultrasound systems produce images by scanning a region of the body with ultrasound beams electronically formed by a transducer array. The timing of signals applied to the array elements determines the direction in which a beam is transmitted and the depth of focus of a beam. A plurality of adjacent beams are transmitted to adequately spatially sample the target region. The echoes from along the beam directions are processed in known ways to form an image of the plane or volume scanned by the beams and depict characteristics of the tissue or bloodflow within the plane or volume.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Systems and methods for detecting x-rays**

  Inventor(s): Bross, Alan D.; (Downers Grove, IL), Mellott, Kerry L.; (Malta, IL), Pla-Dalmau, Anna; (Naperville, IL)

  Correspondence: Kermit D. Lopez/ Luis M. Ortiz; Ortiz & Lopez, Pllc; Patent Attorneys; P.O. Box 4484; Albuquerque; NM; 87196-4484; US

  Patent Application Number: 20040104348

  Date filed: December 3, 2002

  Abstract: Systems and methods for detecting **x-rays** are disclosed herein. One or more x-ray-sensitive scintillators can be configured from a plurality of heavy element nano-sized particles and a plastic material, such as polystyrene. As will be explained in greater detail herein, the heavy element nano-sized particles (e.g., PbWO.sub.4) can be compounded into the plastic material with at least one dopant that permits the plastic material to scintillate. **X-rays** interact with the heavy element nano-sized particles to produce electrons that can deposit energy in the **x-ray** sensitive scintillator, which in turn can produce light.

  Excerpt(s): The present invention is generally related to scintillators utilized in the detection of radiation. The present invention is also related to systems and methods for plastic scintillator material and plastic scintillator devices thereof. The present invention is additionally related to **x-ray** detection systems and methods. Scintillators are well known in the radioactive detection arts. A scintillator is a material that converts energy into light. Energy is deposited into the scintillator by penetrating radiation. This energy is then converted into ultra-violet or visible light, which can then be detected with the use of a photo detector such as a photo multiplier tube. Generally, incident penetrating radiation includes high-energy particles and ionizing radiation such as **x-rays,** gamma rays, alpha particles, beta particles, thermal neutrons, etc. Scintillators are therefore materials that emit flashes or pulses of light when ionizing radiation such as gamma rays interact with them. Plastic scintillators formed from an aromatic polymer such as polystyrene or polyvinyltoluene are particularly well suited for radiation detection applications. These materials are readily melt-processible and capable of being extruded into a variety shapes and sizes to meet the spatial requirements of the detector involved.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Techniques for identifying molecular structures and treating cell types lining a body lumen using fluorescence**

  Inventor(s): Madar, Igal; (Baltimore, MD), Murphy, John C.; (Clarksville, MD)

  Correspondence: The Johns Hopkins University; Applied Physics Laboratory; 11100 Johns Hopkins Road; Laurel; MD; 20723-6099; US

  Patent Application Number: 20040092825

  Date filed: August 1, 2003

  Abstract: Techniques for detecting fluorescence emitted by molecular constituents in a wall of a body lumen include introducing an autonomous solid support into the body lumen. Cells in a lumen wall of the body lumen are illuminated by a light source mounted to the solid support with a wavelength that excites a particular fluorescent signal. A detector mounted to the solid support detects whether illuminated cells emit the particular fluorescent signal. If the particular fluorescent signal is detected from the

illuminated cells, then intensity or position in the lumen wall of the detected fluorescent signal, or both, is determined. These techniques allow the information collected by the capsule to support diagnosis and therapy of GI cancer and other intestinal pathologies and syndromes. For example, these techniques allow **diagnostic imaging** using endogenous and exogenous fluoroprobes, treating diseased sites by targeted release of drug with or without photoactivation, and determining therapeutic efficacy.

Excerpt(s): This application claims benefit of Provisional Appln. 60/400,325, filed Aug. 1, 2002, the entire contents of which are hereby incorporated by reference as if fully set forth herein, under 35 U.S.C.sctn.119(e). The present invention relates to identifying molecular structures and cell types in walls of a body lumen in animals; and in particular to fluorescent imaging of cell types in walls of a body lumen for diagnosis or therapy, such as in vivo therapy based on selective destruction of labeled tumor cells. The invention has application to the diagnosis and treatment of intestinal cancer and colon cancer, among other pathologies and syndromes. Cancer of the gastrointestinal (GI) tract is easily treated if detected early. Consequently a great deal of activity has been expended in developing systems to inspect the GI tract for early signs of cancer. One of the first significant advances was the endoscope, which allows a doctor to inspect portions of the GI tract with a miniaturized light source at a probe end of a coherent bundle fiber optic cable. Reflected light beam images are returned through the fiber optic cable for detection by an external digital camera and display on an external monitor or for recording on an external video recorder or both.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Ultrasonic diagnostic imaging system with articulating display handle**

  Inventor(s): Marshall, Elizabeth A.; (Bothell, WA), Rankers, Ulrich; (Livermore, CA), Schilke, Daryl E.; (Seattle, WA)

  Correspondence: Atl Ultrasound; P.O. Box 3003; 22100 Bothell Everett Highway; Bothell; WA; 98041-3003; US

  Patent Application Number: 20040068185

  Date filed: October 8, 2002

  Abstract: A cart-borne ultrasonic **diagnostic imaging** system includes an image display which is mounted on an articulating mechanism on the cart. The articulating mechanism enables the image display to be moved relative to the cart from a nominal centered and forward-facing position to the side of the cart and to be rotated toward the side of the cart. The image display can also be articulated to face upward or downward from its nominal position. The image display includes a handle mounted on the front of the display which can be gripped by the user to move the display rotationally, forward and back, left and right, and to face upward or downward. Either a CRT display or a flat panel display can be articulated in this manner.

  Excerpt(s): This invention relates to ultrasonic **diagnostic imaging** systems and, in particular, to ultrasonic **diagnostic imaging** systems with displays that can be articulated for ease and comfort of viewing. Designs of ultrasound systems are increasingly taking the comfort and convenience of the user and patient into consideration. These efforts have been stimulated by reports of repetitive stress injuries and by the desire to provide additional comfort and convenience for those using the ultrasound system, including both the operator and the patient. One component of the ultrasound system which is amenable to such designs is the display device on which the

diagnostic image is displayed. As the operator is guiding the ultrasound probe over the body of the patient to acquire the anatomy of interest in the field of view of the probe, the operator is constantly watching the image produced by the probe on the system display. To do this comfortably and effectively, the operator needs to position the patient, the operator, and the display in related positions that enable the anatomy of interest to be effectively scanned while the operator watches the ultrasound image on the display. This procedure is aided when the display device, which may be a CRT monitor or a flat-panel display, can be easily moved to the desired viewing position. To enable the user to adjust the monitor position, some ultrasound systems mount the monitor on the articulation mechanism conventionally found on many computer monitors. These mechanisms include a base mount on which the monitor can swivel about a vertical pivot axis, and which permits the monitor to be rocked about a horizontal axis so as to face more upward or downward toward the operator. However, the patient may want to see the image on the display from time to time, or the ultrasonographer may want to show the image to the patient. To show the patient the live image, the ultrasonographer will have to position the monitor toward the patient with one hand, while continuing to scan with the probe with the other hand. Accordingly, the display should be designed to enable the display device, either a CRT monitor or flat panel display, to be easily moved to a new viewing position with one hand while scanning a patient.

Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Using magnetic resonance imaging to directly map neuronal activity**

  Inventor(s): Fox, Peter T.; (San Antonio, TX), Gao, Jia-Hong; (San Antonio, TX), Xiong, Jinhu; (Iowa City, IA)

  Correspondence: Trop Pruner & Hu, PC; 8554 Katy Freeway; Suite 100; Houston; TX; 77024; US

  Patent Application Number: 20040096395

  Date filed: September 18, 2003

  Abstract: In one embodiment, the present invention includes a method for performing **magnetic resonance imaging** on a subject and directly mapping electromagnetic activity of neural firing of the subject via the **magnetic resonance imaging.**

  Excerpt(s): This application claims priority to U.S. Provisional Application No. 60/412,171 filed on Sep. 20, 2003 in the names of Jinhu Xiong, Jia-Hong Gao, and Peter T. Fox, entitled "Using **Magnetic Resonance Imaging** to Directly Map Neuronal Activity". The present invention relates to medical imaging and more specifically **magnetic resonance imaging** (MRI). Various neuroimaging techniques are presently available. These techniques include MRI, functional MRI (fMRI), and positron emission tomography (PET), for example. None of these techniques, however, are able to directly measure neural activity, i.e., brain activity.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

- **Vitamin-targeted imaging agents**

  Inventor(s): Leamon, Christopher P.; (West Lafayette, IN), Parker, Matthew A.; (San Diego, CA)

  Correspondence: Barnes & Thornburg; 11 South Meridian Street; Indianapolis; IN; 46204; US

  Patent Application Number: 20040033195

  Date filed: May 6, 2003

  Abstract: The invention relates to compounds and methods for targeting radionuclide-based imaging agents to cells having receptors for a vitamin, or vitamin receptor binding derivative or analog thereof, by using such a vitamin as the targeting ligand for the imaging agent. The invention provides a compound of the formula 1for use in such methods. In the compound, V is a vitamin that is a substrate for receptor-mediated transmembrane transport in vivo, or a vitamin receptor binding derivative or analog thereof, L is a divalent linker, R is a side chain of an amino acid of the formula H.sub.2NCHRCOOH, M is a cation of a radionuclide, n is 1 or 0, K is 1 or 0, and the compound can be in a pharmaceutically acceptable carrier therefor. The vitamin-based compounds can be used to target radionuclides to cells, such as a variety of tumor cell types, for use in **diagnostic imaging** of the targeted cells.

  Excerpt(s): This application claims priority under 35 U.S.C.sctn.119(e) to U.S. Provisional Application Serial No. 60/378,571, filed on May 6, 2002. The invention relates to compounds and methods for targeting an imaging agent to cells of an animal. More particularly, radionuclide-based imaging agents are targeted to cells having receptors for a vitamin by using such a vitamin, or a vitamin receptor binding derivative or an analog thereof, as the targeting ligand for the imaging agent. Transmembrane transport is a critical cellular function. Because practitioners have recognized the importance of transmembrane transport to many areas of medical and biological science, including drug therapy and gene transfer, there have been significant research efforts directed to the understanding and application of such processes. Thus, for example, transmembrane delivery of nucleic acids has been attempted through the use of protein carriers, antibody carriers, liposomal delivery systems, electroporation, direct injection, cell fusion, viral carriers, osmotic shock, and calcium-phosphate mediated transformation. However, many of those techniques are limited both by the types of cells in which transmembrane transport occurs and by the conditions required for successful transmembrane transport of exogenous molecules. Furthermore, many of these techniques are limited by the type and size of the exogenous molecule that can be transported across the cell membrane without loss of bioactivity.

  Web site: http://appft1.uspto.gov/netahtml/PTO/search-bool.html

Keeping Current

In order to stay informed about patents and patent applications dealing with diagnostic imaging, you can access the U.S. Patent Office archive via the Internet at the following Web address: **http://www.uspto.gov/patft/index.html**. You will see two broad options: (1) Issued Patent, and (2) Published Applications. To see a list of issued patents, perform the following steps: Under "Issued Patents," click "Quick Search." Then, type "diagnostic imaging" (or

synonyms) into the "Term 1" box. After clicking on the search button, scroll down to see the various patents which have been granted to date on diagnostic imaging.

You can also use this procedure to view pending patent applications concerning diagnostic imaging. Simply go back to **http://www.uspto.gov/patft/index.html**. Select "Quick Search" under "Published Applications." Then proceed with the steps listed above.

CHAPTER 6. BOOKS ON DIAGNOSTIC IMAGING

Overview

This chapter provides bibliographic book references relating to diagnostic imaging. In addition to online booksellers such as **www.amazon.com** and **www.bn.com**, excellent sources for book titles on diagnostic imaging include the Combined Health Information Database and the National Library of Medicine. Your local medical library also may have these titles available for loan.

Book Summaries: Federal Agencies

The Combined Health Information Database collects various book abstracts from a variety of healthcare institutions and federal agencies. To access these summaries, go directly to the following hyperlink: **http://chid.nih.gov/detail/detail.html**. You will need to use the "Detailed Search" option. To find book summaries, use the drop boxes at the bottom of the search page where "You may refine your search by." Select the dates and language you prefer. For the format option, select "Monograph/Book." Now type "diagnostic imaging" (or synonyms) into the "For these words:" box. You should check back periodically with this database which is updated every three months. The following is a typical result when searching for books on diagnostic imaging:

- **Dental Diagnostic Imaging: Diagnostic Features and Pathology**

  Source: in Langlais, R.P.; Hashimoto, K.; Yamamoto, H. Dental Diagnostic Imaging: Diagnostic Features and Pathology. Springfield, IL: Charles C Thomas, LTD. 1997. 176 p.

  Contact: Available from Charles C Thomas Publishers, LTD. 2600 South First Street, Springfield, IL 62794-9265. (800) 258-8980 or (217) 789-8980; Fax (217) 789-9130. PRICE: $52.95 plus shipping and handling.

  Summary: This textbook improves the readers knowledge of dental **diagnostic imaging** and oral and maxillofacial pathology. The authors use a case-based format, with line drawings supplementing the black-and-white radiographs. The line drawings and text are designed to help the reader recognize features in the radiographs. Each case also includes a description of the pathology; many include a photomicrograph depicting the histopathology. Eleven chapters cover dental anomalies, cysts of the jaws, odontogenic

tumors, non-odontogenic tumors, non-specific diseases of the jaw, inflammation of the jaw bones, diseases of the maxillary sinus, temporomandibular joint disorders (TMD), diseases of the salivary glands, traumatic injuries, and miscellaneous disorders. A subject index concludes the volume. (AA-M).

Book Summaries: Online Booksellers

Commercial Internet-based booksellers, such as Amazon.com and Barnes&Noble.com, offer summaries which have been supplied by each title's publisher. Some summaries also include customer reviews. Your local bookseller may have access to in-house and commercial databases that index all published books (e.g. Books in Print®). **IMPORTANT NOTE:** Online booksellers typically produce search results for medical and non-medical books. When searching for "diagnostic imaging" at online booksellers' Web sites, you may discover non-medical books that use the generic term "diagnostic imaging" (or a synonym) in their titles. The following is indicative of the results you might find when searching for "diagnostic imaging" (sorted alphabetically by title; follow the hyperlink to view more details at Amazon.com):

- **12-Lead Ecg and X-Ray Interpretation for Primary Care Providers** by Wendy L. Wright; ISBN: 0803608136; http://www.amazon.com/exec/obidos/ASIN/0803608136/icongroupinterna
- **A Century of X-Rays and Radioactivity in Medicine: With Emphasis on Photographic Records of the Early Years** by Richard F. Mould; ISBN: 0750302240; http://www.amazon.com/exec/obidos/ASIN/0750302240/icongroupinterna
- **Brigham and Women's Hospital Handbook of Diagnostic Imaging (Little, Brown Handbook)** by Herbert L. Abrams, Barbara J. McNeil; ISBN: 0316563226; http://www.amazon.com/exec/obidos/ASIN/0316563226/icongroupinterna
- **Caffey's Pediatric Diagnostic Imaging (2 Vol. Set)** by Jerald P. Kuhn, et al; ISBN: 0323011098; http://www.amazon.com/exec/obidos/ASIN/0323011098/icongroupinterna
- **Chest X-Ray Made Easy** by Jonathan Corne, et al; ISBN: 0443070083; http://www.amazon.com/exec/obidos/ASIN/0443070083/icongroupinterna
- **Developments in X-Ray Tomography II: 22-23 July, 1999, Denver, Colorado (Proceedings of Spie--The International Society for Optical Engineering, V. 3772.)** by U. Bonse, Society of Photo-Optical Instrumentation Engineers; ISBN: 081943258X; http://www.amazon.com/exec/obidos/ASIN/081943258X/icongroupinterna
- **Imaging of the Knee: Techniques and Applications (Medical Radiology. Diagnostic Imaging and Radiation Oncology)** by A. M. Davies, et al; ISBN: 3540002502; http://www.amazon.com/exec/obidos/ASIN/3540002502/icongroupinterna
- **Introduction to Functional Magnetic Resonance Imaging : Principles and Techniques** by Richard B. Buxton; ISBN: 0521581133; http://www.amazon.com/exec/obidos/ASIN/0521581133/icongroupinterna
- **Magnetic Resonance Imaging in Liver Disease: Technical Approach, Diagnostic Imaging of Liver Neoplasms, Focus on a New Superparamagnetic Contrast Agent** by Thomas J. Vogl, et al; ISBN: 1588902366; http://www.amazon.com/exec/obidos/ASIN/1588902366/icongroupinterna

- **Pharmaceuticals in Medical Imaging: Radiopaque Contrast Media, Radiopharmaceuticals, Enhancement Agents for Magnetic Resonance Imaging and Ultrasoun** by Dennis P. Swanson, et al; ISBN: 0024207802; http://www.amazon.com/exec/obidos/ASIN/0024207802/icongroupinterna
- **Pocket Atlas of Sectional Anatomy: Computed Tomography and Magnetic Resonance Imaging : Thorax, Abdomen, and Pelvis** by Torsten B. Moller, Emil Reif; ISBN: 0865778728; http://www.amazon.com/exec/obidos/ASIN/0865778728/icongroupinterna
- **Practical Diagnostic Imaging for the Veterinary Technician** by Connie M. Han, Cheryl D., Rvt Hurd; ISBN: 032300475X; http://www.amazon.com/exec/obidos/ASIN/032300475X/icongroupinterna
- **Radiologic Anatomy: Explore Human Anatomy Using Current Diagnostic Imaging Technology (CD-ROM for Windows & Macintosh 7.0, Student Version)** by Linda Lanier, et al; ISBN: 1885966776; http://www.amazon.com/exec/obidos/ASIN/1885966776/icongroupinterna
- **Signal Processing for Magnetic Resonance Imaging and Spectroscopy (Signal Processing and Communications Series, 15)** by Hong Yan; ISBN: 0824706536; http://www.amazon.com/exec/obidos/ASIN/0824706536/icongroupinterna
- **Spiral and Multislice: Computed Tomography of the Body** by Michael, Md. Galanski, et al; ISBN: 0865778701; http://www.amazon.com/exec/obidos/ASIN/0865778701/icongroupinterna
- **Textbook of Diagnostic Imaging in the Elderly** by Mario Impallomeni, et al; ISBN: 1899066888; http://www.amazon.com/exec/obidos/ASIN/1899066888/icongroupinterna
- **Whole Body Computed Tomography Version 2.0 (Cd-Rom)** by O. H. Wegener; ISBN: 0632042338; http://www.amazon.com/exec/obidos/ASIN/0632042338/icongroupinterna

Chapters on Diagnostic Imaging

In order to find chapters that specifically relate to diagnostic imaging, an excellent source of abstracts is the Combined Health Information Database. You will need to limit your search to book chapters and diagnostic imaging using the "Detailed Search" option. Go to the following hyperlink: **http://chid.nih.gov/detail/detail.html**. To find book chapters, use the drop boxes at the bottom of the search page where "You may refine your search by." Select the dates and language you prefer, and the format option "Book Chapter." Type "diagnostic imaging" (or synonyms) into the "For these words:" box. The following is a typical result when searching for book chapters on diagnostic imaging:

- **Visceral Artery Aneurysms**

  Source: in Kelly, K.A.; Sarr, M.G.; Hinder, R.A., eds. Mayo Clinic Gastrointestinal Surgery. St. Louis, MO: Elsevier Science. 2004. p. 467-474.

  Contact: Available from Elsevier Science. Customer Service Department, 11830 Westline Industrial Drive, St. Louis, MO 63146 (800) 545-2522. Fax (800) 535-9935. Email: usbkinfo@elsevier.com. Website: www.elsevierhealth.com. PRICE: $195.00. ISBN: 721692877.

Summary: Aneurysmal degeneration of the arteries that supply the abdominal viscera is an uncommon but potentially lethal condition. With the increasing use of **diagnostic imaging** for nonspecific abdominal complaints, visceral aneurysms are being recognized more frequently at earlier stages. This chapter on visceral artery aneurysms is from a book that focuses on the major diseases treated by gastrointestinal surgeons, from the esophagus to the anal canal. The presentation has a definite clinical orientation and a major emphasis on practical applications as they are applied at the Mayo Clinic. The authors of this chapter review the anatomy involved, splenic artery aneurysm, hepatic artery aneurysm, superior mesenteric artery aneurysm, celiac artery aneurysm, gastric and gastroepiploic artery aneurysms, jejunal, ileal and colic artery aneurysms, pancreatic and gastroduodenal artery aneurysms. The chapter is illustrated with line drawings and black-and-white photographs. 6 figures. 2 tables. 27 references.

- **Imaging Studies**

  Source: in Landau, L.; Kogan, B.A. 20 Common Problems in Urology. New York, NY: McGraw-Hill, Inc. 2001. p. 305-322.

  Contact: Available from McGraw-Hill, Inc. 1221 Avenue of the Americas, New York, NY 10020. (612) 832-7869. Website: www.bookstore.mcgraw-hill.com. PRICE: $45.00;plus shipping and handling. ISBN: 0070634130.

  Summary: Diagnostic imaging plays an integral role in the evaluation and treatment of urologic disorders. The genitourinary system includes the kidneys, upper tract collecting system (calyces, renal pelvis, ureters), bladder, urethra, prostate, and male and female genitalia. In additional to being anatomically and functionally unique, these structures are susceptible to a number of pathologic processes. This chapter on imaging studies is from a text on common problems in urology (written for the primary care provider). The authors describe salient points about the diagnostic studies employed most frequently when evaluating patients with urologic disorders. Algorithms are used to discuss common genitourinary disease processes presenting to the clinician with an emphasis on diagnostic radiological evaluation. Studies covered include intravenous urogram, retrograde pyelogram, voiding cystourethrogram (cystogram), retrograde urethrogram, computed tomogram (CT scan), ultrasound, **magnetic resonance imaging** (MRI), renal angiogram, and captopril renal scan. 30 figures. 1 table. 5 references.

- **Rhinological Considerations and Upper Airway Physical Examination of Patients with Olfactory Disorders**

  Source: in Doty, R.L., ed. Handbook of Olfaction and Gustation. New York, NY: Marcel Dekker, Inc. 1995. p. 421-440.

  Contact: Available from Marcel Dekker, Inc. 270 Madison Avenue, New York, NY 10016. (800) 228-1160 or (212) 696-9000; Fax (212) 685-4540. PRICE: $225.00 plus shipping and handling. ISBN: 0824792521.

  Summary: In this chapter, from a medical text on olfaction and gustation, the authors review the evaluation of patients presenting with olfactory loss. They stress that the focus of this evaluation is on the patient's history and head and neck examination. Particular emphasis is placed on the technique of office telescopic nasal endoscopy. The authors note that when taken together, the history and physical examination will provide the basis for the anatomical and etiological diagnosis in the majority of patients presenting with olfactory disorders. The authors also discuss **diagnostic imaging** techniques for the sinonasal and central olfactory regions and the indications for their use. 12 figures. 43 references. (AA-M).

- **Evaluation for Dysphagia in Neurogenic Disorders**

  Source: in Leonard, R.; Kendall, K. Dysphagia Assessment and Treatment Planning: A Team Approach. San Diego, CA: Singular Publishing Group, Inc. 1997. p. 29-39.

  Contact: Available from Singular Publishing Group, Inc. 401 West 'A' Street, Suite 325, San Diego, CA 92101-7904. (800) 521-8545 or (619) 238-6777. Fax (800) 774-8398 or (619) 238-6789. E-mail: singpub@singpub.com. Website: www.singpub.com. PRICE: $56.95 plus shipping and handling. ISBN: 156593749X.

  Summary: This chapter is from a textbook that focuses on the principles of assessment and treatment planning for patients with dysphagia (swallowing dysfunction). The chapter reviews specific swallowing problems associated with the major categories of neurogenic disorders. The author discusses concerns related to diagnostic strategies, and the timing of these strategies, in patients experiencing central nervous system or neuromuscular diseases. The author focuses on diagnostic strategies that provide both qualitative and quantitative information regarding dysphagia in neurogenic patient populations. Bedside and clinical evaluations and dynamic radiographic studies of swallow function represent major components of this diagnostic protocol. The author discusses dysphagia and each of the following neurogenic disorders: stroke, brain injury, cerebral palsy, Parkinson's disease, multiple sclerosis, polymyositis and dermatomyositis, myasthenia gravis, muscular dystrophies, amyotrophic lateral sclerosis (ALS), congenital spinal muscular atrophy, and postpolio syndrome. The author reiterates that dysphagia is a significant clinical problem requiring evaluation and treatment in many individuals with neuromuscular and neurologic degenerative diseases. A thorough clinical examination and appropriate **diagnostic imaging** studies are necessary to develop an appropriate treatment regimen. 23 references.

- **Cholecystitis and Mirizzi Syndrome**

  Source: in Okuda, K., ed.,et al. Hepatobiliary Diseases: Pathophysiology and Imaging. Malden, MA: Blackwell Science, Inc. 2001. p. 682-695.

  Contact: Available from Blackwell Science, Inc. 350 Main Street, Commerce Place, Malden, MA 02148. (800) 215-1000 or (617) 388-8250. Fax (617) 388-8270. E-mail: books@blacksci.com. Website: www.blackwell- science.com. PRICE: $275.00. ISBN: 0632055421.

  Summary: This chapter on cholecystitis and Mirizzi syndrome is from a textbook that familiarizes the reader with various imaging modalities, the information they provide, and the merits of each, in order to facilitate the combined use of different imaging techniques in the diagnosis and management of hepatobiliary (liver and bile tract) diseases. Acute calculous cholecystitis is an acute inflammation of the gallbladder precipitated by obstruction of the neck of the gallbladder or cystic duct by a gallstone. Acute cholecystitis is the most common complication of gallbladder stones, causing the patient severe pain and illness. Emphysematous cholecystitis is rare and characterized by the gallbladder being infected by gas-forming bacteria, including Clostridia, Escherichia coli, and Staphylococcus and Streptococcus species. Chronic cholecystitis is almost always associated with gallstones, whether or not the patient has had symptoms. Xanthogranulomatous cholecystitis is characterized by multiple, yellowish brown intraluminal nodules, proliferative fibrosis, and foamy histiocytic infiltration (bile within the gallbladder wall). Porcelain gallbladder is defined as diffuse calcification of the wall of the organ. Milk of calcium bile, or limy bile, is formed by the precipitation of calcium carbonate, calcium phosphate, and calcium bilirubinate in the gallbladder, resulting in a semifluid or putty like material. Mirizzi syndrome is an uncommon

complication of long standing gallstone disease that occurs in 0.7 to 1.4 percent of all cholecystectomies (gallbladder removals) performed. Mirizzi syndrome includes stricture (narrowing) of the common hepatic (liver) bile duct due to inflammation of the gallbladder and fistula after erosion of the impacted stone into the common hepatic duct. For each condition, the author discusses pathogenesis, pathology, clinical presentation, **diagnostic imaging,** and treatment options. 23 figures. 19 references.

- **Cysts of the Jaws**

  Source: in Langlais, R.P.; Hashimoto, K.; Yamamoto, H. Dental Diagnostic Imaging: Diagnostic Features and Pathology. Springfield, IL: Charles C Thomas, LTD. 1997. p. 17-38.

  Contact: Available from Charles C Thomas Publishers, LTD. 2600 South First Street, Springfield, IL 62794-9265. (800) 258-8980 or (217) 789-8980; Fax (217) 789-9130. PRICE: $52.95 plus shipping and handling.

  Summary: This chapter on cysts of the jaws is from a textbook designed to improve the reader's knowledge of dental **diagnostic imaging** and oral and maxillofacial pathology. The authors use a case-based format, with line drawings supplementing the black-and-white radiographs. The line drawings and text are designed to help the reader recognize features in the radiographs. Each case also includes a description of the pathology; many include a photomicrograph depicting the histopathology. The first section covers odontogenic cysts, including radicular, residual, dentigerous, primordial, and calcifying odontogenic cysts. The second section describes non-odontogenic cysts, including nasopalatine duct, median maxillary, nasoalveolar, simple bone, and aneurysmal bone cysts. The section also covers globulomaxillary lesions and the static bone cavity. The chapter concludes with the outline of the histological classification of jaw cysts, as developed by the World Health Organization (1992). 70 figures.

- **Dental Anomalies**

  Source: in Langlais, R.P.; Hashimoto, K.; Yamamoto, H. Dental Diagnostic Imaging: Diagnostic Features and Pathology. Springfield, IL: Charles C Thomas, LTD. 1997. p. 9-15.

  Contact: Available from Charles C Thomas Publishers, LTD. 2600 South First Street, Springfield, IL 62794-9265. (800) 258-8980 or (217) 789-8980; Fax (217) 789-9130. PRICE: $52.95 plus shipping and handling.

  Summary: This chapter on dental anomalies is from a textbook designed to improve the reader's knowledge of dental **diagnostic imaging** and oral and maxillofacial pathology. The authors use a case-based format, with line drawings supplementing the black-and-white radiographs. The line drawings and text are designed to help the reader recognize features in the radiographs. Each case also includes a description of the pathology; many include a photomicrograph depicting the histopathology. This chapter on dental anomalies covers dens in dente (a malformed tooth resulting from invagination of the crown before it is calcified), amelogenesis imperfecta (a severe hypoplasia of dental enamel), and dentinogenesis imperfecta (genetic disturbance of the dentin, characterized by early calcification of the pulp chambers and root canals, marked attrition, and an opalescent hue to the teeth). 25 figures.

- **Diseases of the Salivary Glands**

  Source: in Langlais, R.P.; Hashimoto, K.; Yamamoto, H. Dental Diagnostic Imaging: Diagnostic Features and Pathology. Springfield, IL: Charles C Thomas, LTD. 1997. p. 147-162.

  Contact: Available from Charles C Thomas Publishers, LTD. 2600 South First Street, Springfield, IL 62794-9265. (800) 258-8980 or (217) 789-8980; Fax (217) 789-9130. PRICE: $52.95 plus shipping and handling.

  Summary: This chapter on diseases of the maxillary sinus is from a textbook designed to improve the reader's knowledge of dental **diagnostic imaging** and oral and maxillofacial pathology. The authors use a case-based format, with line drawings supplementing the black-and-white radiographs. The line drawings and text are designed to help the reader recognize features in the radiographs. Each case also includes a description of the pathology; many include a photomicrograph depicting the histopathology. This chapter covers maxillary sinusitis, postoperative maxillary cysts, retention cysts of the maxillary sinus, and the foreign body of the maxillary sinus. 38 figures.

- **Non-Specific Diseases of the Jaws**

  Source: in Langlais, R.P.; Hashimoto, K.; Yamamoto, H. Dental Diagnostic Imaging: Diagnostic Features and Pathology. Springfield, IL: Charles C. Thomas, LTD. 1997. p. 111-116.

  Contact: Available from Charles C Thomas Publishers, LTD. 2600 South First Street, Springfield, IL 62794-9265. (800) 258-8980 or (217) 789-8980; Fax (217) 789-9130. PRICE: $52.95 plus shipping and handling.

  Summary: This chapter on non-specific diseases of the jaws is from a textbook designed to improve the reader's knowledge of dental **diagnostic imaging** and oral and maxillofacial pathology. The authors use a case-based format, with line drawings supplementing the black-and-white radiographs. The line drawings and text are designed to help the reader recognize features in the radiographs. Each case also includes a description of the pathology; many include a photomicrograph depicting the histopathology. This chapter focuses on Paget disease and on eosinophilic granuloma; the latter section also mentions Hand-Schuller-Christian disease and Letterer-Siwe disease. 21 figures.

- **Odontogenic Tumors**

  Source: in Langlais, R.P.; Hashimoto, K.; Yamamoto, H. Dental Diagnostic Imaging: Diagnostic Features and Pathology. Springfield, IL: Charles C Thomas, LTD. 1997. p. 39-68.

  Contact: Available from Charles C Thomas Publishers, LTD. 2600 South First Street, Springfield, IL 62794-9265. (800) 258-8980 or (217) 789-8980; Fax (217) 789-9130. PRICE: $52.95 plus shipping and handling.

  Summary: This chapter on odontogenic tumors is from a textbook designed to improve the reader's knowledge of dental **diagnostic imaging** and oral and maxillofacial pathology. The authors use a case-based format, with line drawings supplementing the black-and-white radiographs. The line drawings and text are designed to help the reader recognize features in the radiographs. Each case also includes a description of the pathology; many include a photomicrograph depicting the histopathology. The bulk of

the chapter covers benign tumors, including ameloblastoma, adenomatoid odontogenic tumors, calcifying epithelial odontogenic tumors (Pindborg tumor), odontogenic fibroma, odontogenic myxoma, benign cementoblastoma, cementifying fibroma, gigantiform cementoma, periapical cemental dysplasia, complex odontoma, compound odontoma, and ameloblastic fibro-odontoma. The authors then include a section on ameloblastic fibrosarcoma (a malignant tumor). The chapter concludes with the World Health Organization (1971) histologic typing of odontogenic tumors. 104 figures.

- **Traumatic Injuries**

  Source: in Langlais, R.P.; Hashimoto, K.; Yamamoto, H. Dental Diagnostic Imaging: Diagnostic Features and Pathology. Springfield, IL: Charles C Thomas, LTD. 1997. p. 163-168.

  Contact: Available from Charles C Thomas Publishers, LTD. 2600 South First Street, Springfield, IL 62794-9265. (800) 258-8980 or (217) 789-8980; Fax (217) 789-9130. PRICE: $52.95 plus shipping and handling.

  Summary: This chapter on traumatic injuries is from a textbook designed to improve the reader's knowledge of dental **diagnostic imaging** and oral and maxillofacial pathology. The authors use a case-based format, with line drawings supplementing the black-and-white radiographs. The line drawings and text are designed to help the reader recognize features in the radiographs. Each case also includes a description of the pathology; many include a photomicrograph depicting the histopathology. The chapter covers alveolar bone fractures, mandibular fractures, maxillary fractures, and fractures of the maxilla and zygomatic arch. The chapter concludes with a brief section explaining the difference between pathologic and traumatic fractures. 23 references.

CHAPTER 7. PERIODICALS AND NEWS ON DIAGNOSTIC IMAGING

Overview

In this chapter, we suggest a number of news sources and present various periodicals that cover diagnostic imaging.

News Services and Press Releases

One of the simplest ways of tracking press releases on diagnostic imaging is to search the news wires. In the following sample of sources, we will briefly describe how to access each service. These services only post recent news intended for public viewing.

PR Newswire

To access the PR Newswire archive, simply go to **http://www.prnewswire.com/**. Select your country. Type "diagnostic imaging" (or synonyms) into the search box. You will automatically receive information on relevant news releases posted within the last 30 days. The search results are shown by order of relevance.

Reuters Health

The Reuters' Medical News and Health eLine databases can be very useful in exploring news archives relating to diagnostic imaging. While some of the listed articles are free to view, others are available for purchase for a nominal fee. To access this archive, go to **http://www.reutershealth.com/en/index.html** and search by "diagnostic imaging" (or synonyms). The following was recently listed in this archive for diagnostic imaging:

- **Alliance Imaging To Acquire Diagnostic Imaging Assets**
  Source: Reuters Medical News
  Date: March 13, 1998

- **FDA Approves Swissray X-Ray Detector For Diagnostic Imaging**
  Source: Reuters Medical News
  Date: November 26, 1997

The NIH

Within MEDLINEplus, the NIH has made an agreement with the New York Times Syndicate, the AP News Service, and Reuters to deliver news that can be browsed by the public. Search news releases at **http://www.nlm.nih.gov/medlineplus/alphanews_a.html**. MEDLINEplus allows you to browse across an alphabetical index. Or you can search by date at the following Web page: **http://www.nlm.nih.gov/medlineplus/newsbydate.html**. Often, news items are indexed by MEDLINEplus within its search engine.

Business Wire

Business Wire is similar to PR Newswire. To access this archive, simply go to **http://www.businesswire.com/**. You can scan the news by industry category or company name.

Market Wire

Market Wire is more focused on technology than the other wires. To browse the latest press releases by topic, such as alternative medicine, biotechnology, fitness, healthcare, legal, nutrition, and pharmaceuticals, access Market Wire's Medical/Health channel at **http://www.marketwire.com/mw/release_index?channel=MedicalHealth**. Or simply go to Market Wire's home page at **http://www.marketwire.com/mw/home**, type "diagnostic imaging" (or synonyms) into the search box, and click on "Search News." As this service is technology oriented, you may wish to use it when searching for press releases covering diagnostic procedures or tests.

Search Engines

Medical news is also available in the news sections of commercial Internet search engines. See the health news page at Yahoo (**http://dir.yahoo.com/Health/News_and_Media/**), or you can use this Web site's general news search page at **http://news.yahoo.com/**. Type in "diagnostic imaging" (or synonyms). If you know the name of a company that is relevant to diagnostic imaging, you can go to any stock trading Web site (such as **http://www.etrade.com/**) and search for the company name there. News items across various news sources are reported on indicated hyperlinks. Google offers a similar service at **http://news.google.com/**.

BBC

Covering news from a more European perspective, the British Broadcasting Corporation (BBC) allows the public free access to their news archive located at **http://www.bbc.co.uk/**. Search by "diagnostic imaging" (or synonyms).

Newsletter Articles

Use the Combined Health Information Database, and limit your search criteria to "newsletter articles." Again, you will need to use the "Detailed Search" option. Go directly to the following hyperlink: **http://chid.nih.gov/detail/detail.html**. Go to the bottom of the search page where "You may refine your search by." Select the dates and language that you prefer. For the format option, select "Newsletter Article." Type "diagnostic imaging" (or synonyms) into the "For these words:" box. You should check back periodically with this database as it is updated every three months. The following is a typical result when searching for newsletter articles on diagnostic imaging:

- **Liver Tests: Simple Blood Tests Can Reveal a Lot**

  Source: Mayo Clinic Health Letter. 18(5): 1-3. May 2000.

  Contact: Available from Mayo Clinic Health Letter. Subscription Services, P.O. Box 53889, Boulder, CO 80322-3889. (800) 333-9037 or (303) 604-1465.

  Summary: This article, from a health newsletter, reviews the liver function tests that are used to monitor liver health and disease. The author begins by reviewing the healthy functions of the liver, including regulating the composition of the blood, manufacturing vital nutrients (such as cholesterol, vitamin A, certain proteins, bile), and neutralizing toxic substances. Sometimes there is an obvious sign of a problem, such as jaundice, which is a buildup of bilirubin in the blood, resulting in a yellow appearance of the skin and eyes. The various liver tests basically screen for three types of abnormalities: liver cell damage, reduced protein levels in the blood, and failure to eliminate certain substances from the blood. Information from the blood tests, combined with a thorough physical exam and sometimes **diagnostic imaging,** may be enough to reach a specific diagnosis; sometimes a liver biopsy is added to the list of diagnostic tests. Some of the more common liver disorders that are detected with these tests are viral hepatitis, alcohol or drug related liver disease, liver cancer, nonalcoholic steatohepatitis (a form of fatty liver), and hemochromatosis (high amounts of iron stored in the body). One sidebar reviews the drugs that can lead to liver toxicity. The author concludes that mild liver test abnormalities are normal; however, significantly abnormal test results should never be ignored. 1 figure.

- **Inflammatory Bowel Diseases: Misery Needn't be the Norm**

  Source: Mayo Clinic Health Letter. 19(10): 1-3. October 2001.

  Contact: Available from Mayo Clinic Health Letter. Subscription Services, P.O. Box 53889, Boulder, CO 80322-3889. (800) 333-9037 or (303) 604-1465.

  Summary: This health education newsletter article familiarizes readers with inflammatory bowel disease (IBD), which includes Crohn's disease and ulcerative colitis. The author describes the two types of IBD, and their incidence, symptoms, diagnosis, drug therapy, lifestyle treatments, and surgical options. The signs and symptoms of Crohn's disease and ulcerative colitis may develop gradually or suddenly and can be similar: chronic diarrhea, vomiting, abdominal cramping, blood in the stool, weight loss and fatigue, and fever in severe cases. In addition, people with Crohn's disease are more likely to develop open sores (ulcers) in their digestive tract. Blood tests and **diagnostic imaging** confirm the diagnoses of inflammatory bowel disease. Drug therapy is a key component of treating IBD. Although drugs do not offer a cure for IBD, they often help control the condition. Once the right drug or combination of drugs is determined,

symptoms can often be reduced. Drugs can include anti-inflammatory drugs, immune modulators, and antibiotics. Lifestyle treatments include dietary management, adequate fluid intake, stress management (including the use of support groups), and avoidance of nonsteroidal anti-inflammatory drugs (NSAIDs). At least 70 percent of those patients with Crohn's disease will need at least one or more surgeries. One side bar reminds readers of the risk of colon cancer in people with IBD. 1 figure.

Academic Periodicals covering Diagnostic Imaging

Numerous periodicals are currently indexed within the National Library of Medicine's PubMed database that are known to publish articles relating to diagnostic imaging. In addition to these sources, you can search for articles covering diagnostic imaging that have been published by any of the periodicals listed in previous chapters. To find the latest studies published, go to **http://www.ncbi.nlm.nih.gov/pubmed**, type the name of the periodical into the search box, and click "Go."

If you want complete details about the historical contents of a journal, you can also visit the following Web site: **http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi**. Here, type in the name of the journal or its abbreviation, and you will receive an index of published articles. At **http://locatorplus.gov/**, you can retrieve more indexing information on medical periodicals (e.g. the name of the publisher). Select the button "Search LOCATORplus." Then type in the name of the journal and select the advanced search option "Journal Title Search."

CHAPTER 8. RESEARCHING MEDICATIONS

Overview

While a number of hard copy or CD-ROM resources are available for researching medications, a more flexible method is to use Internet-based databases. Broadly speaking, there are two sources of information on approved medications: public sources and private sources. We will emphasize free-to-use public sources.

U.S. Pharmacopeia

Because of historical investments by various organizations and the emergence of the Internet, it has become rather simple to learn about the medications recommended for diagnostic imaging. One such source is the United States Pharmacopeia. In 1820, eleven physicians met in Washington, D.C. to establish the first compendium of standard drugs for the United States. They called this compendium the U.S. Pharmacopeia (USP). Today, the USP is a non-profit organization consisting of 800 volunteer scientists, eleven elected officials, and 400 representatives of state associations and colleges of medicine and pharmacy. The USP is located in Rockville, Maryland, and its home page is located at **http://www.usp.org/**. The USP currently provides standards for over 3,700 medications. The resulting USP DI® Advice for the Patient® can be accessed through the National Library of Medicine of the National Institutes of Health. The database is partially derived from lists of federally approved medications in the Food and Drug Administration's (FDA) Drug Approvals database, located at **http://www.fda.gov/cder/da/da.htm**.

While the FDA database is rather large and difficult to navigate, the Phamacopeia is both user-friendly and free to use. It covers more than 9,000 prescription and over-the-counter medications. To access this database, simply type the following hyperlink into your Web browser: **http://www.nlm.nih.gov/medlineplus/druginformation.html**. To view examples of a given medication (brand names, category, description, preparation, proper use, precautions, side effects, etc.), simply follow the hyperlinks indicated within the United States Pharmacopeia (USP).

Below, we have compiled a list of medications associated with diagnostic imaging. If you would like more information on a particular medication, the provided hyperlinks will direct you to ample documentation (e.g. typical dosage, side effects, drug-interaction risks, etc.).

The following drugs have been mentioned in the Pharmacopeia and other sources as being potentially applicable to diagnostic imaging:

Albumin Microspheres Sonicated

- **Systemic - U.S. Brands:** Optison
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/203714.html

Cholecystographic Agents, Oral

- **Diagnostic - U.S. Brands:** Bilivist; Bilopaque; Cholebrine; Oragrafin Calcium; Oragrafin Sodium; Telepaque
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202136.html

Dexrazoxane

- **Systemic - U.S. Brands:** Zinecard
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/203662.html

Fentanyl

- **Transdermal-Systemic - U.S. Brands:** Duragesic
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202702.html

Glucagon

- **Systemic - U.S. Brands:** Glucagon Diagnostic Kit; Glucagon Emergency Kit; Glucagon Emergency Kit for Low Blood Sugar
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202261.html

Mangafodipir

- **Systemic - U.S. Brands:** Teslascan
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/203456.html

Perflubron

- **Diagnostic - U.S. Brands:** Imagent GI
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202688.html

Samarium Sm 153 Lexidronam

- **Therapeutic - U.S. Brands:** Quadramet
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/203683.html

Strontium Chloride Sr 89

- **Therapeutic - U.S. Brands:** Metastron
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202706.html

Commercial Databases

In addition to the medications listed in the USP above, a number of commercial sites are available by subscription to physicians and their institutions. Or, you may be able to access these sources from your local medical library.

Mosby's Drug Consult™

Mosby's Drug Consult™ database (also available on CD-ROM and book format) covers 45,000 drug products including generics and international brands. It provides prescribing information, drug interactions, and patient information. Subscription information is available at the following hyperlink: **http://www.mosbysdrugconsult.com/**.

PDR*health*

The PDR*health* database is a free-to-use, drug information search engine that has been written for the public in layman's terms. It contains FDA-approved drug information adapted from the Physicians' Desk Reference (PDR) database. PDR*health* can be searched by brand name, generic name, or indication. It features multiple drug interactions reports. Search PDR*health* at **http://www.pdrhealth.com/drug_info/index.html**.

Other Web Sites

Drugs.com (**www.drugs.com**) reproduces the information in the Pharmacopeia as well as commercial information. You may also want to consider the Web site of the Medical Letter, Inc. (**http://www.medletter.com/**) which allows users to download articles on various drugs and therapeutics for a nominal fee.

Researching Orphan Drugs

Although the list of orphan drugs is revised on a daily basis, you can quickly research orphan drugs that might be applicable to diagnostic imaging by using the database managed by the National Organization for Rare Disorders, Inc. (NORD), at **http://www.rarediseases.org/**. Scroll down the page, and on the left toolbar, click on "Orphan Drug Designation Database." On this page (**http://www.rarediseases.org/search/noddsearch.html**), type "diagnostic imaging" (or synonyms) into the search box, and click "Submit Query." When you receive your results, note that not all of the drugs may be relevant, as some may have been withdrawn from orphan status. Write down or print out the name of each drug and the relevant contact information. From there, visit the Pharmacopeia Web site and type the name of each orphan drug into the search box at **http://www.nlm.nih.gov/medlineplus/druginformation.html**. You may need to contact the sponsor or NORD for further information.

NORD conducts "early access programs for investigational new drugs (IND) under the Food and Drug Administration's (FDA's) approval 'Treatment INDs' programs which allow for a limited number of individuals to receive investigational drugs before FDA marketing approval." If the orphan product about which you are seeking information is approved for marketing, information on side effects can be found on the product's label. If the product is not approved, you may need to contact the sponsor.

The following is a list of orphan drugs currently listed in the NORD Orphan Drug Designation Database for diagnostic imaging:

- **Technetium Tc-99m murine monoclonal antibody (IgG2 (trade name: LymphoScan)**
  http://www.rarediseases.org/nord/search/nodd_full?code=311

If you have any questions about a medical treatment, the FDA may have an office near you. Look for their number in the blue pages of the phone book. You can also contact the FDA through its toll-free number, 1-888-INFO-FDA (1-888-463-6332), or on the World Wide Web at **www.fda.gov**.

APPENDICES

APPENDIX A. PHYSICIAN RESOURCES

Overview

In this chapter, we focus on databases and Internet-based guidelines and information resources created or written for a professional audience.

NIH Guidelines

Commonly referred to as "clinical" or "professional" guidelines, the National Institutes of Health publish physician guidelines for the most common diseases. Publications are available at the following by relevant Institute[10]:

- Office of the Director (OD); guidelines consolidated across agencies available at **http://www.nih.gov/health/consumer/conkey.htm**
- National Institute of General Medical Sciences (NIGMS); fact sheets available at **http://www.nigms.nih.gov/news/facts/**
- National Library of Medicine (NLM); extensive encyclopedia (A.D.A.M., Inc.) with guidelines: **http://www.nlm.nih.gov/medlineplus/healthtopics.html**
- National Cancer Institute (NCI); guidelines available at **http://www.cancer.gov/cancerinfo/list.aspx?viewid=5f35036e-5497-4d86-8c2c-714a9f7c8d25**
- National Eye Institute (NEI); guidelines available at **http://www.nei.nih.gov/order/index.htm**
- National Heart, Lung, and Blood Institute (NHLBI); guidelines available at **http://www.nhlbi.nih.gov/guidelines/index.htm**
- National Human Genome Research Institute (NHGRI); research available at **http://www.genome.gov/page.cfm?pageID=10000375**
- National Institute on Aging (NIA); guidelines available at **http://www.nia.nih.gov/health/**

[10] These publications are typically written by one or more of the various NIH Institutes.

- National Institute on Alcohol Abuse and Alcoholism (NIAAA); guidelines available at **http://www.niaaa.nih.gov/publications/publications.htm**
- National Institute of Allergy and Infectious Diseases (NIAID); guidelines available at **http://www.niaid.nih.gov/publications/**
- National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS); fact sheets and guidelines available at **http://www.niams.nih.gov/hi/index.htm**
- National Institute of Child Health and Human Development (NICHD); guidelines available at **http://www.nichd.nih.gov/publications/pubskey.cfm**
- National Institute on Deafness and Other Communication Disorders (NIDCD); fact sheets and guidelines at **http://www.nidcd.nih.gov/health/**
- National Institute of Dental and Craniofacial Research (NIDCR); guidelines available at **http://www.nidr.nih.gov/health/**
- National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK); guidelines available at **http://www.niddk.nih.gov/health/health.htm**
- National Institute on Drug Abuse (NIDA); guidelines available at **http://www.nida.nih.gov/DrugAbuse.html**
- National Institute of Environmental Health Sciences (NIEHS); environmental health information available at **http://www.niehs.nih.gov/external/facts.htm**
- National Institute of Mental Health (NIMH); guidelines available at **http://www.nimh.nih.gov/practitioners/index.cfm**
- National Institute of Neurological Disorders and Stroke (NINDS); neurological disorder information pages available at **http://www.ninds.nih.gov/health_and_medical/disorder_index.htm**
- National Institute of Nursing Research (NINR); publications on selected illnesses at **http://www.nih.gov/ninr/news-info/publications.html**
- National Institute of Biomedical Imaging and Bioengineering; general information at **http://grants.nih.gov/grants/becon/becon_info.htm**
- Center for Information Technology (CIT); referrals to other agencies based on keyword searches available at **http://kb.nih.gov/www_query_main.asp**
- National Center for Complementary and Alternative Medicine (NCCAM); health information available at **http://nccam.nih.gov/health/**
- National Center for Research Resources (NCRR); various information directories available at **http://www.ncrr.nih.gov/publications.asp**
- Office of Rare Diseases; various fact sheets available at **http://rarediseases.info.nih.gov/html/resources/rep_pubs.html**
- Centers for Disease Control and Prevention; various fact sheets on infectious diseases available at **http://www.cdc.gov/publications.htm**

NIH Databases

In addition to the various Institutes of Health that publish professional guidelines, the NIH has designed a number of databases for professionals.[11] Physician-oriented resources provide a wide variety of information related to the biomedical and health sciences, both past and present. The format of these resources varies. Searchable databases, bibliographic citations, full-text articles (when available), archival collections, and images are all available. The following are referenced by the National Library of Medicine:[12]

- **Bioethics:** Access to published literature on the ethical, legal, and public policy issues surrounding healthcare and biomedical research. This information is provided in conjunction with the Kennedy Institute of Ethics located at Georgetown University, Washington, D.C.: **http://www.nlm.nih.gov/databases/databases_bioethics.html**
- **HIV/AIDS Resources:** Describes various links and databases dedicated to HIV/AIDS research: **http://www.nlm.nih.gov/pubs/factsheets/aidsinfs.html**
- **NLM Online Exhibitions:** Describes "Exhibitions in the History of Medicine": **http://www.nlm.nih.gov/exhibition/exhibition.html**. Additional resources for historical scholarship in medicine: **http://www.nlm.nih.gov/hmd/hmd.html**
- **Biotechnology Information:** Access to public databases. The National Center for Biotechnology Information conducts research in computational biology, develops software tools for analyzing genome data, and disseminates biomedical information for the better understanding of molecular processes affecting human health and disease: **http://www.ncbi.nlm.nih.gov/**
- **Population Information:** The National Library of Medicine provides access to worldwide coverage of population, family planning, and related health issues, including family planning technology and programs, fertility, and population law and policy: **http://www.nlm.nih.gov/databases/databases_population.html**
- **Cancer Information:** Access to cancer-oriented databases: **http://www.nlm.nih.gov/databases/databases_cancer.html**
- **Profiles in Science:** Offering the archival collections of prominent twentieth-century biomedical scientists to the public through modern digital technology: **http://www.profiles.nlm.nih.gov/**
- **Chemical Information:** Provides links to various chemical databases and references: **http://sis.nlm.nih.gov/Chem/ChemMain.html**
- **Clinical Alerts:** Reports the release of findings from the NIH-funded clinical trials where such release could significantly affect morbidity and mortality: **http://www.nlm.nih.gov/databases/alerts/clinical_alerts.html**
- **Space Life Sciences:** Provides links and information to space-based research (including NASA): **http://www.nlm.nih.gov/databases/databases_space.html**
- **MEDLINE:** Bibliographic database covering the fields of medicine, nursing, dentistry, veterinary medicine, the healthcare system, and the pre-clinical sciences: **http://www.nlm.nih.gov/databases/databases_medline.html**

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[11] Remember, for the general public, the National Library of Medicine recommends the databases referenced in MEDLINE*plus* (**http://medlineplus.gov/** or **http://www.nlm.nih.gov/medlineplus/databases.html**).

[12] See **http://www.nlm.nih.gov/databases/databases.html**.

- **Toxicology and Environmental Health Information (TOXNET):** Databases covering toxicology and environmental health: **http://sis.nlm.nih.gov/Tox/ToxMain.html**
- **Visible Human Interface:** Anatomically detailed, three-dimensional representations of normal male and female human bodies: **http://www.nlm.nih.gov/research/visible/visible_human.html**

The NLM Gateway[13]

The NLM (National Library of Medicine) Gateway is a Web-based system that lets users search simultaneously in multiple retrieval systems at the U.S. National Library of Medicine (NLM). It allows users of NLM services to initiate searches from one Web interface, providing one-stop searching for many of NLM's information resources or databases.[14] To use the NLM Gateway, simply go to the search site at **http://gateway.nlm.nih.gov/gw/Cmd**. Type "diagnostic imaging" (or synonyms) into the search box and click "Search." The results will be presented in a tabular form, indicating the number of references in each database category.

Results Summary

Category	Items Found
Journal Articles	880560
Books / Periodicals / Audio Visual	1928
Consumer Health	959
Meeting Abstracts	76
Other Collections	63
Total	883586

HSTAT[15]

HSTAT is a free, Web-based resource that provides access to full-text documents used in healthcare decision-making.[16] These documents include clinical practice guidelines, quick-reference guides for clinicians, consumer health brochures, evidence reports and technology assessments from the Agency for Healthcare Research and Quality (AHRQ), as well as AHRQ's Put Prevention Into Practice.[17] Simply search by "diagnostic imaging" (or synonyms) at the following Web site: **http://text.nlm.nih.gov**.

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[13] Adapted from NLM: **http://gateway.nlm.nih.gov/gw/Cmd?Overview.x**.

[14] The NLM Gateway is currently being developed by the Lister Hill National Center for Biomedical Communications (LHNCBC) at the National Library of Medicine (NLM) of the National Institutes of Health (NIH).

[15] Adapted from HSTAT: **http://www.nlm.nih.gov/pubs/factsheets/hstat.html**.

[16] The HSTAT URL is **http://hstat.nlm.nih.gov/**.

[17] Other important documents in HSTAT include: the National Institutes of Health (NIH) Consensus Conference Reports and Technology Assessment Reports; the HIV/AIDS Treatment Information Service (ATIS) resource documents; the Substance Abuse and Mental Health Services Administration's Center for Substance Abuse Treatment (SAMHSA/CSAT) Treatment Improvement Protocols (TIP) and Center for Substance Abuse Prevention (SAMHSA/CSAP) Prevention Enhancement Protocols System (PEPS); the Public Health Service (PHS) Preventive Services Task Force's *Guide to Clinical Preventive Services*; the independent, nonfederal Task Force on Community Services' *Guide to Community Preventive Services*; and the Health Technology Advisory Committee (HTAC) of the Minnesota Health Care Commission (MHCC) health technology evaluations.

Coffee Break: Tutorials for Biologists[18]

Coffee Break is a general healthcare site that takes a scientific view of the news and covers recent breakthroughs in biology that may one day assist physicians in developing treatments. Here you will find a collection of short reports on recent biological discoveries. Each report incorporates interactive tutorials that demonstrate how bioinformatics tools are used as a part of the research process. Currently, all Coffee Breaks are written by NCBI staff.[19] Each report is about 400 words and is usually based on a discovery reported in one or more articles from recently published, peer-reviewed literature.[20] This site has new articles every few weeks, so it can be considered an online magazine of sorts. It is intended for general background information. You can access the Coffee Break Web site at the following hyperlink: **http://www.ncbi.nlm.nih.gov/Coffeebreak/**.

Other Commercial Databases

In addition to resources maintained by official agencies, other databases exist that are commercial ventures addressing medical professionals. Here are some examples that may interest you:

- **CliniWeb International:** Index and table of contents to selected clinical information on the Internet; see **http://www.ohsu.edu/cliniweb/**.
- **Medical World Search:** Searches full text from thousands of selected medical sites on the Internet; see **http://www.mwsearch.com/**.

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[18] Adapted from **http://www.ncbi.nlm.nih.gov/Coffeebreak/Archive/FAQ.html**.

[19] The figure that accompanies each article is frequently supplied by an expert external to NCBI, in which case the source of the figure is cited. The result is an interactive tutorial that tells a biological story.

[20] After a brief introduction that sets the work described into a broader context, the report focuses on how a molecular understanding can provide explanations of observed biology and lead to therapies for diseases. Each vignette is accompanied by a figure and hypertext links that lead to a series of pages that interactively show how NCBI tools and resources are used in the research process.

APPENDIX B. PATIENT RESOURCES

Overview

Official agencies, as well as federally funded institutions supported by national grants, frequently publish a variety of guidelines written with the patient in mind. These are typically called "Fact Sheets" or "Guidelines." They can take the form of a brochure, information kit, pamphlet, or flyer. Often they are only a few pages in length. Since new guidelines on diagnostic imaging can appear at any moment and be published by a number of sources, the best approach to finding guidelines is to systematically scan the Internet-based services that post them.

Patient Guideline Sources

The remainder of this chapter directs you to sources which either publish or can help you find additional guidelines on topics related to diagnostic imaging. Due to space limitations, these sources are listed in a concise manner. Do not hesitate to consult the following sources by either using the Internet hyperlink provided, or, in cases where the contact information is provided, contacting the publisher or author directly.

The National Institutes of Health

The NIH gateway to patients is located at **http://health.nih.gov/**. From this site, you can search across various sources and institutes, a number of which are summarized below.

Topic Pages: MEDLINEplus

The National Library of Medicine has created a vast and patient-oriented healthcare information portal called MEDLINEplus. Within this Internet-based system are "health topic pages" which list links to available materials relevant to diagnostic imaging. To access this system, log on to **http://www.nlm.nih.gov/medlineplus/healthtopics.html**. From there you can either search using the alphabetical index or browse by broad topic areas. Recently, MEDLINEplus listed the following when searched for "diagnostic imaging":

Diagnostic Imaging
http://www.nlm.nih.gov/medlineplus/diagnosticimaging.html

Radiation Exposure
http://www.nlm.nih.gov/medlineplus/radiationexposure.html

Within the health topic page dedicated to diagnostic imaging, the following was listed:

- Children

  FDA Cautions Against Ultrasound 'Keepsake' Images
  Source: Food and Drug Administration
  http://www.fda.gov/fdac/features/2004/104_images.html

  Fetal Ultrasound
  Source: American Medical Association
  http://www.medem.com/medlb/article_detaillb.cfm?article_ID=ZZZUSI4YU7C&sub_cat=3

  Pediatric Abdominal Ultrasound Imaging
  Source: American College of Radiology, Radiological Society of North America
  http://www.radiologyinfo.org/content/ultra-abdomen-pd.htm

  Pediatric CT (Computed Tomography)
  Source: Radiological Society of North America
  http://www.radiologyinfo.org/content/pedia-ct.htm

  Pediatric Nuclear Medicine
  Source: American College of Radiology, Radiological Society of North America
  http://www.radiologyinfo.org/content/nuclearmed-pd.htm

  Pediatric Voiding Cystourethrogram
  Source: American College of Radiology, Radiological Society of North America
  http://www.radiologyinfo.org/content/v-cystourethrogrm-pd.htm

  X-Ray Use and Safety
  Source: American Academy of Pediatric Dentistry
  http://www.aapd.org/publications/brochures/xray.asp

- Latest News

  More News on Diagnostic Imaging
  http://www.nlm.nih.gov//www.nlm.nih.gov/medlineplus/alphanews_d.html#DiagnosticImaging

  New Technology Helps Diagnose Appendicitis
  Source: 07/08/2004, United Press International
  http://www.nlm.nih.gov//www.nlm.nih.gov/medlineplus/news/fullstory_18834.html

  Thermal Scans Used to Spot Osteoarthritis
  Source: 07/12/2004, United Press International
  http://www.nlm.nih.gov//www.nlm.nih.gov/medlineplus/news/fullstory_18914.html

Ultrasound Eyed in Breast Cancer Fight
Source: 07/07/2004, New York Times Syndicate
http://www.nlm.nih.gov//www.nlm.nih.gov/medlineplus/news/fullstory_18816.html

- Law and Policy

  Medicare Expands Coverage for PET Scans
  Source: Centers for Medicare & Medicaid Services
  http://www.cms.hhs.gov/media/press/release.asp?counter=727

- Organizations

  Radiology Info
  Source: American College of Radiology, Radiological Society of North America
  http://www.radiologyinfo.org/default.htm

- Research

  "Slice" Scanner Latest Advance in Early Detection of Heart Disease
  Source: American Heart Association
  http://www.americanheart.org/presenter.jhtml?identifier=3005482

  Bleed-Detecting MRI May Identify Dangerous Plaque
  Source: American Heart Association
  http://www.americanheart.org/presenter.jhtml?identifier=3012614

  New Use for Imaging Test May Spot Heart Disease at Earliest Stages
  Source: American Heart Association
  http://www.americanheart.org/presenter.jhtml?identifier=3341

  NIH Licenses New MRI Technology That Produces Detailed Images of Nerves, Other Soft Tissues
  Source: National Institute of Child Health and Human Development
  http://www.nih.gov/news/pr/jul2002/nichd-29.htm

  Spiral Scan Sees Stroke Blockage More Clearly
  Source: American Heart Association
  http://www.americanheart.org/presenter.jhtml?identifier=3001835

- Women

  Mammography
  Source: American College of Radiology, Radiological Society of North America
  http://www.radiologyinfo.org/content/mammogram.htm

  Ultrasound-Obstetric
  Source: American College of Radiology, Radiological Society of North America
  http://www.radiologyinfo.org/content/obstetric_ultrasound.htm

You may also choose to use the search utility provided by MEDLINEplus at the following Web address: **http://www.nlm.nih.gov/medlineplus/**. Simply type a keyword into the search box and click "Search." This utility is similar to the NIH search utility, with the exception that it only includes materials that are linked within the MEDLINEplus system (mostly patient-oriented information). It also has the disadvantage of generating

unstructured results. We recommend, therefore, that you use this method only if you have a very targeted search.

The Combined Health Information Database (CHID)

CHID Online is a reference tool that maintains a database directory of thousands of journal articles and patient education guidelines on diagnostic imaging. CHID offers summaries that describe the guidelines available, including contact information and pricing. CHID's general Web site is **http://chid.nih.gov/**. To search this database, go to **http://chid.nih.gov/detail/detail.html**. In particular, you can use the advanced search options to look up pamphlets, reports, brochures, and information kits. The following was recently posted in this archive:

- **Alzheimer's Disease Society: Research Booklet. Articles From Alzheimer's Disease Society Newsletters, April 1990 to November 1992**

  Source: London, England: Alzheimer's Disease Society. January 1993. 69 p.

  Contact: Available from Alzheimer's Disease Society. Gordon House, 10 Greencoat Place, London SW1P 1PH, ENGLAND. (071) 306-0606. ISBN: 1872874010. PRICE: 3.00 pounds plus 1.51 pounds shipping and handling.

  Summary: This booklet is a compilation of articles appearing in the Alzheimer's Disease Society's newsletter. The articles specifically address issues in Alzheimer's disease. Topics include: an overview of Alzheimer's disease research; aluminum studies; genetics; pathology; behavioral abnormalities; positron emission tomography; tetrahydroaminoacridine (THA); nerve growth factor; **diagnostic imaging;** prevalence of Alzheimer's disease; diagnosis; patient assessment; the history of Alzheimer's disease; pharmacology; and tissue donations.

- **Toxoplasmosis**

  Contact: University of New Mexico School of Medicine, Infectious Diseases Division, New Mexico AIDS Education and Training Center, New Mexico AIDS InfoNet, PO Box 810, Arroyo Seco, NM, 87514-0810, (505) 776-8032, http://www.aidsinfonet.org.

  Summary: This information sheet discusses toxoplasmosis (toxo), a parasitic infection that can affect people who have the human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS). The most common illness caused by toxo is encephalitis. The symptoms of toxo include fever, confusion, headache, disorientation, personality changes, tremors, and seizures. This infection is detected using a toxo antibody test or **diagnostic imaging.** The information sheet discusses the treatment and prevention of toxo and stresses that people who have less than 100 T-cells should take medications to prevent toxo.

The National Guideline Clearinghouse™

The National Guideline Clearinghouse™ offers hundreds of evidence-based clinical practice guidelines published in the United States and other countries. You can search this site located at **http://www.guideline.gov/** by using the keyword "diagnostic imaging" (or synonyms). The following was recently posted:

- **Universe of Florida patients with acute ischemic brain attack**

  Source: Florida Agency for Health Care Administration - State/Local Government Agency [U.S.]; 1999 March 5; 16 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1801&nbr=1027&string=CT+AND+scan

- **Upper extremity musculoskeletal disorders**

  Source: Brigham and Women's Hospital (Boston) - Hospital/Medical Center; 2003; 9 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3694&nbr=2920&string=x-rays

- **Use of antibiotics in adults**

  Source: Singapore Ministry of Health - National Government Agency [Non-U.S.]; 2000 April; 78 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3434&nbr=2660&string=nuclear+AND+medicine+AND+tests

- **Use of inhaled nitric oxide**

  Source: American Academy of Pediatrics - Medical Specialty Society; 2000 August; 2 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2598&nbr=1824&string=nuclear+AND+medicine+AND+tests

- **Use of strontium**

  Source: Practice Guidelines Initiative - State/Local Government Agency [Non-U.S.]; 1997 November 23 (updated online 2001 Oct); Various pagings

  http://www.guideline.gov/summary/summary.aspx?doc_id=3012&nbr=2238&string=diagnostic+AND+imaging

- **VA/DoD clinical practice guideline for the management of stroke rehabilitation in the primary care setting**

  Source: Department of Defense - Federal Government Agency [U.S.]; 2003 February; Various pagings

  http://www.guideline.gov/summary/summary.aspx?doc_id=3846&nbr=3061&string=nuclear+AND+medicine+AND+tests

- **Venous thromboembolism**

  Source: Institute for Clinical Systems Improvement - Private Nonprofit Organization; 1998 June (revised 2003 Apr); 93 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3757&nbr=2983&string=diagnostic+AND+imaging

- **(1) Best practice evidence-based guideline for the appropriate prescribing of hormone replacement therapy. (2) Guideline update: hormone replacement therapy**

  Source: Effective Practice Institute, University of Auckland - Academic Institution; 2001 May (revised information released on 2002 September 30); 185 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3107&nbr=2333&string=nuclear+AND+medicine+AND+tests

- **(1) Part I. Guidelines for the management of severe traumatic brain injury. In: Management and prognosis of severe traumatic brain injury. (2) Update notice. Guidelines for the management of severe traumatic brain injury: cerebral perfusion pressure**

  Source: American Association of Neurological Surgeons - Medical Specialty Society; 2000 (revised 2003); 165 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3794&nbr=3020&string=x-rays

- **2002 national guidelines for the management of late syphilis**

  Source: British Association of Sexual Health and HIV - Medical Specialty Society; 1999 August (revised 2002); Various pagings

  http://www.guideline.gov/summary/summary.aspx?doc_id=3037&nbr=2263&string=nuclear+AND+medicine+AND+tests

- **2002 national guidelines on the management of early syphilis**

  Source: British Association of Sexual Health and HIV - Medical Specialty Society; 1999 August (revised 2002); Various pagings

  http://www.guideline.gov/summary/summary.aspx?doc_id=3036&nbr=2262&string=x-rays

- **A clinician's guide to surgical fires: how they occur, how to prevent them, how to put them out**

  Source: ECRI - Private Nonprofit Research Organization; 2003 January; 20 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3688&nbr=2914&string=x-rays

- **A practice guideline on Wilson disease**

  Source: American Association for the Study of Liver Diseases - Private Nonprofit Research Organization; 2003 June; 18 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3865&nbr=3075&string=nuclear+AND+medicine+AND+tests

- **AACE medical guidelines for clinical practice for the diagnosis and treatment of hyperandrogenic disorders**

  Source: American Association of Clinical Endocrinologists - Medical Specialty Society; 2001 Mar-April; 15 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2847&nbr=2073&string=nuclear+AND+medicine+AND+tests

- **AACE/AAES medical/surgical guidelines for clinical practice: management of thyroid carcinoma**

  Source: American Association of Clinical Endocrinologists - Medical Specialty Society; 1997 (updated 2001 May-Jun); 19 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2848&nbr=2074&string=radionuclide+AND+scans

- **ACC/AHA 2002 guideline update for exercise testing. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Exercise Testing)**

  Source: American College of Cardiology Foundation - Medical Specialty Society; 1997 July (revised 2002 Sep); 59 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3427&nbr=2653&string=nuclear+AND+medicine+AND+tests

- **ACC/AHA 2002 guideline update for the management of patients with unstable angina and non-ST-segment elevation myocardial infarction. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on**

  Source: American College of Cardiology Foundation - Medical Specialty Society; 2000 (revised online 2002 Mar); 95 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3190&nbr=2416&string=diagnostic+AND+imaging

- **ACC/AHA guideline update on perioperative cardiovascular evaluation for noncardiac surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1996 Guidelines on Perioperati**

  Source: American College of Cardiology Foundation - Medical Specialty Society; 1996 March 15 (revised 2002); 58 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3149&nbr=2375&string=diagnostic+AND+imaging

- **ACC/AHA guidelines for the evaluation and management of chronic heart failure in the adult: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1995 Guidelines for the Evalua**

  Source: American College of Cardiology Foundation - Medical Specialty Society; 1995 November 1 (revised 2001 Dec); 56 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3114&nbr=2340&string=x-rays

- **ACC/AHA/ESC guidelines for the management of patients with atrial fibrillation. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology Committee for Practice Guide**

  Source: American College of Cardiology Foundation - Medical Specialty Society; 2001 October; 70 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2968&nbr=2194&string=nuclear+AND+medicine+AND+tests

- **ACR Appropriateness Criteria™ for acute hand and wrist trauma**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2001); 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3262&nbr=2488&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for acute pancreatitis**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2001); 5 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3257&nbr=2483&string=x-rays

- **ACR Appropriateness Criteria™ for acute trauma to the knee**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2001); 8 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3261&nbr=2487&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for imaging evaluation of patients with acute abdominal pain and fever**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2001); 4 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3258&nbr=2484&string=x-rays

- **ACR Appropriateness Criteria™ for imaging recommendations for patients with dysphagia**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2001); 6 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3259&nbr=2485&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for osteoporosis and bone mineral density**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2001); 17 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3263&nbr=2489&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for acute chest pain - suspected aortic dissection**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 5 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2379&nbr=1605&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for acute chest pain--no ECG evidence of myocardial ischemia/infarction**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2001); 5 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3254&nbr=2480&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for acute chest pain--suspected myocardial ischemia**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2380&nbr=1606&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for acute chest pain--suspected pulmonary embolism**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2381&nbr=1607&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for acute low back pain--radiculopathy**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 1999); 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2441&nbr=1667&string=x-rays

- **ACR Appropriateness Criteria™ for ataxia**

  Source: American College of Radiology - Medical Specialty Society; 1999; 6 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2449&nbr=1675&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for atraumatic isolated headache--when to image**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 1999); 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2442&nbr=1668&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for blunt abdominal or pelvic trauma--suspected vascular injury**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2385&nbr=1611&string=radionuclide+AND+scan

- **ACR Appropriateness Criteria™ for bone tumors**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 4 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2418&nbr=1644&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for cerebrovascular disease**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 2000); 21 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2437&nbr=1663&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for chronic ankle pain**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2002); 12 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3554&nbr=2780&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for chronic chest pain, without evidence of myocardial ischemia/infarction**

  Source: American College of Radiology - Medical Specialty Society; 1998; 4 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2392&nbr=1618&string=nuclear+AND+medicine+AND+tests

- **ACR Appropriateness Criteria™ for chronic chest pain--suspected cardiac origin**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 6 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2383&nbr=1609&string=radionuclide+AND+scan

- **ACR Appropriateness Criteria™ for chronic elbow pain**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2001); 5 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3260&nbr=2486&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for chronic foot pain**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2002); 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3555&nbr=2781&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for chronic hip pain**

  Source: American College of Radiology - Medical Specialty Society; 1998; 6 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2435&nbr=1661&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for chronic neck pain**

  Source: American College of Radiology - Medical Specialty Society; 1998; 12 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2429&nbr=1655&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for chronic wrist pain**

  Source: American College of Radiology - Medical Specialty Society; 1998; 6 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2427&nbr=1653&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for dementia**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 1999); 9 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2445&nbr=1671&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for diagnostic imaging of avascular necrosis of the hip**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 8 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2416&nbr=1642&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for endometrial cancer of the uterus**

  Source: American College of Radiology - Medical Specialty Society; 1999; 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2494&nbr=1720&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for epilepsy**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 1999); 12 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2439&nbr=1665&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for follow-up and retreatment of brain metastases**

  Source: American College of Radiology - Medical Specialty Society; 1999; 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2505&nbr=1731&string=radionuclide+AND+scan

- **ACR Appropriateness Criteria™ for follow-up examinations for bone tumors, soft-tissue tumors, and suspected metastasis post therapy**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2002); 10 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3556&nbr=2782&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for growth disturbances: risk of intrauterine growth restriction**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 2001); 10 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3253&nbr=2479&string=nuclear+AND+medicine+AND+tests

- **ACR Appropriateness Criteria™ for head trauma**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 1999); 18 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2444&nbr=1670&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for hematemesis**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2002); 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3557&nbr=2783&string=CT+AND+scan

- **ACR Appropriateness Criteria™ for imaging diagnosis of osteomyelitis in patients with diabetes mellitus**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 8 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2424&nbr=1650&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for imaging evaluation of the palpable abdominal mass.**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2001); 2 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3256&nbr=2482&string=x-rays

- **ACR Appropriateness Criteria™ for imaging of blunt abdominal trauma**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 1999); 9 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2401&nbr=1627&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for imaging of intracranial infections**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 1999); 11 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2446&nbr=1672&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for imaging recommendations for patients with Crohn's disease**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2001); 11 pages

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- **ACR Appropriateness Criteria™ for imaging work-up for stage I breast carcinoma**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 2002); 4 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3562&nbr=2788&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for liver lesion characterization**

  Source: American College of Radiology - Medical Specialty Society; 1998 (revised 2002); 8 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3558&nbr=2784&string=x-rays

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  http://www.guideline.gov/summary/summary.aspx?doc_id=2421&nbr=1647&string=magnetic+AND+resonance+AND+imaging

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  Source: American College of Radiology - Medical Specialty Society; 1999; 8 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2504&nbr=1730&string=radionuclide+AND+scan

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  Source: American College of Radiology - Medical Specialty Society; 1999; 16 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2447&nbr=1673&string=magnetic+AND+resonance+AND+imaging

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  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 1999); 11 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2443&nbr=1669&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for neurodegenerative disorders**

  Source: American College of Radiology - Medical Specialty Society; 1999; 9 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2452&nbr=1678&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for neuroendocrine imaging**

  Source: American College of Radiology - Medical Specialty Society; 1999; 9 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2448&nbr=1674&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for non traumatic knee pain**

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  http://www.guideline.gov/summary/summary.aspx?doc_id=2425&nbr=1651&string=x-rays

- **ACR Appropriateness Criteria™ for orbits, vision and visual loss**

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  http://www.guideline.gov/summary/summary.aspx?doc_id=2450&nbr=1676&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for percutaneous nephrostomy**

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- **ACR Appropriateness Criteria™ for pre-irradiation evaluation and management of brain metastasis**

  Source: American College of Radiology - Medical Specialty Society; 1999; 6 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2502&nbr=1728&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for progressive neurologic deficit**

  Source: American College of Radiology - Medical Specialty Society; 1996 (revised 1999); 21 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2438&nbr=1664&string=diagnostic+AND+imaging

- **ACR Appropriateness Criteria™ for shortness of breath--suspected cardiac origin**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 5 pages

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- **ACR Appropriateness Criteria™ for shoulder trauma**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 4 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2423&nbr=1649&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for soft tissue masses**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 1999); 5 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2417&nbr=1643&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for spine trauma**

  Source: American College of Radiology - Medical Specialty Society; 1999; 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2451&nbr=1677&string=x-rays

- **ACR Appropriateness Criteria™ for stress/insufficiency fractures (excluding vertebral)**

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  http://www.guideline.gov/summary/summary.aspx?doc_id=2419&nbr=1645&string=magnetic+AND+resonance+AND+imaging

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  http://www.guideline.gov/summary/summary.aspx?doc_id=2405&nbr=1631&string=magnetic+AND+resonance+AND+imaging

- **ACR Appropriateness Criteria™ for suspected cervical spine trauma**

  Source: American College of Radiology - Medical Specialty Society; 1995 (revised 2002); 8 pages

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  http://www.guideline.gov/summary/summary.aspx?doc_id=3563&nbr=2789&string=x-rays

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  Source: American College of Radiology - Medical Specialty Society; 1998; 12 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2411&nbr=1637&string=magnetic+AND+resonance+AND+imaging

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  Source: American Cancer Society - Disease Specific Society; 1997 (revised 2003); 29 pages

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- **American Gastroenterological Association medical position statement on management of oropharyngeal dysphagia**

  Source: American Gastroenterological Association - Medical Specialty Society; 1998 July 24 (reviewed 2001); 3 pages

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  Source: Finnish Medical Society Duodecim - Professional Association; 2001 April 30 (revised 2003 October 5); Various pagings

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  Source: Institute for Clinical Systems Improvement - Private Nonprofit Organization; 1996 September (revised 2003 Jan); 45 pages

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  http://www.guideline.gov/summary/summary.aspx?doc_id=1357&nbr=615&string=diagnostic+AND+imaging

- **Procedure guideline for extended scintigraphy for differentiated thyroid cancer**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 15 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1363&nbr=621&string=diagnostic+AND+imaging

- **Procedure guideline for gallium scintigraphy in inflammation**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 21 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1349&nbr=607&string=diagnostic+AND+imaging

- **Procedure guideline for gallium scintigraphy in the evaluation of malignant disease**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February (updated 2001 June 23); 9 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2949&nbr=2175&string=diagnostic+AND+imaging

- **Procedure guideline for gastric emptying and motility**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 July; 16 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1746&nbr=972&string=diagnostic+AND+imaging

- **Procedure guideline for gastrointestinal bleeding and Meckel's diverticulum scintigraphy**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 July; 31 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1747&nbr=973&string=diagnostic+AND+imaging

- **Procedure guideline for gated equilibrium radionuclide ventriculography**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 20 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1361&nbr=619&string=diagnostic+AND+imaging

- **Procedure guideline for general imaging**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 36 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1338&nbr=606&string=diagnostic+AND+imaging

- **Procedure guideline for hepatic and splenic imaging.**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 16 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1337&nbr=605&string=diagnostic+AND+imaging

- **Procedure guideline for hepatobiliary scintigraphy**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February (updated 2001 June 23); 16 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2948&nbr=2174&string=diagnostic+AND+imaging

- **Procedure guideline for In-111 leukocyte scintigraphy for suspected infection/inflammation**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 21 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1350&nbr=608&string=diagnostic+AND+imaging

- **Procedure guideline for lung scintigraphy**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 24 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1352&nbr=610&string=diagnostic+AND+imaging

- **Procedure guideline for myocardial perfusion imaging**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 27 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1353&nbr=611&string=diagnostic+AND+imaging

- **Procedure guideline for parathyroid scintigraphy**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 19 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1354&nbr=612&string=diagnostic+AND+imaging

- **Procedure guideline for pediatric sedation in nuclear medicine**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February

  http://www.guideline.gov/summary/summary.aspx?doc_id=1358&nbr=616&string=diagnostic+AND+imaging

- **Procedure guideline for radionuclide cystography in children**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 20 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1356&nbr=614&string=diagnostic+AND+imaging

- **Procedure guideline for Tc-99m exametazime (HMPAO) labeled leukocyte scintigraphy for suspected infection/inflammation**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 22 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1351&nbr=609&string=diagnostic+AND+imaging

- **Procedure guideline for the use of radiopharmaceuticals**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1998 June (updated 2001 Jun 23); 6 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2946&nbr=2172&string=diagnostic+AND+imaging

- **Procedure guideline for thyroid scintigraphy**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 15 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1364&nbr=622&string=diagnostic+AND+imaging

- **Procedure guideline for thyroid uptake measurement**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 15 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1342&nbr=623&string=diagnostic+AND+imaging

- **Procedure guideline for tumor imaging using F-18 FDG**

  Source: Society of Nuclear Medicine, Inc - Medical Specialty Society; 1999 February; 20 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=1335&nbr=603&string=diagnostic+AND+imaging

- **Prostate specific antigen (PSA): best practice policy**

  Source: American Urological Association, Inc. - Medical Specialty Society; 1999 December 21; 11 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2181&nbr=1407&string=radionuclide+AND+scan

- **Pulmonary rehabilitation**

  Source: American Association for Respiratory Care - Professional Association; 2002; 9 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3211&nbr=2437&string=nuclear+AND+medicine+AND+tests

- **Recommendations regarding selected conditions affecting women's health**

  Source: Centers for Disease Control and Prevention - Federal Government Agency [U.S.]; 2000 March 31

  http://www.guideline.gov/summary/summary.aspx?doc_id=2277&nbr=1503&string=nuclear+AND+medicine+AND+tests

- **Reflex sympathetic dystrophy/complex regional pain syndrome clinical practice guidelines - third edition**

  Source: International Research Foundation for RSD/CRPS - Private Nonprofit Research Organization; 2003 January 1; 48 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=4117&nbr=3162&string=magnetic+AND+resonance+AND+imaging

- **Review criteria for knee surgery**

  Source: Washington State Department of Labor and Industries - State/Local Government Agency [U.S.]; 1991 January (revised 2004 Jan); 7 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=4841&nbr=3482&string=magnetic+AND+resonance+AND+imaging

- **Role of progestogen in hormone therapy for postmenopausal women: position statement of The North American Menopause Society**

  Source: The North American Menopause Society - Private Nonprofit Organization; 2003 Mar-April; 20 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3736&nbr=2962&string=nuclear+AND+medicine+AND+test

- **SAGES guidelines for laparoscopic surgery during pregnancy**

  Source: Society of American Gastrointestinal Endoscopic Surgeons - Medical Specialty Society; 1996 February (revised 2000 Oct); 4 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3146&nbr=2372&string=nuclear+AND+medicine+AND+tests

- **Screening for breast cancer: recommendations and rationale**

  Source: United States Preventive Services Task Force - Independent Expert Panel; 1996 (revised 2002 Sep); 3 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3419&nbr=2645&string=x-rays

- **Screening for colorectal cancer: recommendations and rationale**

  Source: United States Preventive Services Task Force - Independent Expert Panel; 1996 (revised 2002 Jul); 13 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3285&nbr=2511&string=nuclear+AND+medicine+AND+test

- **Screening for coronary heart disease: recommendation statement**

  Source: United States Preventive Services Task Force - Independent Expert Panel; 1996 (revised 2004 February 17); 11 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=4577&nbr=3367&string=x-rays

- **Screening for lung cancer: the guidelines**

  Source: American College of Chest Physicians - Medical Specialty Society; 2003 January; 6 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3637&nbr=2863&string=x-rays

- **Screening for osteoporosis in postmenopausal women: recommendations and rationale**

  Source: United States Preventive Services Task Force - Independent Expert Panel; 1996 (revised 2002 September 17); 12 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3417&nbr=2643&string=diagnostic+AND+imaging

- **Secondary prevention of coronary heart disease following myocardial infarction. A national clinical guideline**

  Source: Scottish Intercollegiate Guidelines Network - National Government Agency [Non-U.S.]; 2000 January; 26 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2303&nbr=1529&string=nuclear+AND+medicine+AND+tests

- **Shoulder**

  Source: Work Loss Data Institute - Public For Profit Organization; 2003; 15 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3805&nbr=3032&string=diagnostic+AND+imaging

- **Small cell lung cancer**

  Source: American College of Chest Physicians - Medical Specialty Society; 2003 January; 13 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3651&nbr=2877&string=x-rays

- **Specialty referral guidelines for cardiovascular evaluation and management**

  Source: American Healthways, Inc - Public For Profit Organization; 2002; 26 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3168&nbr=2394&string=nuclear+AND+medicine+AND+tests

- **Stable coronary artery disease**

  Source: Institute for Clinical Systems Improvement - Private Nonprofit Organization; 1994 July (revised 2002 Jan); 32 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3158&nbr=2384&string=diagnostic+AND+imaging

- **Standards for breast conservation therapy in the management of invasive breast carcinoma.**

  Source: American College of Radiology - Medical Specialty Society; 1992 (revised 2001); 24 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3291&nbr=2517&string=radionuclide+AND+scans

- **Static lung volumes: 2001 revision and update**

  Source: American Association for Respiratory Care - Professional Association; 2001 May; 9 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2846&nbr=2072&string=nuclear+AND+medicine+AND+tests

- **Stroke and transient ischaemic attacks: assessment, investigation, immediate management and secondary prevention**

  Source: Singapore Ministry of Health - National Government Agency [Non-U.S.]; 2003 March; 44 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3751&nbr=2977&string=x-rays

- **Summary of policy recommendations for periodic health examinations**

  Source: American Academy of Family Physicians - Medical Specialty Society; 1996 November (revised 2003 Aug); 13 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=4183&nbr=3208&string=nuclear+AND+medicine+AND+tests

- **Surgical management of hemorrhoids**

  Source: Society for Surgery of the Alimentary Tract, Inc - Medical Specialty Society; 1996 (revised 2000); 3 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2171&nbr=1397&string=x-rays

- **Task force on the management of chest pain**

  Source: European Society of Cardiology - Medical Specialty Society; 2002 August; 24 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3426&nbr=2652&string=diagnostic+AND+imaging

- **The diagnosis and treatment of heel pain**

  Source: American College of Foot and Ankle Surgeons - Medical Specialty Society; 2001 Sep-October; 12 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3173&nbr=2399&string=diagnostic+AND+imaging

- **The management of menorrhagia in secondary care**

  Source: Royal College of Obstetricians and Gynaecologists - Medical Specialty Society; 1999 July; 77 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=2556&nbr=1782&string=nuclear+AND+medicine+AND+tests

- **The noninvasive staging of non-small cell lung cancer: the guidelines**

  Source: American College of Chest Physicians - Medical Specialty Society; 2003 January; 10 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3642&nbr=2868&string=diagnostic+AND+imaging

- **The solitary pulmonary nodule**

  Source: American College of Chest Physicians - Medical Specialty Society; 2003 January; 8 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3638&nbr=2864&string=diagnostic+AND+imaging

- **The utility of MRI in suspected MS: report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society**

  Source: American Academy of Neurology - Medical Specialty Society; 2003 September 9; 10 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=4109&nbr=3154&string=magnetic+AND+resonance+AND+imaging

- **Tissue plasminogen activator (t-PA) for acute ischemic stroke**

  Source: Daniel Freeman Memorial Hospital - Hospital/Medical Center; 1997 June (revised 2002); 10 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3422&nbr=2648&string=x-rays

- **Treatment of acute myocardial infarction**

  Source: Institute for Clinical Systems Improvement - Private Nonprofit Organization; 1996 May (revised 2002 Nov); 68 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3659&nbr=2885&string=nuclear+AND+medicine+AND+tests

- **Treatment of stage II non-small cell lung cancer**

  Source: American College of Chest Physicians - Medical Specialty Society; 2003 January; 14 pages

  http://www.guideline.gov/summary/summary.aspx?doc_id=3646&nbr=2872&string=x-rays

- **Ultrasound scanning during pregnancy**

  Source: Finnish Medical Society Duodecim - Professional Association; 2000 April 3 (revised 2001 June 17); Various pagings

  http://www.guideline.gov/summary/summary.aspx?doc_id=3816&nbr=3042&string=diagnostic+AND+imaging

Healthfinder™

Healthfinder™ is sponsored by the U.S. Department of Health and Human Services and offers links to hundreds of other sites that contain healthcare information. This Web site is located at **http://www.healthfinder.gov**. Again, keyword searches can be used to find guidelines. The following was recently found in this database:

- **Computed Tomography (CT): Questions and Answers**

  Summary: This fact sheet describes the CT scan procedure and technology and its uses in diagnostics and treatment.

  Source: Cancer Information Service, National Cancer Institute

  http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=7186

- **Magnetic Resonance Imaging**

  Summary: This document explains magnetic resonance imaging and what happens before, during, and after an MRI exam.

  Source: American Society of Radiologic Technologists

  http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=7935

- **What To Expect from Your Next Imaging Exam**

  Summary: This page links to information on numerous imaging exams, including radiography (x-rays), magnetic resonance imaging (MRI), nuclear medicine, computed tomography (CT), mammography, radiation therapy,

  Source: American Society of Radiologic Technologists

  http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=7934

- **Whole Body Scanning Using Computed Tomography (CT)**

  Summary: Currently some medical imaging facilities are promoting a new use of computed tomography (CT), also called computerized axial tomography (CAT) scanning.

  Source: Center for Devices and Radiological Health, U.S. Food and Drug Administration

  http://www.healthfinder.gov/scripts/recordpass.asp?RecordType=0&RecordID=6897

The NIH Search Utility

The NIH search utility allows you to search for documents on over 100 selected Web sites that comprise the NIH-WEB-SPACE. Each of these servers is "crawled" and indexed on an ongoing basis. Your search will produce a list of various documents, all of which will relate in some way to diagnostic imaging. The drawbacks of this approach are that the information is not organized by theme and that the references are often a mix of information for professionals and patients. Nevertheless, a large number of the listed Web sites provide useful background information. We can only recommend this route, therefore, for relatively rare or specific disorders, or when using highly targeted searches. To use the NIH search utility, visit the following Web page: **http://search.nih.gov/index.html**.

Additional Web Sources

A number of Web sites are available to the public that often link to government sites. These can also point you in the direction of essential information. The following is a representative sample:

- AOL: **http://search.aol.com/cat.adp?id=168&layer=&from=subcats**
- Family Village: **http://www.familyvillage.wisc.edu/specific.htm**
- Google: **http://directory.google.com/Top/Health/Conditions_and_Diseases/**
- Med Help International: **http://www.medhelp.org/HealthTopics/A.html**
- Open Directory Project: **http://dmoz.org/Health/Conditions_and_Diseases/**
- Yahoo.com: **http://dir.yahoo.com/Health/Diseases_and_Conditions/**
- WebMD®Health: **http://my.webmd.com/health_topics**

Finding Associations

There are several Internet directories that provide lists of medical associations with information on or resources relating to diagnostic imaging. By consulting all of associations listed in this chapter, you will have nearly exhausted all sources for patient associations concerned with diagnostic imaging.

The National Health Information Center (NHIC)

The National Health Information Center (NHIC) offers a free referral service to help people find organizations that provide information about diagnostic imaging. For more information, see the NHIC's Web site at **http://www.health.gov/NHIC/** or contact an information specialist by calling 1-800-336-4797.

Directory of Health Organizations

The Directory of Health Organizations, provided by the National Library of Medicine Specialized Information Services, is a comprehensive source of information on associations. The Directory of Health Organizations database can be accessed via the Internet at **http://www.sis.nlm.nih.gov/Dir/DirMain.html**. It is composed of two parts: DIRLINE and Health Hotlines.

The DIRLINE database comprises some 10,000 records of organizations, research centers, and government institutes and associations that primarily focus on health and biomedicine. To access DIRLINE directly, go to the following Web site: **http://dirline.nlm.nih.gov/**. Simply type in "diagnostic imaging" (or a synonym), and you will receive information on all relevant organizations listed in the database.

Health Hotlines directs you to toll-free numbers to over 300 organizations. You can access this database directly at **http://www.sis.nlm.nih.gov/hotlines/**. On this page, you are given the option to search by keyword or by browsing the subject list. When you have received your search results, click on the name of the organization for its description and contact information.

The Combined Health Information Database

Another comprehensive source of information on healthcare associations is the Combined Health Information Database. Using the "Detailed Search" option, you will need to limit your search to "Organizations" and "diagnostic imaging". Type the following hyperlink into your Web browser: **http://chid.nih.gov/detail/detail.html**. To find associations, use the drop boxes at the bottom of the search page where "You may refine your search by." For publication date, select "All Years." Then, select your preferred language and the format option "Organization Resource Sheet." Type "diagnostic imaging" (or synonyms) into the "For these words:" box. You should check back periodically with this database since it is updated every three months.

The National Organization for Rare Disorders, Inc.

The National Organization for Rare Disorders, Inc. has prepared a Web site that provides, at no charge, lists of associations organized by health topic. You can access this database at the following Web site: **http://www.rarediseases.org/search/orgsearch.html**. Type "diagnostic imaging" (or a synonym) into the search box, and click "Submit Query."

APPENDIX C. FINDING MEDICAL LIBRARIES

Overview

In this Appendix, we show you how to quickly find a medical library in your area.

Preparation

Your local public library and medical libraries have interlibrary loan programs with the National Library of Medicine (NLM), one of the largest medical collections in the world. According to the NLM, most of the literature in the general and historical collections of the National Library of Medicine is available on interlibrary loan to any library. If you would like to access NLM medical literature, then visit a library in your area that can request the publications for you.[21]

Finding a Local Medical Library

The quickest method to locate medical libraries is to use the Internet-based directory published by the National Network of Libraries of Medicine (NN/LM). This network includes 4626 members and affiliates that provide many services to librarians, health professionals, and the public. To find a library in your area, simply visit **http://nnlm.gov/members/adv.html** or call 1-800-338-7657.

Medical Libraries in the U.S. and Canada

In addition to the NN/LM, the National Library of Medicine (NLM) lists a number of libraries with reference facilities that are open to the public. The following is the NLM's list and includes hyperlinks to each library's Web site. These Web pages can provide information on hours of operation and other restrictions. The list below is a small sample of

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[21] Adapted from the NLM: **http://www.nlm.nih.gov/psd/cas/interlibrary.html**.

libraries recommended by the National Library of Medicine (sorted alphabetically by name of the U.S. state or Canadian province where the library is located)[22]:

- **Alabama:** Health InfoNet of Jefferson County (Jefferson County Library Cooperative, Lister Hill Library of the Health Sciences), **http://www.uab.edu/infonet/**
- **Alabama:** Richard M. Scrushy Library (American Sports Medicine Institute)
- **Arizona:** Samaritan Regional Medical Center: The Learning Center (Samaritan Health System, Phoenix, Arizona), **http://www.samaritan.edu/library/bannerlibs.htm**
- **California:** Kris Kelly Health Information Center (St. Joseph Health System, Humboldt), **http://www.humboldt1.com/~kkhic/index.html**
- **California:** Community Health Library of Los Gatos, **http://www.healthlib.org/orgresources.html**
- **California:** Consumer Health Program and Services (CHIPS) (County of Los Angeles Public Library, Los Angeles County Harbor-UCLA Medical Center Library) - Carson, CA, **http://www.colapublib.org/services/chips.html**
- **California:** Gateway Health Library (Sutter Gould Medical Foundation)
- **California:** Health Library (Stanford University Medical Center), **http://www-med.stanford.edu/healthlibrary/**
- **California:** Patient Education Resource Center - Health Information and Resources (University of California, San Francisco), **http://sfghdean.ucsf.edu/barnett/PERC/default.asp**
- **California:** Redwood Health Library (Petaluma Health Care District), **http://www.phcd.org/rdwdlib.html**
- **California:** Los Gatos PlaneTree Health Library, **http://planetreesanjose.org/**
- **California:** Sutter Resource Library (Sutter Hospitals Foundation, Sacramento), **http://suttermedicalcenter.org/library/**
- **California:** Health Sciences Libraries (University of California, Davis), **http://www.lib.ucdavis.edu/healthsci/**
- **California:** ValleyCare Health Library & Ryan Comer Cancer Resource Center (ValleyCare Health System, Pleasanton), **http://gaelnet.stmarys-ca.edu/other.libs/gbal/east/vchl.html**
- **California:** Washington Community Health Resource Library (Fremont), **http://www.healthlibrary.org/**
- **Colorado:** William V. Gervasini Memorial Library (Exempla Healthcare), **http://www.saintjosephdenver.org/yourhealth/libraries/**
- **Connecticut:** Hartford Hospital Health Science Libraries (Hartford Hospital), **http://www.harthosp.org/library/**
- **Connecticut:** Healthnet: Connecticut Consumer Health Information Center (University of Connecticut Health Center, Lyman Maynard Stowe Library), **http://library.uchc.edu/departm/hnet/**

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[22] Abstracted from **http://www.nlm.nih.gov/medlineplus/libraries.html**.

- **Connecticut:** Waterbury Hospital Health Center Library (Waterbury Hospital, Waterbury), **http://www.waterburyhospital.com/library/consumer.shtml**
- **Delaware:** Consumer Health Library (Christiana Care Health System, Eugene du Pont Preventive Medicine & Rehabilitation Institute, Wilmington), **http://www.christianacare.org/health_guide/health_guide_pmri_health_info.cfm**
- **Delaware:** Lewis B. Flinn Library (Delaware Academy of Medicine, Wilmington), **http://www.delamed.org/chls.html**
- **Georgia:** Family Resource Library (Medical College of Georgia, Augusta), **http://cmc.mcg.edu/kids_families/fam_resources/fam_res_lib/frl.htm**
- **Georgia:** Health Resource Center (Medical Center of Central Georgia, Macon), **http://www.mccg.org/hrc/hrchome.asp**
- **Hawaii:** Hawaii Medical Library: Consumer Health Information Service (Hawaii Medical Library, Honolulu), **http://hml.org/CHIS/**
- **Idaho:** DeArmond Consumer Health Library (Kootenai Medical Center, Coeur d'Alene), **http://www.nicon.org/DeArmond/index.htm**
- **Illinois:** Health Learning Center of Northwestern Memorial Hospital (Chicago), **http://www.nmh.org/health_info/hlc.html**
- **Illinois:** Medical Library (OSF Saint Francis Medical Center, Peoria), **http://www.osfsaintfrancis.org/general/library/**
- **Kentucky:** Medical Library - Services for Patients, Families, Students & the Public (Central Baptist Hospital, Lexington), **http://www.centralbap.com/education/community/library.cfm**
- **Kentucky:** University of Kentucky - Health Information Library (Chandler Medical Center, Lexington), **http://www.mc.uky.edu/PatientEd/**
- **Louisiana:** Alton Ochsner Medical Foundation Library (Alton Ochsner Medical Foundation, New Orleans), **http://www.ochsner.org/library/**
- **Louisiana:** Louisiana State University Health Sciences Center Medical Library-Shreveport, **http://lib-sh.lsuhsc.edu/**
- **Maine:** Franklin Memorial Hospital Medical Library (Franklin Memorial Hospital, Farmington), **http://www.fchn.org/fmh/lib.htm**
- **Maine:** Gerrish-True Health Sciences Library (Central Maine Medical Center, Lewiston), **http://www.cmmc.org/library/library.html**
- **Maine:** Hadley Parrot Health Science Library (Eastern Maine Healthcare, Bangor), **http://www.emh.org/hll/hpl/guide.htm**
- **Maine:** Maine Medical Center Library (Maine Medical Center, Portland), **http://www.mmc.org/library/**
- **Maine:** Parkview Hospital (Brunswick), **http://www.parkviewhospital.org/**
- **Maine:** Southern Maine Medical Center Health Sciences Library (Southern Maine Medical Center, Biddeford), **http://www.smmc.org/services/service.php3?choice=10**
- **Maine:** Stephens Memorial Hospital's Health Information Library (Western Maine Health, Norway), **http://www.wmhcc.org/Library/**

- **Manitoba, Canada:** Consumer & Patient Health Information Service (University of Manitoba Libraries), **http://www.umanitoba.ca/libraries/units/health/reference/chis.html**
- **Manitoba, Canada:** J.W. Crane Memorial Library (Deer Lodge Centre, Winnipeg), **http://www.deerlodge.mb.ca/crane_library/about.asp**
- **Maryland:** Health Information Center at the Wheaton Regional Library (Montgomery County, Dept. of Public Libraries, Wheaton Regional Library), **http://www.mont.lib.md.us/healthinfo/hic.asp**
- **Massachusetts:** Baystate Medical Center Library (Baystate Health System), **http://www.baystatehealth.com/1024/**
- **Massachusetts:** Boston University Medical Center Alumni Medical Library (Boston University Medical Center), **http://med-libwww.bu.edu/library/lib.html**
- **Massachusetts:** Lowell General Hospital Health Sciences Library (Lowell General Hospital, Lowell), **http://www.lowellgeneral.org/library/HomePageLinks/WWW.htm**
- **Massachusetts:** Paul E. Woodard Health Sciences Library (New England Baptist Hospital, Boston), **http://www.nebh.org/health_lib.asp**
- **Massachusetts:** St. Luke's Hospital Health Sciences Library (St. Luke's Hospital, Southcoast Health System, New Bedford), **http://www.southcoast.org/library/**
- **Massachusetts:** Treadwell Library Consumer Health Reference Center (Massachusetts General Hospital), **http://www.mgh.harvard.edu/library/chrcindex.html**
- **Massachusetts:** UMass HealthNet (University of Massachusetts Medical School, Worchester), **http://healthnet.umassmed.edu/**
- **Michigan:** Botsford General Hospital Library - Consumer Health (Botsford General Hospital, Library & Internet Services), **http://www.botsfordlibrary.org/consumer.htm**
- **Michigan:** Helen DeRoy Medical Library (Providence Hospital and Medical Centers), **http://www.providence-hospital.org/library/**
- **Michigan:** Marquette General Hospital - Consumer Health Library (Marquette General Hospital, Health Information Center), **http://www.mgh.org/center.html**
- **Michigan:** Patient Education Resouce Center - University of Michigan Cancer Center (University of Michigan Comprehensive Cancer Center, Ann Arbor), **http://www.cancer.med.umich.edu/learn/leares.htm**
- **Michigan:** Sladen Library & Center for Health Information Resources - Consumer Health Information (Detroit), **http://www.henryford.com/body.cfm?id=39330**
- **Montana:** Center for Health Information (St. Patrick Hospital and Health Sciences Center, Missoula)
- **National:** Consumer Health Library Directory (Medical Library Association, Consumer and Patient Health Information Section), **http://caphis.mlanet.org/directory/index.html**
- **National:** National Network of Libraries of Medicine (National Library of Medicine) - provides library services for health professionals in the United States who do not have access to a medical library, **http://nnlm.gov/**
- **National:** NN/LM List of Libraries Serving the Public (National Network of Libraries of Medicine), **http://nnlm.gov/members/**

- **Nevada:** Health Science Library, West Charleston Library (Las Vegas-Clark County Library District, Las Vegas), **http://www.lvccld.org/special_collections/medical/index.htm**
- **New Hampshire:** Dartmouth Biomedical Libraries (Dartmouth College Library, Hanover), **http://www.dartmouth.edu/~biomed/resources.htmld/conshealth.htmld/**
- **New Jersey:** Consumer Health Library (Rahway Hospital, Rahway), **http://www.rahwayhospital.com/library.htm**
- **New Jersey:** Dr. Walter Phillips Health Sciences Library (Englewood Hospital and Medical Center, Englewood), **http://www.englewoodhospital.com/links/index.htm**
- **New Jersey:** Meland Foundation (Englewood Hospital and Medical Center, Englewood), **http://www.geocities.com/ResearchTriangle/9360/**
- **New York:** Choices in Health Information (New York Public Library) - NLM Consumer Pilot Project participant, **http://www.nypl.org/branch/health/links.html**
- **New York:** Health Information Center (Upstate Medical University, State University of New York, Syracuse), **http://www.upstate.edu/library/hic/**
- **New York:** Health Sciences Library (Long Island Jewish Medical Center, New Hyde Park), **http://www.lij.edu/library/library.html**
- **New York:** ViaHealth Medical Library (Rochester General Hospital), **http://www.nyam.org/library/**
- **Ohio:** Consumer Health Library (Akron General Medical Center, Medical & Consumer Health Library), **http://www.akrongeneral.org/hwlibrary.htm**
- **Oklahoma:** The Health Information Center at Saint Francis Hospital (Saint Francis Health System, Tulsa), **http://www.sfh-tulsa.com/services/healthinfo.asp**
- **Oregon:** Planetree Health Resource Center (Mid-Columbia Medical Center, The Dalles), **http://www.mcmc.net/phrc/**
- **Pennsylvania:** Community Health Information Library (Milton S. Hershey Medical Center, Hershey), **http://www.hmc.psu.edu/commhealth/**
- **Pennsylvania:** Community Health Resource Library (Geisinger Medical Center, Danville), **http://www.geisinger.edu/education/commlib.shtml**
- **Pennsylvania:** HealthInfo Library (Moses Taylor Hospital, Scranton), **http://www.mth.org/healthwellness.html**
- **Pennsylvania:** Hopwood Library (University of Pittsburgh, Health Sciences Library System, Pittsburgh), **http://www.hsls.pitt.edu/guides/chi/hopwood/index_html**
- **Pennsylvania:** Koop Community Health Information Center (College of Physicians of Philadelphia), **http://www.collphyphil.org/kooppg1.shtml**
- **Pennsylvania:** Learning Resources Center - Medical Library (Susquehanna Health System, Williamsport), **http://www.shscares.org/services/lrc/index.asp**
- **Pennsylvania:** Medical Library (UPMC Health System, Pittsburgh), **http://www.upmc.edu/passavant/library.htm**
- **Quebec, Canada:** Medical Library (Montreal General Hospital), **http://www.mghlib.mcgill.ca/**

- **South Dakota:** Rapid City Regional Hospital Medical Library (Rapid City Regional Hospital), **http://www.rcrh.org/Services/Library/Default.asp**
- **Texas:** Houston HealthWays (Houston Academy of Medicine-Texas Medical Center Library), **http://hhw.library.tmc.edu/**
- **Washington:** Community Health Library (Kittitas Valley Community Hospital), **http://www.kvch.com/**
- **Washington:** Southwest Washington Medical Center Library (Southwest Washington Medical Center, Vancouver), **http://www.swmedicalcenter.com/body.cfm?id=72**

ONLINE GLOSSARIES

The Internet provides access to a number of free-to-use medical dictionaries. The National Library of Medicine has compiled the following list of online dictionaries:

- ADAM Medical Encyclopedia (A.D.A.M., Inc.), comprehensive medical reference: **http://www.nlm.nih.gov/medlineplus/encyclopedia.html**
- MedicineNet.com Medical Dictionary (MedicineNet, Inc.): **http://www.medterms.com/Script/Main/hp.asp**
- Merriam-Webster Medical Dictionary (Inteli-Health, Inc.): **http://www.intelihealth.com/IH/**
- Multilingual Glossary of Technical and Popular Medical Terms in Eight European Languages (European Commission) - Danish, Dutch, English, French, German, Italian, Portuguese, and Spanish: **http://allserv.rug.ac.be/~rvdstich/eugloss/welcome.html**
- On-line Medical Dictionary (CancerWEB): **http://cancerweb.ncl.ac.uk/omd/**
- Rare Diseases Terms (Office of Rare Diseases): **http://ord.aspensys.com/asp/diseases/diseases.asp**
- Technology Glossary (National Library of Medicine) - Health Care Technology: **http://www.nlm.nih.gov/nichsr/ta101/ta10108.htm**

Beyond these, MEDLINEplus contains a very patient-friendly encyclopedia covering every aspect of medicine (licensed from A.D.A.M., Inc.). The ADAM Medical Encyclopedia can be accessed at **http://www.nlm.nih.gov/medlineplus/encyclopedia.html**. ADAM is also available on commercial Web sites such as drkoop.com (**http://www.drkoop.com/**) and Web MD (**http://my.webmd.com/adam/asset/adam_disease_articles/a_to_z/a**). The NIH suggests the following Web sites in the ADAM Medical Encyclopedia when searching for information on diagnostic imaging:

- **Basic Guidelines for Diagnostic Imaging**

  X-ray
  Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003337.htm

  X-ray - skeleton
  Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003381.htm

- **Signs & Symptoms for Diagnostic Imaging**

  Anxiety
  Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003211.htm

- **Diagnostics and Tests for Diagnostic Imaging**

  Abdominal X-ray
  Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003815.htm

  Barium X-ray
  Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003817.htm

Bone X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003808.htm

Chest X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003804.htm

Dental X-rays
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003801.htm

Extremity X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003461.htm

Gallbladder X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003821.htm

Hands X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003811.htm

Joints X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003810.htm

Lumbosacral spine X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003807.htm

Neck X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003805.htm

Pelvis X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003809.htm

Sinuses X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003803.htm

Skull X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003802.htm

Thoracic spine X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003806.htm

X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003337.htm

X-ray of the skeleton
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003381.htm

- **Background Topics for Diagnostic Imaging**

Fractures
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/000001.htm

Metastasis
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/002260.htm

Online Dictionary Directories

The following are additional online directories compiled by the National Library of Medicine, including a number of specialized medical dictionaries:

- Medical Dictionaries: Medical & Biological (World Health Organization): **http://www.who.int/hlt/virtuallibrary/English/diction.htm#Medical**
- MEL-Michigan Electronic Library List of Online Health and Medical Dictionaries (Michigan Electronic Library): **http://mel.lib.mi.us/health/health-dictionaries.html**
- Patient Education: Glossaries (DMOZ Open Directory Project): **http://dmoz.org/Health/Education/Patient_Education/Glossaries/**
- Web of Online Dictionaries (Bucknell University): **http://www.yourdictionary.com/diction5.html#medicine**

DIAGNOSTIC IMAGING DICTIONARY

The definitions below are derived from official public sources, including the National Institutes of Health [NIH] and the European Union [EU].

Abdomen: That portion of the body that lies between the thorax and the pelvis. [NIH]

Abdominal: Having to do with the abdomen, which is the part of the body between the chest and the hips that contains the pancreas, stomach, intestines, liver, gallbladder, and other organs. [NIH]

Abdominal Pain: Sensation of discomfort, distress, or agony in the abdominal region. [NIH]

Aberrant: Wandering or deviating from the usual or normal course. [EU]

Ablation: The removal of an organ by surgery. [NIH]

Abscess: A localized, circumscribed collection of pus. [NIH]

Acceptor: A substance which, while normally not oxidized by oxygen or reduced by hydrogen, can be oxidized or reduced in presence of a substance which is itself undergoing oxidation or reduction. [NIH]

Accommodation: Adjustment, especially that of the eye for various distances. [EU]

Acetylcholine: A neurotransmitter. Acetylcholine in vertebrates is the major transmitter at neuromuscular junctions, autonomic ganglia, parasympathetic effector junctions, a subset of sympathetic effector junctions, and at many sites in the central nervous system. It is generally not used as an administered drug because it is broken down very rapidly by cholinesterases, but it is useful in some ophthalmological applications. [NIH]

Acoustic: Having to do with sound or hearing. [NIH]

Acquired Immunodeficiency Syndrome: An acquired defect of cellular immunity associated with infection by the human immunodeficiency virus (HIV), a CD4-positive T-lymphocyte count under 200 cells/microliter or less than 14% of total lymphocytes, and increased susceptibility to opportunistic infections and malignant neoplasms. Clinical manifestations also include emaciation (wasting) and dementia. These elements reflect criteria for AIDS as defined by the CDC in 1993. [NIH]

Actin: Essential component of the cell skeleton. [NIH]

Action Potentials: The electric response of a nerve or muscle to its stimulation. [NIH]

Acute myelogenous leukemia: AML. A quickly progressing disease in which too many immature blood-forming cells are found in the blood and bone marrow. Also called acute myeloid leukemia or acute nonlymphocytic leukemia. [NIH]

Acute myeloid leukemia: AML. A quickly progressing disease in which too many immature blood-forming cells are found in the blood and bone marrow. Also called acute myelogenous leukemia or acute nonlymphocytic leukemia. [NIH]

Acute nonlymphocytic leukemia: A quickly progressing disease in which too many immature blood-forming cells are found in the blood and bone marrow. Also called acute myeloid leukemia or acute myelogenous leukemia. [NIH]

Adenocarcinoma: A malignant epithelial tumor with a glandular organization. [NIH]

Adjustment: The dynamic process wherein the thoughts, feelings, behavior, and biophysiological mechanisms of the individual continually change to adjust to the environment. [NIH]

Adjuvant: A substance which aids another, such as an auxiliary remedy; in immunology, nonspecific stimulator (e.g., BCG vaccine) of the immune response. [EU]

Adrenal Glands: Paired glands situated in the retroperitoneal tissues at the superior pole of each kidney. [NIH]

Adverse Effect: An unwanted side effect of treatment. [NIH]

Aerobic: In biochemistry, reactions that need oxygen to happen or happen when oxygen is present. [NIH]

Aerobic Metabolism: A chemical process in which oxygen is used to make energy from carbohydrates (sugars). Also known as aerobic respiration, oxidative metabolism, or cell respiration. [NIH]

Aerobic Respiration: A chemical process in which oxygen is used to make energy from carbohydrates (sugars). Also known as oxidative metabolism, cell respiration, or aerobic metabolism. [NIH]

Aerosol: A solution of a drug which can be atomized into a fine mist for inhalation therapy. [EU]

Afferent: Concerned with the transmission of neural impulse toward the central part of the nervous system. [NIH]

Affinity: 1. Inherent likeness or relationship. 2. A special attraction for a specific element, organ, or structure. 3. Chemical affinity; the force that binds atoms in molecules; the tendency of substances to combine by chemical reaction. 4. The strength of noncovalent chemical binding between two substances as measured by the dissociation constant of the complex. 5. In immunology, a thermodynamic expression of the strength of interaction between a single antigen-binding site and a single antigenic determinant (and thus of the stereochemical compatibility between them), most accurately applied to interactions among simple, uniform antigenic determinants such as haptens. Expressed as the association constant (K litres mole -1), which, owing to the heterogeneity of affinities in a population of antibody molecules of a given specificity, actually represents an average value (mean intrinsic association constant). 6. The reciprocal of the dissociation constant. [EU]

Agar: A complex sulfated polymer of galactose units, extracted from Gelidium cartilagineum, Gracilaria confervoides, and related red algae. It is used as a gel in the preparation of solid culture media for microorganisms, as a bulk laxative, in making emulsions, and as a supporting medium for immunodiffusion and immunoelectrophoresis. [NIH]

Aggressiveness: The quality of being aggressive (= characterized by aggression; militant; enterprising; spreading with vigour; chemically active; variable and adaptable). [EU]

Agonist: In anatomy, a prime mover. In pharmacology, a drug that has affinity for and stimulates physiologic activity at cell receptors normally stimulated by naturally occurring substances. [EU]

Albinism: General term for a number of inherited defects of amino acid metabolism in which there is a deficiency or absence of pigment in the eyes, skin, or hair. [NIH]

Algorithms: A procedure consisting of a sequence of algebraic formulas and/or logical steps to calculate or determine a given task. [NIH]

Alimentary: Pertaining to food or nutritive material, or to the organs of digestion. [EU]

Alkaline: Having the reactions of an alkali. [EU]

Allylamine: Possesses an unusual and selective cytotoxicity for vascular smooth muscle cells in dogs and rats. Useful for experiments dealing with arterial injury, myocardial fibrosis or cardiac decompensation. [NIH]

Alpha Particles: Positively charged particles composed of two protons and two neutrons, i.e., helium nuclei, emitted during disintegration of very heavy isotopes; a beam of alpha particles or an alpha ray has very strong ionizing power, but weak penetrability. [NIH]

Alternative medicine: Practices not generally recognized by the medical community as standard or conventional medical approaches and used instead of standard treatments. Alternative medicine includes the taking of dietary supplements, megadose vitamins, and herbal preparations; the drinking of special teas; and practices such as massage therapy, magnet therapy, spiritual healing, and meditation. [NIH]

Aluminum: A metallic element that has the atomic number 13, atomic symbol Al, and atomic weight 26.98. [NIH]

Ameloblastoma: An epithelial tumor of the jaw originating from the epithelial rests of Malassez or from other epithelial remnants of the developing period of the enamel. [NIH]

Amelogenesis Imperfecta: Either hereditary enamel hypoplasia or hypocalcification. [NIH]

Amine: An organic compound containing nitrogen; any member of a group of chemical compounds formed from ammonia by replacement of one or more of the hydrogen atoms by organic (hydrocarbon) radicals. The amines are distinguished as primary, secondary, and tertiary, according to whether one, two, or three hydrogen atoms are replaced. The amines include allylamine, amylamine, ethylamine, methylamine, phenylamine, propylamine, and many other compounds. [EU]

Amino Acid Motifs: Commonly observed structural components of proteins formed by simple combinations of adjacent secondary structures. A commonly observed structure may be composed of a conserved sequence which can be represented by a consensus sequence. [NIH]

Amino Acid Sequence: The order of amino acids as they occur in a polypeptide chain. This is referred to as the primary structure of proteins. It is of fundamental importance in determining protein conformation. [NIH]

Amino Acids: Organic compounds that generally contain an amino (-NH2) and a carboxyl (-COOH) group. Twenty alpha-amino acids are the subunits which are polymerized to form proteins. [NIH]

Amino Acids: Organic compounds that generally contain an amino (-NH2) and a carboxyl (-COOH) group. Twenty alpha-amino acids are the subunits which are polymerized to form proteins. [NIH]

Ammonia: A colorless alkaline gas. It is formed in the body during decomposition of organic materials during a large number of metabolically important reactions. [NIH]

Amnesia: Lack or loss of memory; inability to remember past experiences. [EU]

Ampulla: A sac-like enlargement of a canal or duct. [NIH]

Amyloid: A general term for a variety of different proteins that accumulate as extracellular fibrils of 7-10 nm and have common structural features, including a beta-pleated sheet conformation and the ability to bind such dyes as Congo red and thioflavine (Kandel, Schwartz, and Jessel, Principles of Neural Science, 3rd ed). [NIH]

Anabolic: Relating to, characterized by, or promoting anabolism. [EU]

Anaesthesia: Loss of feeling or sensation. Although the term is used for loss of tactile sensibility, or of any of the other senses, it is applied especially to loss of the sensation of pain, as it is induced to permit performance of surgery or other painful procedures. [EU]

Anaesthetic: 1. Pertaining to, characterized by, or producing anaesthesia. 2. A drug or agent that is used to abolish the sensation of pain. [EU]

Anal: Having to do with the anus, which is the posterior opening of the large bowel. [NIH]

Analgesic: An agent that alleviates pain without causing loss of consciousness. [EU]

Analog: In chemistry, a substance that is similar, but not identical, to another. [NIH]

Analogous: Resembling or similar in some respects, as in function or appearance, but not in origin or development;. [EU]

Anaplasia: Loss of structural differentiation and useful function of neoplastic cells. [NIH]

Anatomical: Pertaining to anatomy, or to the structure of the organism. [EU]

Anemia: A reduction in the number of circulating erythrocytes or in the quantity of hemoglobin. [NIH]

Anesthesia: A state characterized by loss of feeling or sensation. This depression of nerve function is usually the result of pharmacologic action and is induced to allow performance of surgery or other painful procedures. [NIH]

Aneurysm: A sac formed by the dilatation of the wall of an artery, a vein, or the heart. [NIH]

Angina: Chest pain that originates in the heart. [NIH]

Angiogram: An x-ray of blood vessels; the person receives an injection of dye to outline the vessels on the x-ray. [NIH]

Angiography: Radiography of blood vessels after injection of a contrast medium. [NIH]

Angioplasty: Endovascular reconstruction of an artery, which may include the removal of atheromatous plaque and/or the endothelial lining as well as simple dilatation. These are procedures performed by catheterization. When reconstruction of an artery is performed surgically, it is called endarterectomy. [NIH]

Angiosarcoma: A type of cancer that begins in the lining of blood vessels. [NIH]

Animal model: An animal with a disease either the same as or like a disease in humans. Animal models are used to study the development and progression of diseases and to test new treatments before they are given to humans. Animals with transplanted human cancers or other tissues are called xenograft models. [NIH]

Anions: Negatively charged atoms, radicals or groups of atoms which travel to the anode or positive pole during electrolysis. [NIH]

Ankle: That part of the lower limb directly above the foot. [NIH]

Annealing: The spontaneous alignment of two single DNA strands to form a double helix. [NIH]

Anode: Electrode held at a positive potential with respect to a cathode. [NIH]

Anomalies: Birth defects; abnormalities. [NIH]

Anorectal: Pertaining to the anus and rectum or to the junction region between the two. [EU]

Anterior chamber: The space in front of the iris and behind the cornea. [NIH]

Antibacterial: A substance that destroys bacteria or suppresses their growth or reproduction. [EU]

Antibiotic: A drug used to treat infections caused by bacteria and other microorganisms. [NIH]

Antibodies: Immunoglobulin molecules having a specific amino acid sequence by virtue of which they interact only with the antigen that induced their synthesis in cells of the lymphoid series (especially plasma cells), or with an antigen closely related to it. [NIH]

Antibody: A type of protein made by certain white blood cells in response to a foreign substance (antigen). Each antibody can bind to only a specific antigen. The purpose of this

binding is to help destroy the antigen. Antibodies can work in several ways, depending on the nature of the antigen. Some antibodies destroy antigens directly. Others make it easier for white blood cells to destroy the antigen. [NIH]

Anticoagulant: A drug that helps prevent blood clots from forming. Also called a blood thinner. [NIH]

Antiepileptic: An agent that combats epilepsy. [EU]

Antigen: Any substance which is capable, under appropriate conditions, of inducing a specific immune response and of reacting with the products of that response, that is, with specific antibody or specifically sensitized T-lymphocytes, or both. Antigens may be soluble substances, such as toxins and foreign proteins, or particulate, such as bacteria and tissue cells; however, only the portion of the protein or polysaccharide molecule known as the antigenic determinant (q.v.) combines with antibody or a specific receptor on a lymphocyte. Abbreviated Ag. [EU]

Anti-infective: An agent that so acts. [EU]

Anti-inflammatory: Having to do with reducing inflammation. [NIH]

Anus: The opening of the rectum to the outside of the body. [NIH]

Aorta: The main trunk of the systemic arteries. [NIH]

Aphasia: A cognitive disorder marked by an impaired ability to comprehend or express language in its written or spoken form. This condition is caused by diseases which affect the language areas of the dominant hemisphere. Clinical features are used to classify the various subtypes of this condition. General categories include receptive, expressive, and mixed forms of aphasia. [NIH]

Appendicitis: Acute inflammation of the vermiform appendix. [NIH]

Aqueous: Having to do with water. [NIH]

Arginine: An essential amino acid that is physiologically active in the L-form. [NIH]

Arterial: Pertaining to an artery or to the arteries. [EU]

Arteries: The vessels carrying blood away from the heart. [NIH]

Arterioles: The smallest divisions of the arteries located between the muscular arteries and the capillaries. [NIH]

Arteriovenous: Both arterial and venous; pertaining to or affecting an artery and a vein. [EU]

Arteritis: Inflammation of an artery. [NIH]

Artery: Vessel-carrying blood from the heart to various parts of the body. [NIH]

Arthroscopy: Endoscopic examination, therapy and surgery of the joint. [NIH]

Articular: Of or pertaining to a joint. [EU]

Articulation: The relationship of two bodies by means of a moveable joint. [NIH]

Artifacts: Any visible result of a procedure which is caused by the procedure itself and not by the entity being analyzed. Common examples include histological structures introduced by tissue processing, radiographic images of structures that are not naturally present in living tissue, and products of chemical reactions that occur during analysis. [NIH]

Asbestos: Fibrous incombustible mineral composed of magnesium and calcium silicates with or without other elements. It is relatively inert chemically and used in thermal insulation and fireproofing. Inhalation of dust causes asbestosis and later lung and gastrointestinal neoplasms. [NIH]

Aspergillosis: Infections with fungi of the genus Aspergillus. [NIH]

Assay: Determination of the amount of a particular constituent of a mixture, or of the biological or pharmacological potency of a drug. [EU]

Asymptomatic: Having no signs or symptoms of disease. [NIH]

Ataxia: Impairment of the ability to perform smoothly coordinated voluntary movements. This condition may affect the limbs, trunk, eyes, pharnyx, larnyx, and other structures. Ataxia may result from impaired sensory or motor function. Sensory ataxia may result from posterior column injury or peripheral nerve diseases. Motor ataxia may be associated with cerebellar diseases; cerebral cortex diseases; thalamic diseases; basal ganglia diseases; injury to the red nucleus; and other conditions. [NIH]

Atherectomy: Endovascular procedure in which atheromatous plaque is excised by a cutting or rotating catheter. It differs from balloon and laser angioplasty procedures which enlarge vessels by dilation but frequently do not remove much plaque. If the plaque is removed by surgical excision under general anesthesia rather than by an endovascular procedure through a catheter, it is called endarterectomy. [NIH]

Atrial: Pertaining to an atrium. [EU]

Atrial Fibrillation: Disorder of cardiac rhythm characterized by rapid, irregular atrial impulses and ineffective atrial contractions. [NIH]

Atrium: A chamber; used in anatomical nomenclature to designate a chamber affording entrance to another structure or organ. Usually used alone to designate an atrium of the heart. [EU]

Atrophy: Decrease in the size of a cell, tissue, organ, or multiple organs, associated with a variety of pathological conditions such as abnormal cellular changes, ischemia, malnutrition, or hormonal changes. [NIH]

Attenuation: Reduction of transmitted sound energy or its electrical equivalent. [NIH]

Atypical: Irregular; not conformable to the type; in microbiology, applied specifically to strains of unusual type. [EU]

Auditory: Pertaining to the sense of hearing. [EU]

Auditory Cortex: Area of the temporal lobe concerned with hearing. [NIH]

Autodigestion: Autolysis; a condition found in disease of the stomach: the stomach wall is digested by the gastric juice. [NIH]

Autoimmune disease: A condition in which the body recognizes its own tissues as foreign and directs an immune response against them. [NIH]

Autopsy: Postmortem examination of the body. [NIH]

Back Pain: Acute or chronic pain located in the posterior regions of the trunk, including the thoracic, lumbar, sacral, or adjacent regions. [NIH]

Bacteria: Unicellular prokaryotic microorganisms which generally possess rigid cell walls, multiply by cell division, and exhibit three principal forms: round or coccal, rodlike or bacillary, and spiral or spirochetal. [NIH]

Bacterium: Microscopic organism which may have a spherical, rod-like, or spiral unicellular or non-cellular body. Bacteria usually reproduce through asexual processes. [NIH]

Barium: An element of the alkaline earth group of metals. It has an atomic symbol Ba, atomic number 56, and atomic weight 138. All of its acid-soluble salts are poisonous. [NIH]

Barium enema: A procedure in which a liquid with barium in it is put into the rectum and colon by way of the anus. Barium is a silver-white metallic compound that helps to show the image of the lower gastrointestinal tract on an x-ray. [NIH]

Basal Ganglia: Large subcortical nuclear masses derived from the telencephalon and located in the basal regions of the cerebral hemispheres. [NIH]

Basal Ganglia Diseases: Diseases of the basal ganglia including the putamen; globus pallidus; claustrum; amygdala; and caudate nucleus. Dyskinesias (most notably involuntary movements and alterations of the rate of movement) represent the primary clinical manifestations of these disorders. Common etiologies include cerebrovascular disease; neurodegenerative diseases; and craniocerebral trauma. [NIH]

Base: In chemistry, the nonacid part of a salt; a substance that combines with acids to form salts; a substance that dissociates to give hydroxide ions in aqueous solutions; a substance whose molecule or ion can combine with a proton (hydrogen ion); a substance capable of donating a pair of electrons (to an acid) for the formation of a coordinate covalent bond. [EU]

Behavioral Symptoms: Observable manifestions of impaired psychological functioning. [NIH]

Benign: Not cancerous; does not invade nearby tissue or spread to other parts of the body. [NIH]

Benign tumor: A noncancerous growth that does not invade nearby tissue or spread to other parts of the body. [NIH]

Beta Rays: A stream of positive or negative electrons ejected with high energy from a disintegrating atomic nucleus; most biomedically used isotopes emit negative particles (electrons or negatrons, rather than positrons). Cathode rays are low-energy negative electrons produced in cathode ray tubes, also called television tubes or oscilloscopes. [NIH]

Beta-pleated: Particular three-dimensional pattern of amyloidoses. [NIH]

Bewilderment: Impairment or loss of will power. [NIH]

Bilateral: Affecting both the right and left side of body. [NIH]

Bile: An emulsifying agent produced in the liver and secreted into the duodenum. Its composition includes bile acids and salts, cholesterol, and electrolytes. It aids digestion of fats in the duodenum. [NIH]

Bile Acids: Acids made by the liver that work with bile to break down fats. [NIH]

Bile Acids and Salts: Steroid acids and salts. The primary bile acids are derived from cholesterol in the liver and usually conjugated with glycine or taurine. The secondary bile acids are further modified by bacteria in the intestine. They play an important role in the digestion and absorption of fat. They have also been used pharmacologically, especially in the treatment of gallstones. [NIH]

Bile duct: A tube through which bile passes in and out of the liver. [NIH]

Bile Pigments: Pigments that give a characteristic color to bile including: bilirubin, biliverdine, and bilicyanin. [NIH]

Biliary: Having to do with the liver, bile ducts, and/or gallbladder. [NIH]

Biliary Tract: The gallbladder and its ducts. [NIH]

Bilirubin: A bile pigment that is a degradation product of heme. [NIH]

Binding Sites: The reactive parts of a macromolecule that directly participate in its specific combination with another molecule. [NIH]

Bioavailability: The degree to which a drug or other substance becomes available to the target tissue after administration. [EU]

Biochemical: Relating to biochemistry; characterized by, produced by, or involving chemical reactions in living organisms. [EU]

Biological Transport: The movement of materials (including biochemical substances and drugs) across cell membranes and epithelial layers, usually by passive diffusion. [NIH]

Biopsy: Removal and pathologic examination of specimens in the form of small pieces of tissue from the living body. [NIH]

Biosynthesis: The building up of a chemical compound in the physiologic processes of a living organism. [EU]

Biotechnology: Body of knowledge related to the use of organisms, cells or cell-derived constituents for the purpose of developing products which are technically, scientifically and clinically useful. Alteration of biologic function at the molecular level (i.e., genetic engineering) is a central focus; laboratory methods used include transfection and cloning technologies, sequence and structure analysis algorithms, computer databases, and gene and protein structure function analysis and prediction. [NIH]

Bismuth: A metallic element that has the atomic symbol Bi, atomic number 83 and atomic weight 208.98. [NIH]

Bladder: The organ that stores urine. [NIH]

Bloating: Fullness or swelling in the abdomen that often occurs after meals. [NIH]

Blood Coagulation: The process of the interaction of blood coagulation factors that results in an insoluble fibrin clot. [NIH]

Blood Glucose: Glucose in blood. [NIH]

Blood Platelets: Non-nucleated disk-shaped cells formed in the megakaryocyte and found in the blood of all mammals. They are mainly involved in blood coagulation. [NIH]

Blood pressure: The pressure of blood against the walls of a blood vessel or heart chamber. Unless there is reference to another location, such as the pulmonary artery or one of the heart chambers, it refers to the pressure in the systemic arteries, as measured, for example, in the forearm. [NIH]

Blood vessel: A tube in the body through which blood circulates. Blood vessels include a network of arteries, arterioles, capillaries, venules, and veins. [NIH]

Blood Volume: Volume of circulating blood. It is the sum of the plasma volume and erythrocyte volume. [NIH]

Body Fluids: Liquid components of living organisms. [NIH]

Body Regions: Anatomical areas of the body. [NIH]

Bolus: A single dose of drug usually injected into a blood vessel over a short period of time. Also called bolus infusion. [NIH]

Bolus infusion: A single dose of drug usually injected into a blood vessel over a short period of time. Also called bolus. [NIH]

Bone Cysts: Benign unilocular lytic areas in the proximal end of a long bone with well defined and narrow endosteal margins. The cysts contain fluid and the cyst walls may contain some giant cells. Bone cysts usually occur in males between the ages 3-15 years. [NIH]

Bone Marrow: The soft tissue filling the cavities of bones. Bone marrow exists in two types, yellow and red. Yellow marrow is found in the large cavities of large bones and consists mostly of fat cells and a few primitive blood cells. Red marrow is a hematopoietic tissue and is the site of production of erythrocytes and granular leukocytes. Bone marrow is made up of a framework of connective tissue containing branching fibers with the frame being filled with marrow cells. [NIH]

Bone scan: A technique to create images of bones on a computer screen or on film. A small amount of radioactive material is injected into a blood vessel and travels through the

bloodstream; it collects in the bones and is detected by a scanner. [NIH]

Bowel: The long tube-shaped organ in the abdomen that completes the process of digestion. There is both a small and a large bowel. Also called the intestine. [NIH]

Bowel Movement: Body wastes passed through the rectum and anus. [NIH]

Brachytherapy: A collective term for interstitial, intracavity, and surface radiotherapy. It uses small sealed or partly-sealed sources that may be placed on or near the body surface or within a natural body cavity or implanted directly into the tissues. [NIH]

Bradykinin: A nonapeptide messenger that is enzymatically produced from kallidin in the blood where it is a potent but short-lived agent of arteriolar dilation and increased capillary permeability. Bradykinin is also released from mast cells during asthma attacks, from gut walls as a gastrointestinal vasodilator, from damaged tissues as a pain signal, and may be a neurotransmitter. [NIH]

Brain Diseases: Pathologic conditions affecting the brain, which is composed of the intracranial components of the central nervous system. This includes (but is not limited to) the cerebral cortex; intracranial white matter; basal ganglia; thalamus; hypothalamus; brain stem; and cerebellum. [NIH]

Brain metastases: Cancer that has spread from the original (primary) tumor to the brain. [NIH]

Brain Stem: The part of the brain that connects the cerebral hemispheres with the spinal cord. It consists of the mesencephalon, pons, and medulla oblongata. [NIH]

Breast-conserving surgery: An operation to remove the breast cancer but not the breast itself. Types of breast-conserving surgery include lumpectomy (removal of the lump), quadrantectomy (removal of one quarter of the breast), and segmental mastectomy (removal of the cancer as well as some of the breast tissue around the tumor and the lining over the chest muscles below the tumor). [NIH]

Breeding: The science or art of changing the constitution of a population of plants or animals through sexual reproduction. [NIH]

Bromine: A halogen with the atomic symbol Br, atomic number 36, and atomic weight 79.904. It is a volatile reddish-brown liquid that gives off suffocating vapors, is corrosive to the skin, and may cause severe gastroenteritis if ingested. [NIH]

Bronchial: Pertaining to one or more bronchi. [EU]

Bronchitis: Inflammation (swelling and reddening) of the bronchi. [NIH]

Bronchogenic Cyst: A usually spherical cyst, arising as an embryonic out-pouching of the foregut or trachea. It is generally found in the mediastinum or lung and is usually asymptomatic unless it becomes infected. [NIH]

Bronchopulmonary: Pertaining to the lungs and their air passages; both bronchial and pulmonary. [EU]

Buccal: Pertaining to or directed toward the cheek. In dental anatomy, used to refer to the buccal surface of a tooth. [EU]

Bullous: Pertaining to or characterized by bullae. [EU]

Cachexia: General ill health, malnutrition, and weight loss, usually associated with chronic disease. [NIH]

Cadmium: An element with atomic symbol Cd, atomic number 48, and atomic weight 114. It is a metal and ingestion will lead to cadmium poisoning. [NIH]

Cadmium Poisoning: Poisoning occurring after exposure to cadmium compounds or fumes. It may cause gastrointestinal syndromes, anemia, or pneumonitis. [NIH]

Calcification: Deposits of calcium in the tissues of the breast. Calcification in the breast can be seen on a mammogram, but cannot be detected by touch. There are two types of breast calcification, macrocalcification and microcalcification. Macrocalcifications are large deposits and are usually not related to cancer. Microcalcifications are specks of calcium that may be found in an area of rapidly dividing cells. Many microcalcifications clustered together may be a sign of cancer. [NIH]

Calcium: A basic element found in nearly all organized tissues. It is a member of the alkaline earth family of metals with the atomic symbol Ca, atomic number 20, and atomic weight 40. Calcium is the most abundant mineral in the body and combines with phosphorus to form calcium phosphate in the bones and teeth. It is essential for the normal functioning of nerves and muscles and plays a role in blood coagulation (as factor IV) and in many enzymatic processes. [NIH]

Calcium Carbonate: Carbonic acid calcium salt (CaCO3). An odorless, tasteless powder or crystal that occurs in nature. It is used therapeutically as a phosphate buffer in hemodialysis patients and as a calcium supplement. [NIH]

Calculi: An abnormal concretion occurring mostly in the urinary and biliary tracts, usually composed of mineral salts. Also called stones. [NIH]

Captopril: A potent and specific inhibitor of peptidyl-dipeptidase A. It blocks the conversion of angiotensin I to angiotensin II, a vasoconstrictor and important regulator of arterial blood pressure. Captopril acts to suppress the renin-angiotensin system and inhibits pressure responses to exogenous angiotensin. [NIH]

Carbohydrate: An aldehyde or ketone derivative of a polyhydric alcohol, particularly of the pentahydric and hexahydric alcohols. They are so named because the hydrogen and oxygen are usually in the proportion to form water, (CH2O)n. The most important carbohydrates are the starches, sugars, celluloses, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [EU]

Carcinoembryonic Antigen: A glycoprotein that is secreted into the luminal surface of the epithelia in the gastrointestinal tract. It is found in the feces and pancreaticobiliary secretions and is used to monitor the respone to colon cancer treatment. [NIH]

Carcinogenic: Producing carcinoma. [EU]

Carcinoma: Cancer that begins in the skin or in tissues that line or cover internal organs. [NIH]

Cardiac: Having to do with the heart. [NIH]

Cardiac catheterization: A procedure in which a thin, hollow tube is inserted into a blood vessel. The tube is then advanced through the vessel into the heart, enabling a physician to study the heart and its pumping activity. [NIH]

Cardiac Output: The volume of blood passing through the heart per unit of time. It is usually expressed as liters (volume) per minute so as not to be confused with stroke volume (volume per beat). [NIH]

Cardiology: The study of the heart, its physiology, and its functions. [NIH]

Cardiomyopathy: A general diagnostic term designating primary myocardial disease, often of obscure or unknown etiology. [EU]

Cardiovascular: Having to do with the heart and blood vessels. [NIH]

Cardiovascular disease: Any abnormal condition characterized by dysfunction of the heart and blood vessels. CVD includes atherosclerosis (especially coronary heart disease, which can lead to heart attacks), cerebrovascular disease (e.g., stroke), and hypertension (high blood pressure). [NIH]

Case report: A detailed report of the diagnosis, treatment, and follow-up of an individual patient. Case reports also contain some demographic information about the patient (for example, age, gender, ethnic origin). [NIH]

Case series: A group or series of case reports involving patients who were given similar treatment. Reports of case series usually contain detailed information about the individual patients. This includes demographic information (for example, age, gender, ethnic origin) and information on diagnosis, treatment, response to treatment, and follow-up after treatment. [NIH]

Catecholamine: A group of chemical substances manufactured by the adrenal medulla and secreted during physiological stress. [NIH]

Catheter: A flexible tube used to deliver fluids into or withdraw fluids from the body. [NIH]

Catheterization: Use or insertion of a tubular device into a duct, blood vessel, hollow organ, or body cavity for injecting or withdrawing fluids for diagnostic or therapeutic purposes. It differs from intubation in that the tube here is used to restore or maintain patency in obstructions. [NIH]

Cathode: An electrode, usually an incandescent filament of tungsten, which emits electrons in an X-ray tube. [NIH]

Cations: Postively charged atoms, radicals or groups of atoms which travel to the cathode or negative pole during electrolysis. [NIH]

Cauda Equina: The lower part of the spinal cord consisting of the lumbar, sacral, and coccygeal nerve roots. [NIH]

Cause of Death: Factors which produce cessation of all vital bodily functions. They can be analyzed from an epidemiologic viewpoint. [NIH]

Celiac Artery: The arterial trunk that arises from the abdominal aorta and after a short course divides into the left gastric, common hepatic and splenic arteries. [NIH]

Cell: The individual unit that makes up all of the tissues of the body. All living things are made up of one or more cells. [NIH]

Cell Division: The fission of a cell. [NIH]

Cell Fusion: Fusion of somatic cells in vitro or in vivo, which results in somatic cell hybridization. [NIH]

Cell membrane: Cell membrane = plasma membrane. The structure enveloping a cell, enclosing the cytoplasm, and forming a selective permeability barrier; it consists of lipids, proteins, and some carbohydrates, the lipids thought to form a bilayer in which integral proteins are embedded to varying degrees. [EU]

Cell Respiration: The metabolic process of all living cells (animal and plant) in which oxygen is used to provide a source of energy for the cell. [NIH]

Cell Transplantation: Transference of cells within an individual, between individuals of the same species, or between individuals of different species. [NIH]

Cellular Structures: Components of a cell. [NIH]

Cementoma: An odontogenic fibroma in which cells have developed into cementoblasts and which consists largely of cementum. [NIH]

Central Nervous System: The main information-processing organs of the nervous system, consisting of the brain, spinal cord, and meninges. [NIH]

Central Nervous System Infections: Pathogenic infections of the brain, spinal cord, and meninges. DNA virus infections; RNA virus infections; bacterial infections; mycoplasma infections; Spirochaetales infections; fungal infections; protozoan infections; helminthiasis;

and prion diseases may involve the central nervous system as a primary or secondary process. [NIH]

Cerebellar: Pertaining to the cerebellum. [EU]

Cerebellum: Part of the metencephalon that lies in the posterior cranial fossa behind the brain stem. It is concerned with the coordination of movement. [NIH]

Cerebral: Of or pertaining of the cerebrum or the brain. [EU]

Cerebral Angiography: Radiography of the vascular system of the brain after injection of a contrast medium. [NIH]

Cerebral Cortex: The thin layer of gray matter on the surface of the cerebral hemisphere that develops from the telencephalon and folds into gyri. It reaches its highest development in man and is responsible for intellectual faculties and higher mental functions. [NIH]

Cerebral hemispheres: The two halves of the cerebrum, the part of the brain that controls muscle functions of the body and also controls speech, emotions, reading, writing, and learning. The right hemisphere controls muscle movement on the left side of the body, and the left hemisphere controls muscle movement on the right side of the body. [NIH]

Cerebral Palsy: Refers to a motor disability caused by a brain dysfunction. [NIH]

Cerebrospinal: Pertaining to the brain and spinal cord. [EU]

Cerebrospinal fluid: CSF. The fluid flowing around the brain and spinal cord. Cerebrospinal fluid is produced in the ventricles in the brain. [NIH]

Cerebrovascular: Pertaining to the blood vessels of the cerebrum, or brain. [EU]

Cerebrum: The largest part of the brain. It is divided into two hemispheres, or halves, called the cerebral hemispheres. The cerebrum controls muscle functions of the body and also controls speech, emotions, reading, writing, and learning. [NIH]

Cervical: Relating to the neck, or to the neck of any organ or structure. Cervical lymph nodes are located in the neck; cervical cancer refers to cancer of the uterine cervix, which is the lower, narrow end (the "neck") of the uterus. [NIH]

Cervix: The lower, narrow end of the uterus that forms a canal between the uterus and vagina. [NIH]

Cesarean Section: Extraction of the fetus by means of abdominal hysterotomy. [NIH]

Cesium: A member of the alkali metals. It has an atomic symbol Cs, atomic number 50, and atomic weight 132.91. Cesium has many industrial applications, including the construction of atomic clocks based on its atomic vibrational frequency. [NIH]

Character: In current usage, approximately equivalent to personality. The sum of the relatively fixed personality traits and habitual modes of response of an individual. [NIH]

Chelating Agents: Organic chemicals that form two or more coordination bonds with a central metal ion. Heterocyclic rings are formed with the central metal atom as part of the ring. Some biological systems form metal chelates, e.g., the iron-binding porphyrin group of hemoglobin and the magnesium-binding chlorophyll of plants. (From Hawley's Condensed Chemical Dictionary, 12th ed) They are used chemically to remove ions from solutions, medicinally against microorganisms, to treat metal poisoning, and in chemotherapy protocols. [NIH]

Chelation: Combination with a metal in complexes in which the metal is part of a ring. [EU]

Chemoprevention: The use of drugs, vitamins, or other agents to try to reduce the risk of, or delay the development or recurrence of, cancer. [NIH]

Chemotherapy: Treatment with anticancer drugs. [NIH]

Chest Pain: Pressure, burning, or numbness in the chest. [NIH]

Chin: The anatomical frontal portion of the mandible, also known as the mentum, that contains the line of fusion of the two separate halves of the mandible (symphysis menti). This line of fusion divides inferiorly to enclose a triangular area called the mental protuberance. On each side, inferior to the second premolar tooth, is the mental foramen for the passage of blood vessels and a nerve. [NIH]

Chlorophyll: Porphyrin derivatives containing magnesium that act to convert light energy in photosynthetic organisms. [NIH]

Cholecystitis: Inflammation of the gallbladder. [NIH]

Cholesterol: The principal sterol of all higher animals, distributed in body tissues, especially the brain and spinal cord, and in animal fats and oils. [NIH]

Choline: A basic constituent of lecithin that is found in many plants and animal organs. It is important as a precursor of acetylcholine, as a methyl donor in various metabolic processes, and in lipid metabolism. [NIH]

Chondrocytes: Polymorphic cells that form cartilage. [NIH]

Choriocarcinoma: A malignant tumor of trophoblastic epithelium characterized by secretion of large amounts of chorionic gonadotropin. It usually originates from chorionic products of conception (i.e., hydatidiform mole, normal pregnancy, or following abortion), but can originate in a teratoma of the testis, mediastinum, or pineal gland. [NIH]

Chromosomal: Pertaining to chromosomes. [EU]

Chromosome: Part of a cell that contains genetic information. Except for sperm and eggs, all human cells contain 46 chromosomes. [NIH]

Chronic: A disease or condition that persists or progresses over a long period of time. [NIH]

Chronic Disease: Disease or ailment of long duration. [NIH]

Chronic granulocytic leukemia: A slowly progressing disease in which too many white blood cells are made in the bone marrow. Also called chronic myelogenous leukemia or chronic myeloid leukemia. [NIH]

Chronic myelogenous leukemia: CML. A slowly progressing disease in which too many white blood cells are made in the bone marrow. Also called chronic myeloid leukemia or chronic granulocytic leukemia. [NIH]

Chronic Obstructive Pulmonary Disease: Collective term for chronic bronchitis and emphysema. [NIH]

Ciliary: Inflammation or infection of the glands of the margins of the eyelids. [NIH]

Ciliary Body: A ring of tissue extending from the scleral spur to the ora serrata of the retina. It consists of the uveal portion and the epithelial portion. The ciliary muscle is in the uveal portion and the ciliary processes are in the epithelial portion. [NIH]

Circulatory system: The system that contains the heart and the blood vessels and moves blood throughout the body. This system helps tissues get enough oxygen and nutrients, and it helps them get rid of waste products. The lymph system, which connects with the blood system, is often considered part of the circulatory system. [NIH]

Cirrhosis: A type of chronic, progressive liver disease. [NIH]

Clinical Medicine: The study and practice of medicine by direct examination of the patient. [NIH]

Clinical Protocols: Precise and detailed plans for the study of a medical or biomedical problem and/or plans for a regimen of therapy. [NIH]

Clinical study: A research study in which patients receive treatment in a clinic or other medical facility. Reports of clinical studies can contain results for single patients (case reports) or many patients (case series or clinical trials). [NIH]

Clinical trial: A research study that tests how well new medical treatments or other interventions work in people. Each study is designed to test new methods of screening, prevention, diagnosis, or treatment of a disease. [NIH]

Cloning: The production of a number of genetically identical individuals; in genetic engineering, a process for the efficient replication of a great number of identical DNA molecules. [NIH]

Cobalt: A trace element that is a component of vitamin B12. It has the atomic symbol Co, atomic number 27, and atomic weight 58.93. It is used in nuclear weapons, alloys, and pigments. Deficiency in animals leads to anemia; its excess in humans can lead to erythrocytosis. [NIH]

Cofactor: A substance, microorganism or environmental factor that activates or enhances the action of another entity such as a disease-causing agent. [NIH]

Cognitive restructuring: A method of identifying and replacing fear-promoting, irrational beliefs with more realistic and functional ones. [NIH]

Colchicine: A major alkaloid from Colchicum autumnale L. and found also in other Colchicum species. Its primary therapeutic use is in the treatment of gout, but it has been used also in the therapy of familial Mediterranean fever (periodic disease). [NIH]

Colic: Paroxysms of pain. This condition usually occurs in the abdominal region but may occur in other body regions as well. [NIH]

Colitis: Inflammation of the colon. [NIH]

Collagen: A polypeptide substance comprising about one third of the total protein in mammalian organisms. It is the main constituent of skin, connective tissue, and the organic substance of bones and teeth. Different forms of collagen are produced in the body but all consist of three alpha-polypeptide chains arranged in a triple helix. Collagen is differentiated from other fibrous proteins, such as elastin, by the content of proline, hydroxyproline, and hydroxylysine; by the absence of tryptophan; and particularly by the high content of polar groups which are responsible for its swelling properties. [NIH]

Collapse: 1. A state of extreme prostration and depression, with failure of circulation. 2. Abnormal falling in of the walls of any part of organ. [EU]

Colloidal: Of the nature of a colloid. [EU]

Colon: The long, coiled, tubelike organ that removes water from digested food. The remaining material, solid waste called stool, moves through the colon to the rectum and leaves the body through the anus. [NIH]

Colorectal: Having to do with the colon or the rectum. [NIH]

Colorectal Cancer: Cancer that occurs in the colon (large intestine) or the rectum (the end of the large intestine). A number of digestive diseases may increase a person's risk of colorectal cancer, including polyposis and Zollinger-Ellison Syndrome. [NIH]

Colorectal Neoplasms: Tumors or cancer of the either the colon or rectum or both. The most frequent malignant tumor in the United States. Etiological factors which increase the risk of colorectal cancer include chronic ulcerative colitis, familial polyposis of the colon, exposure to asbestos, irradiation of the cervix. [NIH]

Colposcope: A lighted magnifying instrument used for examination of the vagina and cervix. [NIH]

Combinatorial: A cut-and-paste process that churns out thousands of potentially valuable compounds at once. [NIH]

Common Bile Duct: The largest biliary duct. It is formed by the junction of the cystic duct and the hepatic duct. [NIH]

Complement: A term originally used to refer to the heat-labile factor in serum that causes immune cytolysis, the lysis of antibody-coated cells, and now referring to the entire functionally related system comprising at least 20 distinct serum proteins that is the effector not only of immune cytolysis but also of other biologic functions. Complement activation occurs by two different sequences, the classic and alternative pathways. The proteins of the classic pathway are termed 'components of complement' and are designated by the symbols C1 through C9. C1 is a calcium-dependent complex of three distinct proteins C1q, C1r and C1s. The proteins of the alternative pathway (collectively referred to as the properdin system) and complement regulatory proteins are known by semisystematic or trivial names. Fragments resulting from proteolytic cleavage of complement proteins are designated with lower-case letter suffixes, e.g., C3a. Inactivated fragments may be designated with the suffix 'i', e.g. C3bi. Activated components or complexes with biological activity are designated by a bar over the symbol e.g. C1 or C4b,2a. The classic pathway is activated by the binding of C1 to classic pathway activators, primarily antigen-antibody complexes containing IgM, IgG1, IgG3; C1q binds to a single IgM molecule or two adjacent IgG molecules. The alternative pathway can be activated by IgA immune complexes and also by nonimmunologic materials including bacterial endotoxins, microbial polysaccharides, and cell walls. Activation of the classic pathway triggers an enzymatic cascade involving C1, C4, C2 and C3; activation of the alternative pathway triggers a cascade involving C3 and factors B, D and P. Both result in the cleavage of C5 and the formation of the membrane attack complex. Complement activation also results in the formation of many biologically active complement fragments that act as anaphylatoxins, opsonins, or chemotactic factors. [EU]

Complementary and alternative medicine: CAM. Forms of treatment that are used in addition to (complementary) or instead of (alternative) standard treatments. These practices are not considered standard medical approaches. CAM includes dietary supplements, megadose vitamins, herbal preparations, special teas, massage therapy, magnet therapy, spiritual healing, and meditation. [NIH]

Complementary medicine: Practices not generally recognized by the medical community as standard or conventional medical approaches and used to enhance or complement the standard treatments. Complementary medicine includes the taking of dietary supplements, megadose vitamins, and herbal preparations; the drinking of special teas; and practices such as massage therapy, magnet therapy, spiritual healing, and meditation. [NIH]

Compliance: Distensibility measure of a chamber such as the lungs (lung compliance) or bladder. Compliance is expressed as a change in volume per unit change in pressure. [NIH]

Computational Biology: A field of biology concerned with the development of techniques for the collection and manipulation of biological data, and the use of such data to make biological discoveries or predictions. This field encompasses all computational methods and theories applicable to molecular biology and areas of computer-based techniques for solving biological problems including manipulation of models and datasets. [NIH]

Computed tomography: CT scan. A series of detailed pictures of areas inside the body, taken from different angles; the pictures are created by a computer linked to an x-ray machine. Also called computerized tomography and computerized axial tomography (CAT) scan. [NIH]

Computerized axial tomography: A series of detailed pictures of areas inside the body, taken from different angles; the pictures are created by a computer linked to an x-ray

machine. Also called CAT scan, computed tomography (CT scan), or computerized tomography. [NIH]

Computerized tomography: A series of detailed pictures of areas inside the body, taken from different angles; the pictures are created by a computer linked to an x-ray machine. Also called computerized axial tomography (CAT) scan and computed tomography (CT scan). [NIH]

Conception: The onset of pregnancy, marked by implantation of the blastocyst; the formation of a viable zygote. [EU]

Concretion: Minute, hard, yellow masses found in the palpebral conjunctivae of elderly people or following chronic conjunctivitis, composed of the products of cellular degeneration retained in the depressions and tubular recesses in the conjunctiva. [NIH]

Conduction: The transfer of sound waves, heat, nervous impulses, or electricity. [EU]

Confusion: A mental state characterized by bewilderment, emotional disturbance, lack of clear thinking, and perceptual disorientation. [NIH]

Conjugated: Acting or operating as if joined; simultaneous. [EU]

Conjugation: 1. The act of joining together or the state of being conjugated. 2. A sexual process seen in bacteria, ciliate protozoa, and certain fungi in which nuclear material is exchanged during the temporary fusion of two cells (conjugants). In bacterial genetics a form of sexual reproduction in which a donor bacterium (male) contributes some, or all, of its DNA (in the form of a replicated set) to a recipient (female) which then incorporates differing genetic information into its own chromosome by recombination and passes the recombined set on to its progeny by replication. In ciliate protozoa, two conjugants of separate mating types exchange micronuclear material and then separate, each now being a fertilized cell. In certain fungi, the process involves fusion of two gametes, resulting in union of their nuclei and formation of a zygote. 3. In chemistry, the joining together of two compounds to produce another compound, such as the combination of a toxic product with some substance in the body to form a detoxified product, which is then eliminated. [EU]

Connective Tissue: Tissue that supports and binds other tissues. It consists of connective tissue cells embedded in a large amount of extracellular matrix. [NIH]

Connective Tissue: Tissue that supports and binds other tissues. It consists of connective tissue cells embedded in a large amount of extracellular matrix. [NIH]

Connective Tissue Cells: A group of cells that includes fibroblasts, cartilage cells, adipocytes, smooth muscle cells, and bone cells. [NIH]

Consciousness: Sense of awareness of self and of the environment. [NIH]

Consensus Sequence: A theoretical representative nucleotide or amino acid sequence in which each nucleotide or amino acid is the one which occurs most frequently at that site in the different sequences which occur in nature. The phrase also refers to an actual sequence which approximates the theoretical consensus. A known conserved sequence set is represented by a consensus sequence. Commonly observed supersecondary protein structures (amino acid motifs) are often formed by conserved sequences. [NIH]

Conserved Sequence: A sequence of amino acids in a polypeptide or of nucleotides in DNA or RNA that is similar across multiple species. A known set of conserved sequences is represented by a consensus sequence. Amino acid motifs are often composed of conserved sequences. [NIH]

Constipation: Infrequent or difficult evacuation of feces. [NIH]

Constitutional: 1. Affecting the whole constitution of the body; not local. 2. Pertaining to the constitution. [EU]

Constriction: The act of constricting. [NIH]

Consultation: A deliberation between two or more physicians concerning the diagnosis and the proper method of treatment in a case. [NIH]

Contamination: The soiling or pollution by inferior material, as by the introduction of organisms into a wound, or sewage into a stream. [EU]

Continuum: An area over which the vegetation or animal population is of constantly changing composition so that homogeneous, separate communities cannot be distinguished. [NIH]

Contractility: Capacity for becoming short in response to a suitable stimulus. [EU]

Contraindications: Any factor or sign that it is unwise to pursue a certain kind of action or treatment, e. g. giving a general anesthetic to a person with pneumonia. [NIH]

Contrast Media: Substances used in radiography that allow visualization of certain tissues. [NIH]

Contrast medium: A substance that is introduced into or around a structure and, because of the difference in absorption of x-rays by the contrast medium and the surrounding tissues, allows radiographic visualization of the structure. [EU]

Controlled study: An experiment or clinical trial that includes a comparison (control) group. [NIH]

Convulsions: A general term referring to sudden and often violent motor activity of cerebral or brainstem origin. Convulsions may also occur in the absence of an electrical cerebral discharge (e.g., in response to hypotension). [NIH]

Coordination: Muscular or motor regulation or the harmonious cooperation of muscles or groups of muscles, in a complex action or series of actions. [NIH]

Coronary: Encircling in the manner of a crown; a term applied to vessels; nerves, ligaments, etc. The term usually denotes the arteries that supply the heart muscle and, by extension, a pathologic involvement of them. [EU]

Coronary Arteriosclerosis: Thickening and loss of elasticity of the coronary arteries. [NIH]

Coronary heart disease: A type of heart disease caused by narrowing of the coronary arteries that feed the heart, which needs a constant supply of oxygen and nutrients carried by the blood in the coronary arteries. When the coronary arteries become narrowed or clogged by fat and cholesterol deposits and cannot supply enough blood to the heart, CHD results. [NIH]

Coronary Thrombosis: Presence of a thrombus in a coronary artery, often causing a myocardial infarction. [NIH]

Cortex: The outer layer of an organ or other body structure, as distinguished from the internal substance. [EU]

Cortical: Pertaining to or of the nature of a cortex or bark. [EU]

Cranial: Pertaining to the cranium, or to the anterior (in animals) or superior (in humans) end of the body. [EU]

Craniocerebral Trauma: Traumatic injuries involving the cranium and intracranial structures (i.e., brain; cranial nerves; meninges; and other structures). Injuries may be classified by whether or not the skull is penetrated (i.e., penetrating vs. nonpenetrating) or whether there is an associated hemorrhage. [NIH]

Criterion: A standard by which something may be judged. [EU]

Curative: Tending to overcome disease and promote recovery. [EU]

Cutaneous: Having to do with the skin. [NIH]

Cyclic: Pertaining to or occurring in a cycle or cycles; the term is applied to chemical compounds that contain a ring of atoms in the nucleus. [EU]

Cyst: A sac or capsule filled with fluid. [NIH]

Cystic Duct: The tube that carries bile from the gallbladder into the common bile duct and the small intestine. [NIH]

Cytochrome: Any electron transfer hemoprotein having a mode of action in which the transfer of a single electron is effected by a reversible valence change of the central iron atom of the heme prosthetic group between the +2 and +3 oxidation states; classified as cytochromes a in which the heme contains a formyl side chain, cytochromes b, which contain protoheme or a closely similar heme that is not covalently bound to the protein, cytochromes c in which protoheme or other heme is covalently bound to the protein, and cytochromes d in which the iron-tetrapyrrole has fewer conjugated double bonds than the hemes have. Well-known cytochromes have been numbered consecutively within groups and are designated by subscripts (beginning with no subscript), e.g. cytochromes c, c1, C2, . New cytochromes are named according to the wavelength in nanometres of the absorption maximum of the a-band of the iron (II) form in pyridine, e.g., c-555. [EU]

Cytoplasm: The protoplasm of a cell exclusive of that of the nucleus; it consists of a continuous aqueous solution (cytosol) and the organelles and inclusions suspended in it (phaneroplasm), and is the site of most of the chemical activities of the cell. [EU]

Cytotoxic: Cell-killing. [NIH]

Data Collection: Systematic gathering of data for a particular purpose from various sources, including questionnaires, interviews, observation, existing records, and electronic devices. The process is usually preliminary to statistical analysis of the data. [NIH]

Defibrillation: The act to arrest the fibrillation of (heart muscle) by applying electric shock across the chest, thus depolarizing the heart cells and allowing normal rhythm to return. [EU]

Degenerative: Undergoing degeneration : tending to degenerate; having the character of or involving degeneration; causing or tending to cause degeneration. [EU]

Dementia: An acquired organic mental disorder with loss of intellectual abilities of sufficient severity to interfere with social or occupational functioning. The dysfunction is multifaceted and involves memory, behavior, personality, judgment, attention, spatial relations, language, abstract thought, and other executive functions. The intellectual decline is usually progressive, and initially spares the level of consciousness. [NIH]

Dendrites: Extensions of the nerve cell body. They are short and branched and receive stimuli from other neurons. [NIH]

Dendritic: 1. Branched like a tree. 2. Pertaining to or possessing dendrites. [EU]

Dens in Dente: Anomaly of the tooth, found chiefly in upper lateral incisors. It is characterized by invagination of the enamel at the incisal edge. [NIH]

Dental Care: The total of dental diagnostic, preventive, and restorative services provided to meet the needs of a patient (from Illustrated Dictionary of Dentistry, 1982). [NIH]

Dental Caries: Localized destruction of the tooth surface initiated by decalcification of the enamel followed by enzymatic lysis of organic structures and leading to cavity formation. If left unchecked, the cavity may penetrate the enamel and dentin and reach the pulp. The three most prominent theories used to explain the etiology of the disase are that acids produced by bacteria lead to decalcification; that micro-organisms destroy the enamel protein; or that keratolytic micro-organisms produce chelates that lead to decalcification. [NIH]

Dental implant: A small metal pin placed inside the jawbone to mimic the root of a tooth. Dental implants can be used to help anchor a false tooth or teeth, or a crown or bridge. [NIH]

Dentigerous Cyst: Most common follicular odontogenic cyst. Occurs in relation to a partially erupted or unerupted tooth with at least the crown of the tooth to which the cyst is attached protruding into the cystic cavity. May give rise to an ameloblastoma and, in rare instances, undergo malignant transformation. [NIH]

Depolarization: The process or act of neutralizing polarity. In neurophysiology, the reversal of the resting potential in excitable cell membranes when stimulated, i.e., the tendency of the cell membrane potential to become positive with respect to the potential outside the cell. [EU]

Dermatology: A medical specialty concerned with the skin, its structure, functions, diseases, and treatment. [NIH]

Detoxification: Treatment designed to free an addict from his drug habit. [EU]

Deuterium: Deuterium. The stable isotope of hydrogen. It has one neutron and one proton in the nucleus. [NIH]

Diabetes Mellitus: A heterogeneous group of disorders that share glucose intolerance in common. [NIH]

Diagnostic procedure: A method used to identify a disease. [NIH]

Diagnostic Services: Organized services for the purpose of providing diagnosis to promote and maintain health. [NIH]

Diarrhea: Passage of excessively liquid or excessively frequent stools. [NIH]

Diastolic: Of or pertaining to the diastole. [EU]

Diffusion: The tendency of a gas or solute to pass from a point of higher pressure or concentration to a point of lower pressure or concentration and to distribute itself throughout the available space; a major mechanism of biological transport. [NIH]

Digestion: The process of breakdown of food for metabolism and use by the body. [NIH]

Digestive tract: The organs through which food passes when food is eaten. These organs are the mouth, esophagus, stomach, small and large intestines, and rectum. [NIH]

Dilated cardiomyopathy: Heart muscle disease that leads to enlargement of the heart's chambers, robbing the heart of its pumping ability. [NIH]

Dimethyl: A volatile metabolite of the amino acid methionine. [NIH]

Direct: 1. Straight; in a straight line. 2. Performed immediately and without the intervention of subsidiary means. [EU]

Discrete: Made up of separate parts or characterized by lesions which do not become blended; not running together; separate. [NIH]

Discrimination: The act of qualitative and/or quantitative differentiation between two or more stimuli. [NIH]

Disease Progression: The worsening of a disease over time. This concept is most often used for chronic and incurable diseases where the stage of the disease is an important determinant of therapy and prognosis. [NIH]

Disorientation: The loss of proper bearings, or a state of mental confusion as to time, place, or identity. [EU]

Disposition: A tendency either physical or mental toward certain diseases. [EU]

Dissection: Cutting up of an organism for study. [NIH]

Dissociation: 1. The act of separating or state of being separated. 2. The separation of a

molecule into two or more fragments (atoms, molecules, ions, or free radicals) produced by the absorption of light or thermal energy or by solvation. 3. In psychology, a defense mechanism in which a group of mental processes are segregated from the rest of a person's mental activity in order to avoid emotional distress, as in the dissociative disorders (q.v.), or in which an idea or object is segregated from its emotional significance; in the first sense it is roughly equivalent to splitting, in the second, to isolation. 4. A defect of mental integration in which one or more groups of mental processes become separated off from normal consciousness and, thus separated, function as a unitary whole. [EU]

Dissociative Disorders: Sudden temporary alterations in the normally integrative functions of consciousness. [NIH]

Distal: Remote; farther from any point of reference; opposed to proximal. In dentistry, used to designate a position on the dental arch farther from the median line of the jaw. [EU]

Diuretic: A drug that increases the production of urine. [NIH]

Diverticulum: A pathological condition manifested as a pouch or sac opening from a tubular or sacular organ. [NIH]

Dorsal: 1. Pertaining to the back or to any dorsum. 2. Denoting a position more toward the back surface than some other object of reference; same as posterior in human anatomy; superior in the anatomy of quadrupeds. [EU]

Dorsum: A plate of bone which forms the posterior boundary of the sella turcica. [NIH]

Dose-limiting: Describes side effects of a drug or other treatment that are serious enough to prevent an increase in dose or level of that treatment. [NIH]

Dosimetry: All the methods either of measuring directly, or of measuring indirectly and computing, absorbed dose, absorbed dose rate, exposure, exposure rate, dose equivalent, and the science associated with these methods. [NIH]

Drug Interactions: The action of a drug that may affect the activity, metabolism, or toxicity of another drug. [NIH]

Duct: A tube through which body fluids pass. [NIH]

Duodenum: The first part of the small intestine. [NIH]

Dyes: Chemical substances that are used to stain and color other materials. The coloring may or may not be permanent. Dyes can also be used as therapeutic agents and test reagents in medicine and scientific research. [NIH]

Dysphagia: Difficulty in swallowing. [EU]

Dysplasia: Cells that look abnormal under a microscope but are not cancer. [NIH]

Dystrophy: Any disorder arising from defective or faulty nutrition, especially the muscular dystrophies. [EU]

Eating Disorders: A group of disorders characterized by physiological and psychological disturbances in appetite or food intake. [NIH]

Echocardiography: Ultrasonic recording of the size, motion, and composition of the heart and surrounding tissues. The standard approach is transthoracic. [NIH]

Eclampsia: Onset of convulsions or coma in a previously diagnosed pre-eclamptic patient. [NIH]

Edema: Excessive amount of watery fluid accumulated in the intercellular spaces, most commonly present in subcutaneous tissue. [NIH]

Efficacy: The extent to which a specific intervention, procedure, regimen, or service produces a beneficial result under ideal conditions. Ideally, the determination of efficacy is

based on the results of a randomized control trial. [NIH]

Effusion: The escape of fluid into a part or tissue, as an exudation or a transudation. [EU]

Elastic: Susceptible of resisting and recovering from stretching, compression or distortion applied by a force. [EU]

Elasticity: Resistance and recovery from distortion of shape. [NIH]

Elastin: The protein that gives flexibility to tissues. [NIH]

Elective: Subject to the choice or decision of the patient or physician; applied to procedures that are advantageous to the patient but not urgent. [EU]

Electric shock: A dangerous patho-physiological effect resulting from an electric current passing through the body of a human or animal. [NIH]

Electroacupuncture: A form of acupuncture using low frequency electrically stimulated needles to produce analgesia and anesthesia and to treat disease. [NIH]

Electrocardiogram: Measurement of electrical activity during heartbeats. [NIH]

Electrolysis: Destruction by passage of a galvanic electric current, as in disintegration of a chemical compound in solution. [NIH]

Electrolytes: Substances that break up into ions (electrically charged particles) when they are dissolved in body fluids or water. Some examples are sodium, potassium, chloride, and calcium. Electrolytes are primarily responsible for the movement of nutrients into cells, and the movement of wastes out of cells. [NIH]

Electrons: Stable elementary particles having the smallest known negative charge, present in all elements; also called negatrons. Positively charged electrons are called positrons. The numbers, energies and arrangement of electrons around atomic nuclei determine the chemical identities of elements. Beams of electrons are called cathode rays or beta rays, the latter being a high-energy biproduct of nuclear decay. [NIH]

Electroporation: A technique in which electric pulses of intensity in kilovolts per centimeter and of microsecond-to-millisecond duration cause a temporary loss of the semipermeability of cell membranes, thus leading to ion leakage, escape of metabolites, and increased uptake by cells of drugs, molecular probes, and DNA. Some applications of electroporation include introduction of plasmids or foreign DNA into living cells for transfection, fusion of cells to prepare hybridomas, and insertion of proteins into cell membranes. [NIH]

Elementary Particles: Individual components of atoms, usually subatomic; subnuclear particles are usually detected only when the atomic nucleus decays and then only transiently, as most of them are unstable, often yielding pure energy without substance, i.e., radiation. [NIH]

Emaciation: Clinical manifestation of excessive leanness usually caused by disease or a lack of nutrition. [NIH]

Emboli: Bit of foreign matter which enters the blood stream at one point and is carried until it is lodged or impacted in an artery and obstructs it. It may be a blood clot, an air bubble, fat or other tissue, or clumps of bacteria. [NIH]

Embolism: Blocking of a blood vessel by a blood clot or foreign matter that has been transported from a distant site by the blood stream. [NIH]

Embolization: The blocking of an artery by a clot or foreign material. Embolization can be done as treatment to block the flow of blood to a tumor. [NIH]

Embolus: Bit of foreign matter which enters the blood stream at one point and is carried until it is lodged or impacted in an artery and obstructs it. It may be a blood clot, an air bubble, fat or other tissue, or clumps of bacteria. [NIH]

Embryo: The prenatal stage of mammalian development characterized by rapid morphological changes and the differentiation of basic structures. [NIH]

Emergency Medicine: A branch of medicine concerned with an individual's resuscitation, transportation and care from the point of injury or beginning of illness through the hospital or other emergency treatment facility. [NIH]

Emergency Treatment: First aid or other immediate intervention for accidents or medical conditions requiring immediate care and treatment before definitive medical and surgical management can be procured. [NIH]

Emphysema: A pathological accumulation of air in tissues or organs. [NIH]

Empiric: Empirical; depending upon experience or observation alone, without using scientific method or theory. [EU]

Enamel: A very hard whitish substance which covers the dentine of the anatomical crown of a tooth. [NIH]

Encapsulated: Confined to a specific, localized area and surrounded by a thin layer of tissue. [NIH]

Encephalitis: Inflammation of the brain due to infection, autoimmune processes, toxins, and other conditions. Viral infections (see encephalitis, viral) are a relatively frequent cause of this condition. [NIH]

Encephalitis, Viral: Inflammation of brain parenchymal tissue as a result of viral infection. Encephalitis may occur as primary or secondary manifestation of Togaviridae infections; Herpesviridae infections; Adenoviridae infections; Flaviviridae infections; Bunyaviridae infections; Picornaviridae infections; Paramyxoviridae infections; Orthomyxoviridae infections; Retroviridae infections; and Arenaviridae infections. [NIH]

Endarterectomy: Surgical excision, performed under general anesthesia, of the atheromatous tunica intima of an artery. When reconstruction of an artery is performed as an endovascular procedure through a catheter, it is called atherectomy. [NIH]

Endemic: Present or usually prevalent in a population or geographical area at all times; said of a disease or agent. Called also endemial. [EU]

Endocrine System: The system of glands that release their secretions (hormones) directly into the circulatory system. In addition to the endocrine glands, included are the chromaffin system and the neurosecretory systems. [NIH]

Endocrinology: A subspecialty of internal medicine concerned with the metabolism, physiology, and disorders of the endocrine system. [NIH]

Endogenous: Produced inside an organism or cell. The opposite is external (exogenous) production. [NIH]

Endometrial: Having to do with the endometrium (the layer of tissue that lines the uterus). [NIH]

Endometriosis: A condition in which tissue more or less perfectly resembling the uterine mucous membrane (the endometrium) and containing typical endometrial granular and stromal elements occurs aberrantly in various locations in the pelvic cavity. [NIH]

Endometrium: The layer of tissue that lines the uterus. [NIH]

Endoscope: A thin, lighted tube used to look at tissues inside the body. [NIH]

Endoscopic: A technique where a lateral-view endoscope is passed orally to the duodenum for visualization of the ampulla of Vater. [NIH]

Endoscopy: Endoscopic examination, therapy or surgery performed on interior parts of the body. [NIH]

Endosonography: Ultrasonography of internal organs using an ultrasound transducer sometimes mounted on a fiberoptic endoscope. In endosonography the transducer converts electronic signals into acoustic pulses or continuous waves and acts also as a receiver to detect reflected pulses from within the organ. An audiovisual-electronic interface converts the detected or processed echo signals, which pass through the electronics of the instrument, into a form that the technologist can evaluate. The procedure should not be confused with endoscopy which employs a special instrument called an endoscope. The "endo-" of endosonography refers to the examination of tissue within hollow organs, with reference to the usual ultrasonography procedure which is performed externally or transcutaneously. [NIH]

Endothelium: A layer of epithelium that lines the heart, blood vessels (endothelium, vascular), lymph vessels (endothelium, lymphatic), and the serous cavities of the body. [NIH]

Endothelium-derived: Small molecule that diffuses to the adjacent muscle layer and relaxes it. [NIH]

Enema: The injection of a liquid through the anus into the large bowel. [NIH]

Energetic: Exhibiting energy : strenuous; operating with force, vigour, or effect. [EU]

Enhancer: Transcriptional element in the virus genome. [NIH]

Environmental Health: The science of controlling or modifying those conditions, influences, or forces surrounding man which relate to promoting, establishing, and maintaining health. [NIH]

Enzymatic: Phase where enzyme cuts the precursor protein. [NIH]

Enzyme: A protein that speeds up chemical reactions in the body. [NIH]

Eosinophilic: A condition found primarily in grinding workers caused by a reaction of the pulmonary tissue, in particular the eosinophilic cells, to dust that has entered the lung. [NIH]

Eosinophilic Granuloma: The most benign clinical form of Langerhans-cell histiocytosis, which involves localized nodular lesions of the gastric mucosa, small intestine, bones, lungs, or skin, with infiltration by eosinophils. The proliferating cell that appears to be responsible for the clinical manifestations is the Langerhans cell. [NIH]

Eosinophils: Granular leukocytes with a nucleus that usually has two lobes connected by a slender thread of chromatin, and cytoplasm containing coarse, round granules that are uniform in size and stainable by eosin. [NIH]

Epidemic: Occurring suddenly in numbers clearly in excess of normal expectancy; said especially of infectious diseases but applied also to any disease, injury, or other health-related event occurring in such outbreaks. [EU]

Epidermis: Nonvascular layer of the skin. It is made up, from within outward, of five layers: 1) basal layer (stratum basale epidermidis); 2) spinous layer (stratum spinosum epidermidis); 3) granular layer (stratum granulosum epidermidis); 4) clear layer (stratum lucidum epidermidis); and 5) horny layer (stratum corneum epidermidis). [NIH]

Epithelial: Refers to the cells that line the internal and external surfaces of the body. [NIH]

Epithelium: One or more layers of epithelial cells, supported by the basal lamina, which covers the inner or outer surfaces of the body. [NIH]

Epitope: A molecule or portion of a molecule capable of binding to the combining site of an antibody. For every given antigenic determinant, the body can construct a variety of antibody-combining sites, some of which fit almost perfectly, and others which barely fit. [NIH]

ERV: The expiratory reserve volume is the largest volume of gas that can be expired from the end-expiratory level. [NIH]

Erythrocyte Volume: Volume of circulating erythrocytes. It is usually measured by radioisotope dilution technique. [NIH]

Escape Reaction: Innate response elicited by sensory stimuli associated with a threatening situation, or actual confrontation with an enemy. [NIH]

Esophageal: Having to do with the esophagus, the muscular tube through which food passes from the throat to the stomach. [NIH]

Esophagitis: Inflammation, acute or chronic, of the esophagus caused by bacteria, chemicals, or trauma. [NIH]

Esophagus: The muscular tube through which food passes from the throat to the stomach. [NIH]

Estrogen: One of the two female sex hormones. [NIH]

Estrogen Antagonists: Compounds which inhibit or antagonize the action or biosynthesis of estrogen. [NIH]

Estrogen receptor: ER. Protein found on some cancer cells to which estrogen will attach. [NIH]

Estrogen receptor positive: ER+. Breast cancer cells that have a protein (receptor molecule) to which estrogen will attach. Breast cancer cells that are ER+ need the hormone estrogen to grow and will usually respond to hormone (antiestrogen) therapy that blocks these receptor sites. [NIH]

Evacuation: An emptying, as of the bowels. [EU]

Evoke: The electric response recorded from the cerebral cortex after stimulation of a peripheral sense organ. [NIH]

Excisional: The surgical procedure of removing a tumor by cutting it out. The biopsy is then examined under a microscope. [NIH]

Excisional biopsy: A surgical procedure in which an entire lump or suspicious area is removed for diagnosis. The tissue is then examined under a microscope. [NIH]

Excitation: An act of irritation or stimulation or of responding to a stimulus; the addition of energy, as the excitation of a molecule by absorption of photons. [EU]

Exercise Test: Controlled physical activity, more strenuous than at rest, which is performed in order to allow assessment of physiological functions, particularly cardiovascular and pulmonary, but also aerobic capacity. Maximal (most intense) exercise is usually required but submaximal exercise is also used. The intensity of exercise is often graded, using criteria such as rate of work done, oxygen consumption, and heart rate. Physiological data obtained from an exercise test may be used for diagnosis, prognosis, and evaluation of disease severity, and to evaluate therapy. Data may also be used in prescribing exercise by determining a person's exercise capacity. [NIH]

Exhaustion: The feeling of weariness of mind and body. [NIH]

Exogenous: Developed or originating outside the organism, as exogenous disease. [EU]

Expiratory: The volume of air which leaves the breathing organs in each expiration. [NIH]

Expiratory Reserve Volume: The extra volume of air that can be expired with maximum effort beyond the level reached at the end of a normal, quiet expiration. Common abbreviation is ERV. [NIH]

External-beam radiation: Radiation therapy that uses a machine to aim high-energy rays at the cancer. Also called external radiation. [NIH]

Extracellular: Outside a cell or cells. [EU]

Extracellular Matrix: A meshwork-like substance found within the extracellular space and in association with the basement membrane of the cell surface. It promotes cellular proliferation and provides a supporting structure to which cells or cell lysates in culture dishes adhere. [NIH]

Extraction: The process or act of pulling or drawing out. [EU]

Extraocular: External to or outside of the eye. [NIH]

Extremity: A limb; an arm or leg (membrum); sometimes applied specifically to a hand or foot. [EU]

Facial: Of or pertaining to the face. [EU]

Familial polyposis: An inherited condition in which numerous polyps (tissue masses) develop on the inside walls of the colon and rectum. It increases the risk for colon cancer. [NIH]

Family Planning: Programs or services designed to assist the family in controlling reproduction by either improving or diminishing fertility. [NIH]

Fasciculation: A small local contraction of muscles, visible through the skin, representing a spontaneous discharge of a number of fibres innervated by a single motor nerve filament. [EU]

Fast Neutrons: Neutrons, the energy of which exceeds some arbitrary level, usually around one million electron volts. [NIH]

Fat: Total lipids including phospholipids. [NIH]

Fatigue: The state of weariness following a period of exertion, mental or physical, characterized by a decreased capacity for work and reduced efficiency to respond to stimuli. [NIH]

Fatty acids: A major component of fats that are used by the body for energy and tissue development. [NIH]

Fatty Liver: The buildup of fat in liver cells. The most common cause is alcoholism. Other causes include obesity, diabetes, and pregnancy. Also called steatosis. [NIH]

Feasibility Studies: Studies to determine the advantages or disadvantages, practicability, or capability of accomplishing a projected plan, study, or project. [NIH]

Febrile: Pertaining to or characterized by fever. [EU]

Feces: The excrement discharged from the intestines, consisting of bacteria, cells exfoliated from the intestines, secretions, chiefly of the liver, and a small amount of food residue. [EU]

Femoral: Pertaining to the femur, or to the thigh. [EU]

Femur: The longest and largest bone of the skeleton, it is situated between the hip and the knee. [NIH]

Ferritin: An iron-containing protein complex that is formed by a combination of ferric iron with the protein apoferritin. [NIH]

Fetal Monitoring: Physiologic or biochemical monitoring of the fetus. It is usually done during labor and may be performed in conjunction with the monitoring of uterine activity. It may also be performed prenatally as when the mother is undergoing surgery. [NIH]

Fetus: The developing offspring from 7 to 8 weeks after conception until birth. [NIH]

Fibrillation: A small, local, involuntary contraction of muscle, invisible under the skin, resulting from spontaneous activation of single muscle cells or muscle fibres. [EU]

Fibroma: A benign tumor of fibrous or fully developed connective tissue. [NIH]

Fibrosarcoma: A type of soft tissue sarcoma that begins in fibrous tissue, which holds bones,

muscles, and other organs in place. [NIH]

Fibrosis: Any pathological condition where fibrous connective tissue invades any organ, usually as a consequence of inflammation or other injury. [NIH]

Fibula: The bone of the lower leg lateral to and smaller than the tibia. In proportion to its length, it is the most slender of the long bones. [NIH]

Fissure: Any cleft or groove, normal or otherwise; especially a deep fold in the cerebral cortex which involves the entire thickness of the brain wall. [EU]

Fistula: Abnormal communication most commonly seen between two internal organs, or between an internal organ and the surface of the body. [NIH]

Flatus: Gas passed through the rectum. [NIH]

Fluorescence: The property of emitting radiation while being irradiated. The radiation emitted is usually of longer wavelength than that incident or absorbed, e.g., a substance can be irradiated with invisible radiation and emit visible light. X-ray fluorescence is used in diagnosis. [NIH]

Fluorine: A nonmetallic, diatomic gas that is a trace element and member of the halogen family. It is used in dentistry as flouride to prevent dental caries. [NIH]

Fluoroscopy: Production of an image when X-rays strike a fluorescent screen. [NIH]

Fold: A plication or doubling of various parts of the body. [NIH]

Follicular Cyst: Cyst due to the occlusion of the duct of a follicle or small gland. [NIH]

Forearm: The part between the elbow and the wrist. [NIH]

Free Radicals: Highly reactive molecules with an unsatisfied electron valence pair. Free radicals are produced in both normal and pathological processes. They are proven or suspected agents of tissue damage in a wide variety of circumstances including radiation, damage from environment chemicals, and aging. Natural and pharmacological prevention of free radical damage is being actively investigated. [NIH]

Friction: Surface resistance to the relative motion of one body against the rubbing, sliding, rolling, or flowing of another with which it is in contact. [NIH]

Frontal Lobe: The anterior part of the cerebral hemisphere. [NIH]

Functional magnetic resonance imaging: A noninvasive tool used to observe functioning in the brain or other organs by detecting changes in chemical composition, blood flow, or both. [NIH]

Gallbladder: The pear-shaped organ that sits below the liver. Bile is concentrated and stored in the gallbladder. [NIH]

Gallium: A rare, metallic element designated by the symbol, Ga, atomic number 31, and atomic weight 69.72. [NIH]

Gamma Cameras: Electronic instruments that produce photographs or cathode-ray tube images of the gamma-ray emissions from organs containing radionuclide tracers. [NIH]

Gamma Rays: Very powerful and penetrating, high-energy electromagnetic radiation of shorter wavelength than that of x-rays. They are emitted by a decaying nucleus, usually between 0.01 and 10 MeV. They are also called nuclear x-rays. [NIH]

Gas: Air that comes from normal breakdown of food. The gases are passed out of the body through the rectum (flatus) or the mouth (burp). [NIH]

Gastric: Having to do with the stomach. [NIH]

Gastric Emptying: The evacuation of food from the stomach into the duodenum. [NIH]

Gastrin: A hormone released after eating. Gastrin causes the stomach to produce more acid. [NIH]

Gastroduodenal: Pertaining to or communicating with the stomach and duodenum, as a gastroduodenal fistula. [EU]

Gastroenteritis: An acute inflammation of the lining of the stomach and intestines, characterized by anorexia, nausea, diarrhoea, abdominal pain, and weakness, which has various causes, including food poisoning due to infection with such organisms as Escherichia coli, Staphylococcus aureus, and Salmonella species; consumption of irritating food or drink; or psychological factors such as anger, stress, and fear. Called also enterogastritis. [EU]

Gastroesophageal Reflux: Reflux of gastric juice and/or duodenal contents (bile acids, pancreatic juice) into the distal esophagus, commonly due to incompetence of the lower esophageal sphincter. Gastric regurgitation is an extension of this process with entry of fluid into the pharynx or mouth. [NIH]

Gastroesophageal Reflux Disease: Flow of the stomach's contents back up into the esophagus. Happens when the muscle between the esophagus and the stomach (the lower esophageal sphincter) is weak or relaxes when it shouldn't. May cause esophagitis. Also called esophageal reflux or reflux esophagitis. [NIH]

Gastrointestinal: Refers to the stomach and intestines. [NIH]

Gastrointestinal tract: The stomach and intestines. [NIH]

Gene: The functional and physical unit of heredity passed from parent to offspring. Genes are pieces of DNA, and most genes contain the information for making a specific protein. [NIH]

Gene Expression: The phenotypic manifestation of a gene or genes by the processes of gene action. [NIH]

General practitioner: A medical practitioner who does not specialize in a particular branch of medicine or limit his practice to a specific class of diseases. [NIH]

Generator: Any system incorporating a fixed parent radionuclide from which is produced a daughter radionuclide which is to be removed by elution or by any other method and used in a radiopharmaceutical. [NIH]

Genetic Code: The specifications for how information, stored in nucleic acid sequence (base sequence), is translated into protein sequence (amino acid sequence). The start, stop, and order of amino acids of a protein is specified by consecutive triplets of nucleotides called codons (codon). [NIH]

Genetics: The biological science that deals with the phenomena and mechanisms of heredity. [NIH]

Genital: Pertaining to the genitalia. [EU]

Genitourinary: Pertaining to the genital and urinary organs; urogenital; urinosexual. [EU]

Genitourinary system: The parts of the body that play a role in reproduction, getting rid of waste products in the form of urine, or both. [NIH]

Germ Cells: The reproductive cells in multicellular organisms. [NIH]

Gestational: Psychosis attributable to or occurring during pregnancy. [NIH]

Gestational trophoblastic disease: A rare cancer in women of child-bearing age in which cancer cells grow in the tissues that are formed in the uterus after conception. Also called gestational trophoblastic tumor, gestational trophoblastic neoplasia, molar pregnancy, or choriocarcinoma. [NIH]

Gestational trophoblastic neoplasia: A rare cancer in women of child-bearing age in which cancer cells grow in the tissues that are formed in the uterus after conception. Also called gestational trophoblastic disease, gestational trophoblastic tumor, molar pregnancy, or choriocarcinoma. [NIH]

Gestational trophoblastic tumor: A rare cancer in women of child-bearing age in which cancer cells grow in the tissues that are formed in the uterus after conception. Also called gestational trophoblastic disease, gestational trophoblastic neoplasia, molar pregnancy, or choriocarcinoma. [NIH]

Gland: An organ that produces and releases one or more substances for use in the body. Some glands produce fluids that affect tissues or organs. Others produce hormones or participate in blood production. [NIH]

Glioma: A cancer of the brain that comes from glial, or supportive, cells. [NIH]

Glucose: D-Glucose. A primary source of energy for living organisms. It is naturally occurring and is found in fruits and other parts of plants in its free state. It is used therapeutically in fluid and nutrient replacement. [NIH]

Glucose Intolerance: A pathological state in which the fasting plasma glucose level is less than 140 mg per deciliter and the 30-, 60-, or 90-minute plasma glucose concentration following a glucose tolerance test exceeds 200 mg per deciliter. This condition is seen frequently in diabetes mellitus but also occurs with other diseases. [NIH]

Glycoprotein: A protein that has sugar molecules attached to it. [NIH]

Glycosaminoglycans: Heteropolysaccharides which contain an N-acetylated hexosamine in a characteristic repeating disaccharide unit. The repeating structure of each disaccharide involves alternate 1,4- and 1,3-linkages consisting of either N-acetylglucosamine or N-acetylgalactosamine. [NIH]

Goiter: Enlargement of the thyroid gland. [NIH]

Governing Board: The group in which legal authority is vested for the control of health-related institutions and organizations. [NIH]

Grade: The grade of a tumor depends on how abnormal the cancer cells look under a microscope and how quickly the tumor is likely to grow and spread. Grading systems are different for each type of cancer. [NIH]

Graft: Healthy skin, bone, or other tissue taken from one part of the body and used to replace diseased or injured tissue removed from another part of the body. [NIH]

Graft Survival: The survival of a graft in a host, the factors responsible for the survival and the changes occurring within the graft during growth in the host. [NIH]

Grafting: The operation of transfer of tissue from one site to another. [NIH]

Gravis: Eruption of watery blisters on the skin among those handling animals and animal products. [NIH]

Guanylate Cyclase: An enzyme that catalyzes the conversion of GTP to 3',5'-cyclic GMP and pyrophosphate. It also acts on ITP and dGTP. (From Enzyme Nomenclature, 1992) EC 4.6.1.2. [NIH]

Gynecology: A medical-surgical specialty concerned with the physiology and disorders primarily of the female genital tract, as well as female endocrinology and reproductive physiology. [NIH]

Habitual: Of the nature of a habit; according to habit; established by or repeated by force of habit, customary. [EU]

Habituation: Decline in response of an organism to environmental or other stimuli with

repeated or maintained exposure. [NIH]

Haematoma: A localized collection of blood, usually clotted, in an organ, space, or tissue, due to a break in the wall of a blood vessel. [EU]

Haemorrhage: The escape of blood from the vessels; bleeding. Small haemorrhages are classified according to size as petechiae (very small), purpura (up to 1 cm), and ecchymoses (larger). The massive accumulation of blood within a tissue is called a haematoma. [EU]

Half-Life: The time it takes for a substance (drug, radioactive nuclide, or other) to lose half of its pharmacologic, physiologic, or radiologic activity. [NIH]

Hammer: The largest of the three ossicles of the ear. [NIH]

Haptens: Small antigenic determinants capable of eliciting an immune response only when coupled to a carrier. Haptens bind to antibodies but by themselves cannot elicit an antibody response. [NIH]

Headache: Pain in the cranial region that may occur as an isolated and benign symptom or as a manifestation of a wide variety of conditions including subarachnoid hemorrhage; craniocerebral trauma; central nervous system infections; intracranial hypertension; and other disorders. In general, recurrent headaches that are not associated with a primary disease process are referred to as headache disorders (e.g., migraine). [NIH]

Headache Disorders: Common conditions characterized by persistent or recurrent headaches. Headache syndrome classification systems may be based on etiology (e.g., vascular headache, post-traumatic headaches, etc.), temporal pattern (e.g., cluster headache, paroxysmal hemicrania, etc.), and precipitating factors (e.g., cough headache). [NIH]

Health Education: Education that increases the awareness and favorably influences the attitudes and knowledge relating to the improvement of health on a personal or community basis. [NIH]

Health Services: Services for the diagnosis and treatment of disease and the maintenance of health. [NIH]

Heart attack: A seizure of weak or abnormal functioning of the heart. [NIH]

Heart failure: Loss of pumping ability by the heart, often accompanied by fatigue, breathlessness, and excess fluid accumulation in body tissues. [NIH]

Heartbeat: One complete contraction of the heart. [NIH]

Hematemesis: Vomiting of blood. [NIH]

Hematology: A subspecialty of internal medicine concerned with morphology, physiology, and pathology of the blood and blood-forming tissues. [NIH]

Hematuria: Presence of blood in the urine. [NIH]

Hemochromatosis: A disease that occurs when the body absorbs too much iron. The body stores the excess iron in the liver, pancreas, and other organs. May cause cirrhosis of the liver. Also called iron overload disease. [NIH]

Hemodialysis: The use of a machine to clean wastes from the blood after the kidneys have failed. The blood travels through tubes to a dialyzer, which removes wastes and extra fluid. The cleaned blood then flows through another set of tubes back into the body. [NIH]

Hemoglobin: One of the fractions of glycosylated hemoglobin A1c. Glycosylated hemoglobin is formed when linkages of glucose and related monosaccharides bind to hemoglobin A and its concentration represents the average blood glucose level over the previous several weeks. HbA1c levels are used as a measure of long-term control of plasma glucose (normal, 4 to 6 percent). In controlled diabetes mellitus, the concentration of glycosylated hemoglobin A is within the normal range, but in uncontrolled cases the level

may be 3 to 4 times the normal conentration. Generally, complications are substantially lower among patients with Hb levels of 7 percent or less than in patients with HbA1c levels of 9 percent or more. [NIH]

Hemoglobin A: Normal adult human hemoglobin. The globin moiety consists of two alpha and two beta chains. [NIH]

Hemoglobin M: A group of abnormal hemoglobins in which amino acid substitutions take place in either the alpha or beta chains but near the heme iron. This results in facilitated oxidation of the hemoglobin to yield excess methemoglobin which leads to cyanosis. [NIH]

Hemoglobinopathies: A group of inherited disorders characterized by structural alterations within the hemoglobin molecule. [NIH]

Hemorrhage: Bleeding or escape of blood from a vessel. [NIH]

Hemorrhoids: Varicosities of the hemorrhoidal venous plexuses. [NIH]

Hemostasis: The process which spontaneously arrests the flow of blood from vessels carrying blood under pressure. It is accomplished by contraction of the vessels, adhesion and aggregation of formed blood elements, and the process of blood or plasma coagulation. [NIH]

Hepatic: Refers to the liver. [NIH]

Hepatic Artery: A branch of the celiac artery that distributes to the stomach, pancreas, duodenum, liver, gallbladder, and greater omentum. [NIH]

Hepatitis: Inflammation of the liver and liver disease involving degenerative or necrotic alterations of hepatocytes. [NIH]

Hepatobiliary: Pertaining to the liver and the bile or the biliary ducts. [EU]

Hepatocellular: Pertaining to or affecting liver cells. [EU]

Hepatocellular carcinoma: A type of adenocarcinoma, the most common type of liver tumor. [NIH]

Hepatocytes: The main structural component of the liver. They are specialized epithelial cells that are organized into interconnected plates called lobules. [NIH]

Hereditary: Of, relating to, or denoting factors that can be transmitted genetically from one generation to another. [NIH]

Heredity: 1. The genetic transmission of a particular quality or trait from parent to offspring. 2. The genetic constitution of an individual. [EU]

Heterogeneity: The property of one or more samples or populations which implies that they are not identical in respect of some or all of their parameters, e. g. heterogeneity of variance. [NIH]

Hippocampus: A curved elevation of gray matter extending the entire length of the floor of the temporal horn of the lateral ventricle (Dorland, 28th ed). The hippocampus, subiculum, and dentate gyrus constitute the hippocampal formation. Sometimes authors include the entorhinal cortex in the hippocampal formation. [NIH]

Histiocytosis: General term for the abnormal appearance of histiocytes in the blood. Based on the pathological features of the cells involved rather than on clinical findings, the histiocytic diseases are subdivided into three groups: Langerhans cell histiocytosis, non-Langerhans cell histiocytosis, and malignant histiocytic disorders. [NIH]

Histology: The study of tissues and cells under a microscope. [NIH]

Holography: The recording of images in three-dimensional form on a photographic film by exposing it to a laser beam reflected from the object under study. [NIH]

Homogeneous: Consisting of or composed of similar elements or ingredients; of a uniform quality throughout. [EU]

Hormonal: Pertaining to or of the nature of a hormone. [EU]

Hormone: A substance in the body that regulates certain organs. Hormones such as gastrin help in breaking down food. Some hormones come from cells in the stomach and small intestine. [NIH]

Hormone Replacement Therapy: Therapeutic use of hormones to alleviate the effects of hormone deficiency. [NIH]

Hormone therapy: Treatment of cancer by removing, blocking, or adding hormones. Also called endocrine therapy. [NIH]

Humoral: Of, relating to, proceeding from, or involving a bodily humour - now often used of endocrine factors as opposed to neural or somatic. [EU]

Humour: 1. A normal functioning fluid or semifluid of the body (as the blood, lymph or bile) especially of vertebrates. 2. A secretion that is itself an excitant of activity (as certain hormones). [EU]

Hybrid: Cross fertilization between two varieties or, more usually, two species of vines, see also crossing. [NIH]

Hybridization: The genetic process of crossbreeding to produce a hybrid. Hybrid nucleic acids can be formed by nucleic acid hybridization of DNA and RNA molecules. Protein hybridization allows for hybrid proteins to be formed from polypeptide chains. [NIH]

Hybridomas: Cells artificially created by fusion of activated lymphocytes with neoplastic cells. The resulting hybrid cells are cloned and produce pure or "monoclonal" antibodies or T-cell products, identical to those produced by the immunologically competent parent, and continually grow and divide as the neoplastic parent. [NIH]

Hydrogen: The first chemical element in the periodic table. It has the atomic symbol H, atomic number 1, and atomic weight 1. It exists, under normal conditions, as a colorless, odorless, tasteless, diatomic gas. Hydrogen ions are protons. Besides the common H1 isotope, hydrogen exists as the stable isotope deuterium and the unstable, radioactive isotope tritium. [NIH]

Hydrolysis: The process of cleaving a chemical compound by the addition of a molecule of water. [NIH]

Hydrophobic: Not readily absorbing water, or being adversely affected by water, as a hydrophobic colloid. [EU]

Hydroxylysine: A hydroxylated derivative of the amino acid lysine that is present in certain collagens. [NIH]

Hydroxyproline: A hydroxylated form of the imino acid proline. A deficiency in ascorbic acid can result in impaired hydroxyproline formation. [NIH]

Hyperbilirubinemia: Pathologic process consisting of an abnormal increase in the amount of bilirubin in the circulating blood, which may result in jaundice. [NIH]

Hyperlipidemia: An excess of lipids in the blood. [NIH]

Hyperplasia: An increase in the number of cells in a tissue or organ, not due to tumor formation. It differs from hypertrophy, which is an increase in bulk without an increase in the number of cells. [NIH]

Hypersensitivity: Altered reactivity to an antigen, which can result in pathologic reactions upon subsequent exposure to that particular antigen. [NIH]

Hypertension: Persistently high arterial blood pressure. Currently accepted threshold levels

are 140 mm Hg systolic and 90 mm Hg diastolic pressure. [NIH]

Hyperthyroidism: Excessive functional activity of the thyroid gland. [NIH]

Hypertrophy: General increase in bulk of a part or organ, not due to tumor formation, nor to an increase in the number of cells. [NIH]

Hypoglycemic: An orally active drug that produces a fall in blood glucose concentration. [NIH]

Hypoplasia: Incomplete development or underdevelopment of an organ or tissue. [EU]

Hypothalamus: Ventral part of the diencephalon extending from the region of the optic chiasm to the caudal border of the mammillary bodies and forming the inferior and lateral walls of the third ventricle. [NIH]

Hysterectomy: Excision of the uterus. [NIH]

Hysterotomy: An incision in the uterus, performed through either the abdomen or the vagina. [NIH]

Ileal: Related to the ileum, the lowest end of the small intestine. [NIH]

Ileum: The lower end of the small intestine. [NIH]

Image Processing, Computer-Assisted: A technique of inputting two-dimensional images into a computer and then enhancing or analyzing the imagery into a form that is more useful to the human observer. [NIH]

Imagination: A new pattern of perceptual or ideational material derived from past experience. [NIH]

Imaging procedures: Methods of producing pictures of areas inside the body. [NIH]

Immune response: The activity of the immune system against foreign substances (antigens). [NIH]

Immune system: The organs, cells, and molecules responsible for the recognition and disposal of foreign ("non-self") material which enters the body. [NIH]

Immunity: Nonsusceptibility to the invasive or pathogenic effects of foreign microorganisms or to the toxic effect of antigenic substances. [NIH]

Immunodeficiency: The decreased ability of the body to fight infection and disease. [NIH]

Immunogenic: Producing immunity; evoking an immune response. [EU]

Immunohistochemistry: Histochemical localization of immunoreactive substances using labeled antibodies as reagents. [NIH]

Immunologic: The ability of the antibody-forming system to recall a previous experience with an antigen and to respond to a second exposure with the prompt production of large amounts of antibody. [NIH]

Immunology: The study of the body's immune system. [NIH]

Immunoscintigraphy: An imaging procedure in which antibodies labeled with radioactive substances are given to the person. A picture is taken of sites in the body where the antibody localizes. [NIH]

Immunotoxins: Semisynthetic conjugates of various toxic molecules, including radioactive isotopes and bacterial or plant toxins, with specific immune substances such as immunoglobulins, monoclonal antibodies, and antigens. The antitumor or antiviral immune substance carries the toxin to the tumor or infected cell where the toxin exerts its poisonous effect. [NIH]

Impairment: In the context of health experience, an impairment is any loss or abnormality of psychological, physiological, or anatomical structure or function. [NIH]

Implant radiation: A procedure in which radioactive material sealed in needles, seeds, wires, or catheters is placed directly into or near the tumor. Also called [NIH]

Implantation: The insertion or grafting into the body of biological, living, inert, or radioactive material. [EU]

In situ: In the natural or normal place; confined to the site of origin without invasion of neighbouring tissues. [EU]

In vitro: In the laboratory (outside the body). The opposite of in vivo (in the body). [NIH]

In vivo: In the body. The opposite of in vitro (outside the body or in the laboratory). [NIH]

Incision: A cut made in the body during surgery. [NIH]

Incompetence: Physical or mental inadequacy or insufficiency. [EU]

Indocyanine Green: A tricarbocyanine dye that is used diagnostically in liver function tests and to determine blood volume and cardiac output. [NIH]

Induction: The act or process of inducing or causing to occur, especially the production of a specific morphogenetic effect in the developing embryo through the influence of evocators or organizers, or the production of anaesthesia or unconsciousness by use of appropriate agents. [EU]

Infarction: A pathological process consisting of a sudden insufficient blood supply to an area, which results in necrosis of that area. It is usually caused by a thrombus, an embolus, or a vascular torsion. [NIH]

Infection: 1. Invasion and multiplication of microorganisms in body tissues, which may be clinically unapparent or result in local cellular injury due to competitive metabolism, toxins, intracellular replication, or antigen-antibody response. The infection may remain localized, subclinical, and temporary if the body's defensive mechanisms are effective. A local infection may persist and spread by extension to become an acute, subacute, or chronic clinical infection or disease state. A local infection may also become systemic when the microorganisms gain access to the lymphatic or vascular system. 2. An infectious disease. [EU]

Infertility: The diminished or absent ability to conceive or produce an offspring while sterility is the complete inability to conceive or produce an offspring. [NIH]

Infiltration: The diffusion or accumulation in a tissue or cells of substances not normal to it or in amounts of the normal. Also, the material so accumulated. [EU]

Inflammation: A pathological process characterized by injury or destruction of tissues caused by a variety of cytologic and chemical reactions. It is usually manifested by typical signs of pain, heat, redness, swelling, and loss of function. [NIH]

Inflammatory bowel disease: A general term that refers to the inflammation of the colon and rectum. Inflammatory bowel disease includes ulcerative colitis and Crohn's disease. [NIH]

Information Science: The field of knowledge, theory, and technology dealing with the collection of facts and figures, and the processes and methods involved in their manipulation, storage, dissemination, publication, and retrieval. It includes the fields of communication, publishing, library science and informatics. [NIH]

Infusion: A method of putting fluids, including drugs, into the bloodstream. Also called intravenous infusion. [NIH]

Ingestion: Taking into the body by mouth [NIH]

Inhalation: The drawing of air or other substances into the lungs. [EU]

Initiation: Mutation induced by a chemical reactive substance causing cell changes; being a

step in a carcinogenic process. [NIH]

In-line: A sexually-reproducing population derived from a common parentage. [NIH]

Insight: The capacity to understand one's own motives, to be aware of one's own psychodynamics, to appreciate the meaning of symbolic behavior. [NIH]

Insulator: Material covering the metal conductor of the lead. It is usually polyurethane or silicone. [NIH]

Intermediate Filaments: Cytoplasmic filaments intermediate in diameter (about 10 nanometers) between the microfilaments and the microtubules. They may be composed of any of a number of different proteins and form a ring around the cell nucleus. [NIH]

Intermittent: Occurring at separated intervals; having periods of cessation of activity. [EU]

Internal Medicine: A medical specialty concerned with the diagnosis and treatment of diseases of the internal organ systems of adults. [NIH]

Internal radiation: A procedure in which radioactive material sealed in needles, seeds, wires, or catheters is placed directly into or near the tumor. Also called brachytherapy, implant radiation, or interstitial radiation therapy. [NIH]

Interstitial: Pertaining to or situated between parts or in the interspaces of a tissue. [EU]

Intervertebral: Situated between two contiguous vertebrae. [EU]

Intervertebral Disk Displacement: An intervertebral disk in which the nucleus pulposus has protruded through surrounding fibrocartilage. This occurs most frequently in the lower lumbar region. [NIH]

Intestinal: Having to do with the intestines. [NIH]

Intestine: A long, tube-shaped organ in the abdomen that completes the process of digestion. There is both a large intestine and a small intestine. Also called the bowel. [NIH]

Intracellular: Inside a cell. [NIH]

Intramuscular: IM. Within or into muscle. [NIH]

Intravascular: Within a vessel or vessels. [EU]

Intravenous: IV. Into a vein. [NIH]

Intrinsic: Situated entirely within or pertaining exclusively to a part. [EU]

Intubation: Introduction of a tube into a hollow organ to restore or maintain patency if obstructed. It is differentiated from catheterization in that the insertion of a catheter is usually performed for the introducing or withdrawing of fluids from the body. [NIH]

Invasive: 1. Having the quality of invasiveness. 2. Involving puncture or incision of the skin or insertion of an instrument or foreign material into the body; said of diagnostic techniques. [EU]

Involuntary: Reaction occurring without intention or volition. [NIH]

Iodine: A nonmetallic element of the halogen group that is represented by the atomic symbol I, atomic number 53, and atomic weight of 126.90. It is a nutritionally essential element, especially important in thyroid hormone synthesis. In solution, it has anti-infective properties and is used topically. [NIH]

Ionization: 1. Any process by which a neutral atom gains or loses electrons, thus acquiring a net charge, as the dissociation of a substance in solution into ions or ion production by the passage of radioactive particles. 2. Iontophoresis. [EU]

Ionizing: Radiation comprising charged particles, e. g. electrons, protons, alpha-particles, etc., having sufficient kinetic energy to produce ionization by collision. [NIH]

Ions: An atom or group of atoms that have a positive or negative electric charge due to a gain (negative charge) or loss (positive charge) of one or more electrons. Atoms with a positive charge are known as cations; those with a negative charge are anions. [NIH]

Iridocyclitis: Acute or chronic inflammation of the iris and ciliary body characterized by exudates into the anterior chamber, discoloration of the iris, and constricted, sluggish pupil. Symptoms include radiating pain, photophobia, lacrimation, and interference with vision. [NIH]

Iris: The most anterior portion of the uveal layer, separating the anterior chamber from the posterior. It consists of two layers - the stroma and the pigmented epithelium. Color of the iris depends on the amount of melanin in the stroma on reflection from the pigmented epithelium. [NIH]

Irradiation: The use of high-energy radiation from x-rays, neutrons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy) or from materials called radioisotopes. Radioisotopes produce radiation and can be placed in or near the tumor or in the area near cancer cells. This type of radiation treatment is called internal radiation therapy, implant radiation, interstitial radiation, or brachytherapy. Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. Irradiation is also called radiation therapy, radiotherapy, and x-ray therapy. [NIH]

Irritable Bowel Syndrome: A disorder that comes and goes. Nerves that control the muscles in the GI tract are too active. The GI tract becomes sensitive to food, stool, gas, and stress. Causes abdominal pain, bloating, and constipation or diarrhea. Also called spastic colon or mucous colitis. [NIH]

Ischemia: Deficiency of blood in a part, due to functional constriction or actual obstruction of a blood vessel. [EU]

Ischemic stroke: A condition in which the blood supply to part of the brain is cut off. Also called "plug-type" strokes. Blocked arteries starve areas of the brain controlling sight, speech, sensation, and movement so that these functions are partially or completely lost. Ischemic stroke is the most common type of stroke, accounting for 80 percent of all strokes. Most ischemic strokes are caused by a blood clot called a thrombus, which blocks blood flow in the arteries feeding the brain, usually the carotid artery in the neck, the major vessel bringing blood to the brain. When it becomes blocked, the risk of stroke is very high. [NIH]

Jaundice: A clinical manifestation of hyperbilirubinemia, consisting of deposition of bile pigments in the skin, resulting in a yellowish staining of the skin and mucous membranes. [NIH]

Jaw Cysts: Saccular lesions lined with epithelium and contained within pathologically formed cavities in the jaw; also nonepithelial cysts (pseudocysts) as they apply to the jaw, e.g., traumatic or solitary cyst, static bone cavity, and aneurysmal bone cyst. True jaw cysts are classified as odontogenic or nonodontogenic. [NIH]

Kb: A measure of the length of DNA fragments, 1 Kb = 1000 base pairs. The largest DNA fragments are up to 50 kilobases long. [NIH]

Keratolytic: An agent that promotes keratolysis. [EU]

Ketamine: A cyclohexanone derivative used for induction of anesthesia. Its mechanism of action is not well understood, but ketamine can block NMDA receptors (receptors, N-Methyl-D-Aspartate) and may interact with sigma receptors. [NIH]

Kidney Disease: Any one of several chronic conditions that are caused by damage to the cells of the kidney. People who have had diabetes for a long time may have kidney damage. Also called nephropathy. [NIH]

Kinetic: Pertaining to or producing motion. [EU]

Laboratory Personnel: Those health care professionals, technicians, and assistants staffing a research or health care facility where specimens are grown, tested, or evaluated and the results of such measures are recorded. [NIH]

Large Intestine: The part of the intestine that goes from the cecum to the rectum. The large intestine absorbs water from stool and changes it from a liquid to a solid form. The large intestine is 5 feet long and includes the appendix, cecum, colon, and rectum. Also called colon. [NIH]

Larynx: An irregularly shaped, musculocartilaginous tubular structure, lined with mucous membrane, located at the top of the trachea and below the root of the tongue and the hyoid bone. It is the essential sphincter guarding the entrance into the trachea and functioning secondarily as the organ of voice. [NIH]

Lens: The transparent, double convex (outward curve on both sides) structure suspended between the aqueous and vitreous; helps to focus light on the retina. [NIH]

Lesion: An area of abnormal tissue change. [NIH]

Lethal: Deadly, fatal. [EU]

Leukemia: Cancer of blood-forming tissue. [NIH]

Leukoplakia: A white patch that may develop on mucous membranes such as the cheek, gums, or tongue and may become cancerous. [NIH]

Library Science: Study of the principles and practices of library administration and services. [NIH]

Lice: A general name for small, wingless, parasitic insects, previously of the order Phthiraptera. Though exact taxonomy is still controversial, they can be grouped in the orders Anoplura (sucking lice), Mallophaga (biting lice), and Rhynchophthirina (elephant lice). [NIH]

Ligament: A band of fibrous tissue that connects bones or cartilages, serving to support and strengthen joints. [EU]

Ligands: A RNA simulation method developed by the MIT. [NIH]

Ligation: Application of a ligature to tie a vessel or strangulate a part. [NIH]

Light microscope: A microscope (device to magnify small objects) in which objects are lit directly by white light. [NIH]

Limbic: Pertaining to a limbus, or margin; forming a border around. [EU]

Limbic System: A set of forebrain structures common to all mammals that is defined functionally and anatomically. It is implicated in the higher integration of visceral, olfactory, and somatic information as well as homeostatic responses including fundamental survival behaviors (feeding, mating, emotion). For most authors, it includes the amygdala, epithalamus, gyrus cinguli, hippocampal formation (see hippocampus), hypothalamus, parahippocampal gyrus, septal nuclei, anterior nuclear group of thalamus, and portions of the basal ganglia. (Parent, Carpenter's Human Neuroanatomy, 9th ed, p744; NeuroNames, http://rprcsgi.rprc.washington.edu/neuronames/index.html (September 2, 1998)). [NIH]

Linkages: The tendency of two or more genes in the same chromosome to remain together from one generation to the next more frequently than expected according to the law of independent assortment. [NIH]

Lipid: Fat. [NIH]

Lipoma: A benign tumor composed of fat cells. [NIH]

Lipophilic: Having an affinity for fat; pertaining to or characterized by lipophilia. [EU]

Liposomal: A drug preparation that contains the active drug in very tiny fat particles. This fat-encapsulated drug is absorbed better, and its distribution to the tumor site is improved. [NIH]

Liposome: A spherical particle in an aqueous medium, formed by a lipid bilayer enclosing an aqueous compartment. [EU]

Liver: A large, glandular organ located in the upper abdomen. The liver cleanses the blood and aids in digestion by secreting bile. [NIH]

Liver cancer: A disease in which malignant (cancer) cells are found in the tissues of the liver. [NIH]

Liver metastases: Cancer that has spread from the original (primary) tumor to the liver. [NIH]

Liver scan: An image of the liver created on a computer screen or on film. A radioactive substance is injected into a blood vessel and travels through the bloodstream. It collects in the liver, especially in abnormal areas, and can be detected by the scanner. [NIH]

Liver Transplantation: The transference of a part of or an entire liver from one human or animal to another. [NIH]

Localization: The process of determining or marking the location or site of a lesion or disease. May also refer to the process of keeping a lesion or disease in a specific location or site. [NIH]

Localized: Cancer which has not metastasized yet. [NIH]

Long-Term Care: Care over an extended period, usually for a chronic condition or disability, requiring periodic, intermittent, or continuous care. [NIH]

Low Back Pain: Acute or chronic pain in the lumbar or sacral regions, which may be associated with musculo-ligamentous sprains and strains; intervertebral disk displacement; and other conditions. [NIH]

Lower Esophageal Sphincter: The muscle between the esophagus and stomach. When a person swallows, this muscle relaxes to let food pass from the esophagus to the stomach. It stays closed at other times to keep stomach contents from flowing back into the esophagus. [NIH]

Lumbar: Pertaining to the loins, the part of the back between the thorax and the pelvis. [EU]

Lumpectomy: Surgery to remove the tumor and a small amount of normal tissue around it. [NIH]

Lung volume: The amount of air the lungs hold. [NIH]

Lupus: A form of cutaneous tuberculosis. It is seen predominantly in women and typically involves the nasal, buccal, and conjunctival mucosa. [NIH]

Lymph: The almost colorless fluid that travels through the lymphatic system and carries cells that help fight infection and disease. [NIH]

Lymph node: A rounded mass of lymphatic tissue that is surrounded by a capsule of connective tissue. Also known as a lymph gland. Lymph nodes are spread out along lymphatic vessels and contain many lymphocytes, which filter the lymphatic fluid (lymph). [NIH]

Lymphadenopathy: Disease or swelling of the lymph nodes. [NIH]

Lymphatic: The tissues and organs, including the bone marrow, spleen, thymus, and lymph nodes, that produce and store cells that fight infection and disease. [NIH]

Lymphatic system: The tissues and organs that produce, store, and carry white blood cells

that fight infection and other diseases. This system includes the bone marrow, spleen, thymus, lymph nodes and a network of thin tubes that carry lymph and white blood cells. These tubes branch, like blood vessels, into all the tissues of the body. [NIH]

Lymphocyte Count: A count of the number of lymphocytes in the blood. [NIH]

Lymphocytes: White blood cells formed in the body's lymphoid tissue. The nucleus is round or ovoid with coarse, irregularly clumped chromatin while the cytoplasm is typically pale blue with azurophilic (if any) granules. Most lymphocytes can be classified as either T or B (with subpopulations of each); those with characteristics of neither major class are called null cells. [NIH]

Lymphoid: Referring to lymphocytes, a type of white blood cell. Also refers to tissue in which lymphocytes develop. [NIH]

Lymphoma: A general term for various neoplastic diseases of the lymphoid tissue. [NIH]

Lymphoproliferative: Disorders characterized by proliferation of lymphoid tissue, general or unspecified. [NIH]

Lytic: 1. Pertaining to lysis or to a lysin. 2. Producing lysis. [EU]

Macula: A stain, spot, or thickening. Often used alone to refer to the macula retinae. [EU]

Macula Lutea: An oval area in the retina, 3 to 5 mm in diameter, usually located temporal to the superior pole of the eye and slightly below the level of the optic disk. [NIH]

Macular Degeneration: Degenerative changes in the macula lutea of the retina. [NIH]

Magnetic Resonance Angiography: Non-invasive method of vascular imaging and determination of internal anatomy without injection of contrast media or radiation exposure. The technique is used especially in cerebral angiography as well as for studies of other vascular structures. [NIH]

Magnetic Resonance Imaging: Non-invasive method of demonstrating internal anatomy based on the principle that atomic nuclei in a strong magnetic field absorb pulses of radiofrequency energy and emit them as radiowaves which can be reconstructed into computerized images. The concept includes proton spin tomographic techniques. [NIH]

Magnetic Resonance Spectroscopy: Spectroscopic method of measuring the magnetic moment of elementary particles such as atomic nuclei, protons or electrons. It is employed in clinical applications such as NMR Tomography (magnetic resonance imaging). [NIH]

Malaria: A protozoan disease caused in humans by four species of the genus Plasmodium (P. falciparum (malaria, falciparum), P. vivax (malaria, vivax), P. ovale, and P. malariae) and transmitted by the bite of an infected female mosquito of the genus Anopheles. Malaria is endemic in parts of Asia, Africa, Central and South America, Oceania, and certain Caribbean islands. It is characterized by extreme exhaustion associated with paroxysms of high fever, sweating, shaking chills, and anemia. Malaria in animals is caused by other species of plasmodia. [NIH]

Malaria, Falciparum: Malaria caused by Plasmodium falciparum. This is the severest form of malaria and is associated with the highest levels of parasites in the blood. This disease is characterized by irregularly recurring febrile paroxysms that in extreme cases occur with acute cerebral, renal, or gastrointestinal manifestations. [NIH]

Malaria, Vivax: Malaria caused by Plasmodium vivax. This form of malaria is less severe than malaria, falciparum, but there is a higher probability for relapses to occur. Febrile paroxysms often occur every other day. [NIH]

Malformation: A morphologic defect resulting from an intrinsically abnormal developmental process. [EU]

Malignancy: A cancerous tumor that can invade and destroy nearby tissue and spread to other parts of the body. [NIH]

Malignant: Cancerous; a growth with a tendency to invade and destroy nearby tissue and spread to other parts of the body. [NIH]

Malignant tumor: A tumor capable of metastasizing. [NIH]

Malnutrition: A condition caused by not eating enough food or not eating a balanced diet. [NIH]

Mammary: Pertaining to the mamma, or breast. [EU]

Mammogram: An x-ray of the breast. [NIH]

Mammography: Radiographic examination of the breast. [NIH]

Mandible: The largest and strongest bone of the face constituting the lower jaw. It supports the lower teeth. [NIH]

Mandibular Fractures: Fractures of the lower jaw. [NIH]

Manifest: Being the part or aspect of a phenomenon that is directly observable : concretely expressed in behaviour. [EU]

Mastectomy: Surgery to remove the breast (or as much of the breast tissue as possible). [NIH]

Maxillary: Pertaining to the maxilla : the irregularly shaped bone that with its fellow forms the upper jaw. [EU]

Maxillary Fractures: Fractures of the upper jaw. [NIH]

Maxillary Sinus: One of the paired paranasal sinuses, located in the body of the maxilla, communicating with the middle meatus of the nasal cavity. [NIH]

Maxillary Sinusitis: Inflammation of the maxillary sinus. In most cases it is the result of infection by the bacteria Haemophilus influenzae, Streptococcus pneumoniae, and Staphylococcus aureus. This condition may be acute or chronic. [NIH]

Meatus: A canal running from the internal auditory foramen through the petrous portion of the temporal bone. It gives passage to the facial and auditory nerves together with the auditory branch of the basilar artery and the internal auditory veins. [NIH]

Medial: Lying near the midsaggital plane of the body; opposed to lateral. [NIH]

Mediastinum: The area between the lungs. The organs in this area include the heart and its large blood vessels, the trachea, the esophagus, the bronchi, and lymph nodes. [NIH]

Mediate: Indirect; accomplished by the aid of an intervening medium. [EU]

Mediator: An object or substance by which something is mediated, such as (1) a structure of the nervous system that transmits impulses eliciting a specific response; (2) a chemical substance (transmitter substance) that induces activity in an excitable tissue, such as nerve or muscle; or (3) a substance released from cells as the result of the interaction of antigen with antibody or by the action of antigen with a sensitized lymphocyte. [EU]

Medical Records: Recording of pertinent information concerning patient's illness or illnesses. [NIH]

Medicament: A medicinal substance or agent. [EU]

MEDLINE: An online database of MEDLARS, the computerized bibliographic Medical Literature Analysis and Retrieval System of the National Library of Medicine. [NIH]

Melanin: The substance that gives the skin its color. [NIH]

Melanocytes: Epidermal dendritic pigment cells which control long-term morphological color changes by alteration in their number or in the amount of pigment they produce and

store in the pigment containing organelles called melanosomes. Melanophores are larger cells which do not exist in mammals. [NIH]

Melanoma: A form of skin cancer that arises in melanocytes, the cells that produce pigment. Melanoma usually begins in a mole. [NIH]

Membrane: A very thin layer of tissue that covers a surface. [NIH]

Memory: Complex mental function having four distinct phases: (1) memorizing or learning, (2) retention, (3) recall, and (4) recognition. Clinically, it is usually subdivided into immediate, recent, and remote memory. [NIH]

Meninges: The three membranes that cover and protect the brain and spinal cord. [NIH]

Menopause: Permanent cessation of menstruation. [NIH]

Menorrhagia: Excessive menstrual flow. [NIH]

Mental: Pertaining to the mind; psychic. 2. (L. mentum chin) pertaining to the chin. [EU]

Mental Disorders: Psychiatric illness or diseases manifested by breakdowns in the adaptational process expressed primarily as abnormalities of thought, feeling, and behavior producing either distress or impairment of function. [NIH]

Mental Health: The state wherein the person is well adjusted. [NIH]

Mental Processes: Conceptual functions or thinking in all its forms. [NIH]

Mental Retardation: Refers to sub-average general intellectual functioning which originated during the developmental period and is associated with impairment in adaptive behavior. [NIH]

Mesenteric: Pertaining to the mesentery : a membranous fold attaching various organs to the body wall. [EU]

Mesentery: A layer of the peritoneum which attaches the abdominal viscera to the abdominal wall and conveys their blood vessels and nerves. [NIH]

Metabolite: Any substance produced by metabolism or by a metabolic process. [EU]

Metalloporphyrins: Porphyrins which are combined with a metal ion. The metal is bound equally to all four nitrogen atoms of the pyrrole rings. They possess characteristic absorption spectra which can be utilized for identification or quantitative estimation of porphyrins and porphyrin-bound compounds. [NIH]

Metastasis: The spread of cancer from one part of the body to another. Tumors formed from cells that have spread are called "secondary tumors" and contain cells that are like those in the original (primary) tumor. The plural is metastases. [NIH]

Metastatic: Having to do with metastasis, which is the spread of cancer from one part of the body to another. [NIH]

Metatarsophalangeal Joint: The articulation between a metatarsal bone and a phalanx. [NIH]

Methylprednisolone: (6 alpha,11 beta)-11,17,21-Trihydroxy-6-methylpregna-1,4-diene-3,2-dione. A prednisolone derivative which has pharmacological actions similar to prednisolone. [NIH]

Micelle: A colloid particle formed by an aggregation of small molecules. [EU]

Microbe: An organism which cannot be observed with the naked eye; e. g. unicellular animals, lower algae, lower fungi, bacteria. [NIH]

Microbiology: The study of microorganisms such as fungi, bacteria, algae, archaea, and viruses. [NIH]

Microcalcifications: Tiny deposits of calcium in the breast that cannot be felt but can be

detected on a mammogram. A cluster of these very small specks of calcium may indicate that cancer is present. [NIH]

Microorganism: An organism that can be seen only through a microscope. Microorganisms include bacteria, protozoa, algae, and fungi. Although viruses are not considered living organisms, they are sometimes classified as microorganisms. [NIH]

Micro-organism: An organism which cannot be observed with the naked eye; e. g. unicellular animals, lower algae, lower fungi, bacteria. [NIH]

Microspheres: Small uniformly-sized spherical particles frequently labeled with radioisotopes or various reagents acting as tags or markers. [NIH]

Microsurgery: Surgical procedures on the cellular level; a light microscope and miniaturized instruments are used. [NIH]

Microtubule-Associated Proteins: High molecular weight proteins found in the microtubules of the cytoskeletal system. Under certain conditions they are required for tubulin assembly into the microtubules and stabilize the assembled microtubules. [NIH]

Microtubules: Slender, cylindrical filaments found in the cytoskeleton of plant and animal cells. They are composed of the protein tubulin. [NIH]

Migration: The systematic movement of genes between populations of the same species, geographic race, or variety. [NIH]

Mitochondria: Parts of a cell where aerobic production (also known as cell respiration) takes place. [NIH]

Mitochondrial Swelling: Increase in volume of mitochondria due to an influx of fluid; it occurs in hypotonic solutions due to osmotic pressure and in isotonic solutions as a result of altered permeability of the membranes of respiring mitochondria. [NIH]

Modeling: A treatment procedure whereby the therapist presents the target behavior which the learner is to imitate and make part of his repertoire. [NIH]

Modification: A change in an organism, or in a process in an organism, that is acquired from its own activity or environment. [NIH]

Molecular: Of, pertaining to, or composed of molecules : a very small mass of matter. [EU]

Molecular Probes: A group of atoms or molecules attached to other molecules or cellular structures and used in studying the properties of these molecules and structures. Radioactive DNA or RNA sequences are used in molecular genetics to detect the presence of a complementary sequence by molecular hybridization. [NIH]

Molecular Structure: The location of the atoms, groups or ions relative to one another in a molecule, as well as the number, type and location of covalent bonds. [NIH]

Molecule: A chemical made up of two or more atoms. The atoms in a molecule can be the same (an oxygen molecule has two oxygen atoms) or different (a water molecule has two hydrogen atoms and one oxygen atom). Biological molecules, such as proteins and DNA, can be made up of many thousands of atoms. [NIH]

Monitor: An apparatus which automatically records such physiological signs as respiration, pulse, and blood pressure in an anesthetized patient or one undergoing surgical or other procedures. [NIH]

Monoclonal: An antibody produced by culturing a single type of cell. It therefore consists of a single species of immunoglobulin molecules. [NIH]

Monoclonal antibodies: Laboratory-produced substances that can locate and bind to cancer cells wherever they are in the body. Many monoclonal antibodies are used in cancer detection or therapy; each one recognizes a different protein on certain cancer cells.

Monoclonal antibodies can be used alone, or they can be used to deliver drugs, toxins, or radioactive material directly to a tumor. [NIH]

Morphological: Relating to the configuration or the structure of live organs. [NIH]

Morphology: The science of the form and structure of organisms (plants, animals, and other forms of life). [NIH]

Motility: The ability to move spontaneously. [EU]

Motion Sickness: Sickness caused by motion, as sea sickness, train sickness, car sickness, and air sickness. [NIH]

Mucociliary: Pertaining to or affecting the mucus membrane and hairs (including eyelashes, nose hair, .): mucociliary clearing: the clearance of mucus by ciliary movement (particularly in the respiratory system). [EU]

Mucosa: A mucous membrane, or tunica mucosa. [EU]

Mucositis: A complication of some cancer therapies in which the lining of the digestive system becomes inflamed. Often seen as sores in the mouth. [NIH]

Mucus: The viscous secretion of mucous membranes. It contains mucin, white blood cells, water, inorganic salts, and exfoliated cells. [NIH]

Multiple sclerosis: A disorder of the central nervous system marked by weakness, numbness, a loss of muscle coordination, and problems with vision, speech, and bladder control. Multiple sclerosis is thought to be an autoimmune disease in which the body's immune system destroys myelin. Myelin is a substance that contains both protein and fat (lipid) and serves as a nerve insulator and helps in the transmission of nerve signals. [NIH]

Muscle Fibers: Large single cells, either cylindrical or prismatic in shape, that form the basic unit of muscle tissue. They consist of a soft contractile substance enclosed in a tubular sheath. [NIH]

Muscle Hypertonia: Abnormal increase in skeletal or smooth muscle tone. Skeletal muscle hypertonicity may be associated with pyramidal tract lesions or basal ganglia diseases. [NIH]

Muscular Atrophy: Derangement in size and number of muscle fibers occurring with aging, reduction in blood supply, or following immobilization, prolonged weightlessness, malnutrition, and particularly in denervation. [NIH]

Myasthenia: Muscular debility; any constitutional anomaly of muscle. [EU]

Myelin: The fatty substance that covers and protects nerves. [NIH]

Myelogenous: Produced by, or originating in, the bone marrow. [NIH]

Myeloma: Cancer that arises in plasma cells, a type of white blood cell. [NIH]

Myocardial infarction: Gross necrosis of the myocardium as a result of interruption of the blood supply to the area; it is almost always caused by atherosclerosis of the coronary arteries, upon which coronary thrombosis is usually superimposed. [NIH]

Myocardial Ischemia: A disorder of cardiac function caused by insufficient blood flow to the muscle tissue of the heart. The decreased blood flow may be due to narrowing of the coronary arteries (coronary arteriosclerosis), to obstruction by a thrombus (coronary thrombosis), or less commonly, to diffuse narrowing of arterioles and other small vessels within the heart. Severe interruption of the blood supply to the myocardial tissue may result in necrosis of cardiac muscle (myocardial infarction). [NIH]

Myocardium: The muscle tissue of the heart composed of striated, involuntary muscle known as cardiac muscle. [NIH]

Nausea: An unpleasant sensation in the stomach usually accompanied by the urge to vomit.

Common causes are early pregnancy, sea and motion sickness, emotional stress, intense pain, food poisoning, and various enteroviruses. [NIH]

Neck Pain: Discomfort or more intense forms of pain that are localized to the cervical region. This term generally refers to pain in the posterior or lateral regions of the neck. [NIH]

Necrosis: A pathological process caused by the progressive degradative action of enzymes that is generally associated with severe cellular trauma. It is characterized by mitochondrial swelling, nuclear flocculation, uncontrolled cell lysis, and ultimately cell death. [NIH]

Neocortex: The largest portion of the cerebral cortex. It is composed of neurons arranged in six layers. [NIH]

Neoplasia: Abnormal and uncontrolled cell growth. [NIH]

Neoplasm: A new growth of benign or malignant tissue. [NIH]

Nephron: A tiny part of the kidneys. Each kidney is made up of about 1 million nephrons, which are the working units of the kidneys, removing wastes and extra fluids from the blood. [NIH]

Nephropathy: Disease of the kidneys. [EU]

Nerve Growth Factor: Nerve growth factor is the first of a series of neurotrophic factors that were found to influence the growth and differentiation of sympathetic and sensory neurons. It is comprised of alpha, beta, and gamma subunits. The beta subunit is responsible for its growth stimulating activity. [NIH]

Nervous System: The entire nerve apparatus composed of the brain, spinal cord, nerves and ganglia. [NIH]

Networks: Pertaining to a nerve or to the nerves, a meshlike structure of interlocking fibers or strands. [NIH]

Neural: 1. Pertaining to a nerve or to the nerves. 2. Situated in the region of the spinal axis, as the neutral arch. [EU]

Neuroblastoma: Cancer that arises in immature nerve cells and affects mostly infants and children. [NIH]

Neurodegenerative Diseases: Hereditary and sporadic conditions which are characterized by progressive nervous system dysfunction. These disorders are often associated with atrophy of the affected central or peripheral nervous system structures. [NIH]

Neuroendocrine: Having to do with the interactions between the nervous system and the endocrine system. Describes certain cells that release hormones into the blood in response to stimulation of the nervous system. [NIH]

Neurofibrillary Tangles: Abnormal structures located in various parts of the brain and composed of dense arrays of paired helical filaments (neurofilaments and microtubules). These double helical stacks of transverse subunits are twisted into left-handed ribbon-like filaments that likely incorporate the following proteins: (1) the intermediate filaments: medium- and high-molecular-weight neurofilaments; (2) the microtubule-associated proteins map-2 and tau; (3) actin; and (4) ubiquitin. As one of the hallmarks of Alzheimer disease, the neurofibrillary tangles eventually occupy the whole of the cytoplasm in certain classes of cell in the neocortex, hippocampus, brain stem, and diencephalon. The number of these tangles, as seen in post mortem histology, correlates with the degree of dementia during life. Some studies suggest that tangle antigens leak into the systemic circulation both in the course of normal aging and in cases of Alzheimer disease. [NIH]

Neurofilaments: Bundle of neuronal fibers. [NIH]

Neurogenic: Loss of bladder control caused by damage to the nerves controlling the

bladder. [NIH]

Neurologic: Having to do with nerves or the nervous system. [NIH]

Neurology: A medical specialty concerned with the study of the structures, functions, and diseases of the nervous system. [NIH]

Neuroma: A tumor that arises in nerve cells. [NIH]

Neuromuscular: Pertaining to muscles and nerves. [EU]

Neuromuscular Diseases: A general term encompassing lower motor neuron disease; peripheral nervous system diseases; and certain muscular diseases. Manifestations include muscle weakness; fasciculation; muscle atrophy; spasm; myokymia; muscle hypertonia, myalgias, and musclehypotonia. [NIH]

Neuronal: Pertaining to a neuron or neurons (= conducting cells of the nervous system). [EU]

Neurons: The basic cellular units of nervous tissue. Each neuron consists of a body, an axon, and dendrites. Their purpose is to receive, conduct, and transmit impulses in the nervous system. [NIH]

Neuropathy: A problem in any part of the nervous system except the brain and spinal cord. Neuropathies can be caused by infection, toxic substances, or disease. [NIH]

Neurophysiology: The scientific discipline concerned with the physiology of the nervous system. [NIH]

Neuropil: A dense intricate feltwork of interwoven fine glial processes, fibrils, synaptic terminals, axons, and dendrites interspersed among the nerve cells in the gray matter of the central nervous system. [NIH]

Neuropil Threads: Abnormal structures located chiefly in distal dendrites and, along with neurofibrillary tangles and senile plaques, constitute the three morphological hallmarks of Alzheimer disease. Neuropil threads are made up of straight and paired helical filaments which consist of abnormally phosphorylated microtubule-associated tau proteins. It has been suggested that the threads have a major role in the cognitive impairment seen in Alzheimer disease. [NIH]

Neurosurgery: A surgical specialty concerned with the treatment of diseases and disorders of the brain, spinal cord, and peripheral and sympathetic nervous system. [NIH]

Neutrons: Electrically neutral elementary particles found in all atomic nuclei except light hydrogen; the mass is equal to that of the proton and electron combined and they are unstable when isolated from the nucleus, undergoing beta decay. Slow, thermal, epithermal, and fast neutrons refer to the energy levels with which the neutrons are ejected from heavier nuclei during their decay. [NIH]

Nickel: A trace element with the atomic symbol Ni, atomic number 28, and atomic weight 58.69. It is a cofactor of the enzyme urease. [NIH]

Nitric Oxide: A free radical gas produced endogenously by a variety of mammalian cells. It is synthesized from arginine by a complex reaction, catalyzed by nitric oxide synthase. Nitric oxide is endothelium-derived relaxing factor. It is released by the vascular endothelium and mediates the relaxation induced by some vasodilators such as acetylcholine and bradykinin. It also inhibits platelet aggregation, induces disaggregation of aggregated platelets, and inhibits platelet adhesion to the vascular endothelium. Nitric oxide activates cytosolic guanylate cyclase and thus elevates intracellular levels of cyclic GMP. [NIH]

Nitrogen: An element with the atomic symbol N, atomic number 7, and atomic weight 14. Nitrogen exists as a diatomic gas and makes up about 78% of the earth's atmosphere by volume. It is a constituent of proteins and nucleic acids and found in all living cells. [NIH]

Non-small cell lung cancer: A group of lung cancers that includes squamous cell carcinoma, adenocarcinoma, and large cell carcinoma. [NIH]

Nuclear: A test of the structure, blood flow, and function of the kidneys. The doctor injects a mildly radioactive solution into an arm vein and uses x-rays to monitor its progress through the kidneys. [NIH]

Nuclear magnetic resonance imaging: NMRI. A procedure in which a magnet linked to a computer is used to create detailed pictures of areas inside the body. Also called magnetic resonance imaging (MRI). [NIH]

Nuclear Medicine: A specialty field of radiology concerned with diagnostic, therapeutic, and investigative use of radioactive compounds in a pharmaceutical form. [NIH]

Nuclear Proteins: Proteins found in the nucleus of a cell. Do not confuse with nucleoproteins which are proteins conjugated with nucleic acids, that are not necessarily present in the nucleus. [NIH]

Nuclei: A body of specialized protoplasm found in nearly all cells and containing the chromosomes. [NIH]

Nucleic acid: Either of two types of macromolecule (DNA or RNA) formed by polymerization of nucleotides. Nucleic acids are found in all living cells and contain the information (genetic code) for the transfer of genetic information from one generation to the next. [NIH]

Nucleoproteins: Proteins conjugated with nucleic acids. [NIH]

Nucleus: A body of specialized protoplasm found in nearly all cells and containing the chromosomes. [NIH]

Nulliparous: Having never given birth to a viable infant. [EU]

Obstetrics: A medical-surgical specialty concerned with management and care of women during pregnancy, parturition, and the puerperium. [NIH]

Occult: Obscure; concealed from observation, difficult to understand. [EU]

Ocular: 1. Of, pertaining to, or affecting the eye. 2. Eyepiece. [EU]

Odontogenic Cysts: Cysts found in the jaws and arising from epithelium involved in tooth formation. They include follicular cysts (e.g., primordial cyst, dentigerous cyst, multilocular cyst), lateral periodontal cysts, and radicular cysts. They may become keratinized (odontogenic keratocysts). Follicular cysts may give rise to ameloblastomas and, in rare cases, undergo malignant transformation. [NIH]

Odontogenic Tumors: Neoplasms produced from tooth-forming tissues. [NIH]

Olfaction: Function of the olfactory apparatus to perceive and discriminate between the molecules that reach it, in gas form from an external environment, directly or indirectly via the nose. [NIH]

Omentum: A fold of the peritoneum (the thin tissue that lines the abdomen) that surrounds the stomach and other organs in the abdomen. [NIH]

Oncologist: A doctor who specializes in treating cancer. Some oncologists specialize in a particular type of cancer treatment. For example, a radiation oncologist specializes in treating cancer with radiation. [NIH]

Oncology: The study of cancer. [NIH]

On-line: A sexually-reproducing population derived from a common parentage. [NIH]

Opalescent: Showing a milky iridescence, like an opal. [EU]

Ophthalmology: A surgical specialty concerned with the structure and function of the eye

and the medical and surgical treatment of its defects and diseases. [NIH]

Opportunistic Infections: An infection caused by an organism which becomes pathogenic under certain conditions, e.g., during immunosuppression. [NIH]

Orbit: One of the two cavities in the skull which contains an eyeball. Each eye is located in a bony socket or orbit. [NIH]

Orchiectomy: The surgical removal of one or both testicles. [NIH]

Organ Culture: The growth in aseptic culture of plant organs such as roots or shoots, beginning with organ primordia or segments and maintaining the characteristics of the organ. [NIH]

Organ Specificity: Restriction of a characteristic or response to a particular organ of the body; it usually refers to that property of the immune response which differentiates one organ from another on the basis of antigen recognition, but the concept is not limited to immunology. [NIH]

Osmosis: Tendency of fluids (e.g., water) to move from the less concentrated to the more concentrated side of a semipermeable membrane. [NIH]

Osmotic: Pertaining to or of the nature of osmosis (= the passage of pure solvent from a solution of lesser to one of greater solute concentration when the two solutions are separated by a membrane which selectively prevents the passage of solute molecules, but is permeable to the solvent). [EU]

Ossicles: The hammer, anvil and stirrup, the small bones of the middle ear, which transmit the vibrations from the tympanic membrane to the oval window. [NIH]

Osteoarthritis: A progressive, degenerative joint disease, the most common form of arthritis, especially in older persons. The disease is thought to result not from the aging process but from biochemical changes and biomechanical stresses affecting articular cartilage. In the foreign literature it is often called osteoarthrosis deformans. [NIH]

Osteomyelitis: Inflammation of bone caused by a pyogenic organism. It may remain localized or may spread through the bone to involve the marrow, cortex, cancellous tissue, and periosteum. [EU]

Osteoporosis: Reduction of bone mass without alteration in the composition of bone, leading to fractures. Primary osteoporosis can be of two major types: postmenopausal osteoporosis and age-related (or senile) osteoporosis. [NIH]

Osteoradionecrosis: Necrosis of bone following radiation injury. [NIH]

Otolaryngology: A surgical specialty concerned with the study and treatment of disorders of the ear, nose, and throat. [NIH]

Outpatient: A patient who is not an inmate of a hospital but receives diagnosis or treatment in a clinic or dispensary connected with the hospital. [NIH]

Ovary: Either of the paired glands in the female that produce the female germ cells and secrete some of the female sex hormones. [NIH]

Oxidation: The act of oxidizing or state of being oxidized. Chemically it consists in the increase of positive charges on an atom or the loss of negative charges. Most biological oxidations are accomplished by the removal of a pair of hydrogen atoms (dehydrogenation) from a molecule. Such oxidations must be accompanied by reduction of an acceptor molecule. Univalent o. indicates loss of one electron; divalent o., the loss of two electrons. [EU]

Oxidative metabolism: A chemical process in which oxygen is used to make energy from carbohydrates (sugars). Also known as aerobic respiration, cell respiration, or aerobic

metabolism. [NIH]

Oximetry: The determination of oxygen-hemoglobin saturation of blood either by withdrawing a sample and passing it through a classical photoelectric oximeter or by electrodes attached to some translucent part of the body like finger, earlobe, or skin fold. It includes non-invasive oxygen monitoring by pulse oximetry. [NIH]

Oxygen Consumption: The oxygen consumption is determined by calculating the difference between the amount of oxygen inhaled and exhaled. [NIH]

Palliative: 1. Affording relief, but not cure. 2. An alleviating medicine. [EU]

Palpation: Application of fingers with light pressure to the surface of the body to determine consistence of parts beneath in physical diagnosis; includes palpation for determining the outlines of organs. [NIH]

Pancreas: A mixed exocrine and endocrine gland situated transversely across the posterior abdominal wall in the epigastric and hypochondriac regions. The endocrine portion is comprised of the Islets of Langerhans, while the exocrine portion is a compound acinar gland that secretes digestive enzymes. [NIH]

Pancreatic: Having to do with the pancreas. [NIH]

Pancreatic cancer: Cancer of the pancreas, a salivary gland of the abdomen. [NIH]

Pancreatic Juice: The fluid containing digestive enzymes secreted by the pancreas in response to food in the duodenum. [NIH]

Pancreatitis: Acute or chronic inflammation of the pancreas, which may be asymptomatic or symptomatic, and which is due to autodigestion of a pancreatic tissue by its own enzymes. It is caused most often by alcoholism or biliary tract disease; less commonly it may be associated with hyperlipaemia, hyperparathyroidism, abdominal trauma (accidental or operative injury), vasculitis, or uraemia. [EU]

Paralysis: Loss of ability to move all or part of the body. [NIH]

Paranasal Sinuses: Air-filled extensions of the respiratory part of the nasal cavity into the frontal, ethmoid, sphenoid, and maxillary cranial bones. They vary in size and form in different individuals and are lined by the ciliated mucous membranes of the nasal cavity. [NIH]

Parasite: An animal or a plant that lives on or in an organism of another species and gets at least some of its nutrition from that other organism. [NIH]

Parasitic: Having to do with or being a parasite. A parasite is an animal or a plant that lives on or in an organism of another species and gets at least some of its nutrients from it. [NIH]

Parathyroid: 1. Situated beside the thyroid gland. 2. One of the parathyroid glands. 3. A sterile preparation of the water-soluble principle(s) of the parathyroid glands, ad-ministered parenterally as an antihypocalcaemic, especially in the treatment of acute hypoparathyroidism with tetany. [EU]

Parathyroid Glands: Two small paired endocrine glands in the region of the thyroid gland. They secrete parathyroid hormone and are concerned with the metabolism of calcium and phosphorus. [NIH]

Parenteral: Not through the alimentary canal but rather by injection through some other route, as subcutaneous, intramuscular, intraorbital, intracapsular, intraspinal, intrasternal, intravenous, etc. [EU]

Parenteral Nutrition: The administering of nutrients for assimilation and utilization by a patient who cannot maintain adequate nutrition by enteral feeding alone. Nutrients are administered by a route other than the alimentary canal (e.g., intravenously,

subcutaneously). [NIH]

Parietal: 1. Of or pertaining to the walls of a cavity. 2. Pertaining to or located near the parietal bone, as the parietal lobe. [EU]

Parietal Lobe: Upper central part of the cerebral hemisphere. [NIH]

Parotid: The space that contains the parotid gland, the facial nerve, the external carotid artery, and the retromandibular vein. [NIH]

Particle: A tiny mass of material. [EU]

Parturition: The act or process of given birth to a child. [EU]

Patch: A piece of material used to cover or protect a wound, an injured part, etc.: a patch over the eye. [NIH]

Pathogen: Any disease-producing microorganism. [EU]

Pathologic: 1. Indicative of or caused by a morbid condition. 2. Pertaining to pathology (= branch of medicine that treats the essential nature of the disease, especially the structural and functional changes in tissues and organs of the body caused by the disease). [EU]

Pathologic Processes: The abnormal mechanisms and forms involved in the dysfunctions of tissues and organs. [NIH]

Pathologies: The study of abnormality, especially the study of diseases. [NIH]

Pathophysiology: Altered functions in an individual or an organ due to disease. [NIH]

Patient Education: The teaching or training of patients concerning their own health needs. [NIH]

Pelvic: Pertaining to the pelvis. [EU]

Pelvis: The lower part of the abdomen, located between the hip bones. [NIH]

Peptide: Any compound consisting of two or more amino acids, the building blocks of proteins. Peptides are combined to make proteins. [NIH]

Perception: The ability quickly and accurately to recognize similarities and differences among presented objects, whether these be pairs of words, pairs of number series, or multiple sets of these or other symbols such as geometric figures. [NIH]

Percutaneous: Performed through the skin, as injection of radiopacque material in radiological examination, or the removal of tissue for biopsy accomplished by a needle. [EU]

Perfusion: Bathing an organ or tissue with a fluid. In regional perfusion, a specific area of the body (usually an arm or a leg) receives high doses of anticancer drugs through a blood vessel. Such a procedure is performed to treat cancer that has not spread. [NIH]

Pericardium: The fibroserous sac surrounding the heart and the roots of the great vessels. [NIH]

Perineal: Pertaining to the perineum. [EU]

Periodicity: The tendency of a phenomenon to recur at regular intervals; in biological systems, the recurrence of certain activities (including hormonal, cellular, neural) may be annual, seasonal, monthly, daily, or more frequently (ultradian). [NIH]

Periodontal Cyst: An epithelium-lined sac containing fluid; usually found at the apex of a pulp-involved tooth. The lateral type occurs less frequently along the side of the root. [NIH]

Perioperative: Around the time of surgery; usually lasts from the time of going into the hospital or doctor's office for surgery until the time the patient goes home. [NIH]

Peripheral Nervous System: The nervous system outside of the brain and spinal cord. The peripheral nervous system has autonomic and somatic divisions. The autonomic nervous

system includes the enteric, parasympathetic, and sympathetic subdivisions. The somatic nervous system includes the cranial and spinal nerves and their ganglia and the peripheral sensory receptors. [NIH]

Peripheral Nervous System Diseases: Diseases of the peripheral nerves external to the brain and spinal cord, which includes diseases of the nerve roots, ganglia, plexi, autonomic nerves, sensory nerves, and motor nerves. [NIH]

Petechiae: Pinpoint, unraised, round red spots under the skin caused by bleeding. [NIH]

PH: The symbol relating the hydrogen ion (H+) concentration or activity of a solution to that of a given standard solution. Numerically the pH is approximately equal to the negative logarithm of H+ concentration expressed in molarity. pH 7 is neutral; above it alkalinity increases and below it acidity increases. [EU]

Phantom: Used to absorb and/or scatter radiation equivalently to a patient, and hence to estimate radiation doses and test imaging systems without actually exposing a patient. It may be an anthropomorphic or a physical test object. [NIH]

Pharmacodynamic: Is concerned with the response of living tissues to chemical stimuli, that is, the action of drugs on the living organism in the absence of disease. [NIH]

Pharmacokinetic: The mathematical analysis of the time courses of absorption, distribution, and elimination of drugs. [NIH]

Pharmacologic: Pertaining to pharmacology or to the properties and reactions of drugs. [EU]

Pharmacotherapy: A regimen of using appetite suppressant medications to manage obesity by decreasing appetite or increasing the feeling of satiety. These medications decrease appetite by increasing serotonin or catecholamine—two brain chemicals that affect mood and appetite. [NIH]

Pharynx: The hollow tube about 5 inches long that starts behind the nose and ends at the top of the trachea (windpipe) and esophagus (the tube that goes to the stomach). [NIH]

Phospholipids: Lipids containing one or more phosphate groups, particularly those derived from either glycerol (phosphoglycerides; glycerophospholipids) or sphingosine (sphingolipids). They are polar lipids that are of great importance for the structure and function of cell membranes and are the most abundant of membrane lipids, although not stored in large amounts in the system. [NIH]

Phosphorus: A non-metallic element that is found in the blood, muscles, nevers, bones, and teeth, and is a component of adenosine triphosphate (ATP; the primary energy source for the body's cells.) [NIH]

Phosphorylated: Attached to a phosphate group. [NIH]

Phosphorylation: The introduction of a phosphoryl group into a compound through the formation of an ester bond between the compound and a phosphorus moiety. [NIH]

Photophobia: Abnormal sensitivity to light. This may occur as a manifestation of eye diseases; migraine; subarachnoid hemorrhage; meningitis; and other disorders. Photophobia may also occur in association with depression and other mental disorders. [NIH]

Physical Examination: Systematic and thorough inspection of the patient for physical signs of disease or abnormality. [NIH]

Physicochemical: Pertaining to physics and chemistry. [EU]

Physiologic: Having to do with the functions of the body. When used in the phrase "physiologic age," it refers to an age assigned by general health, as opposed to calendar age. [NIH]

Physiology: The science that deals with the life processes and functions of organismus, their

cells, tissues, and organs. [NIH]

Pigment: A substance that gives color to tissue. Pigments are responsible for the color of skin, eyes, and hair. [NIH]

Pineal Body: A small conical midline body attached to the posterior part of the third ventricle and lying between the superior colliculi, below the splenium of the corpus callosum. [NIH]

Pineal gland: A tiny organ located in the cerebrum that produces melatonin. Also called pineal body or pineal organ. [NIH]

Plants: Multicellular, eukaryotic life forms of the kingdom Plantae. They are characterized by a mainly photosynthetic mode of nutrition; essentially unlimited growth at localized regions of cell divisions (meristems); cellulose within cells providing rigidity; the absence of organs of locomotion; absense of nervous and sensory systems; and an alteration of haploid and diploid generations. [NIH]

Plaque: A clear zone in a bacterial culture grown on an agar plate caused by localized destruction of bacterial cells by a bacteriophage. The concentration of infective virus in a fluid can be estimated by applying the fluid to a culture and counting the number of. [NIH]

Plasma: The clear, yellowish, fluid part of the blood that carries the blood cells. The proteins that form blood clots are in plasma. [NIH]

Plasma cells: A type of white blood cell that produces antibodies. [NIH]

Plasma protein: One of the hundreds of different proteins present in blood plasma, including carrier proteins (such albumin, transferrin, and haptoglobin), fibrinogen and other coagulation factors, complement components, immunoglobulins, enzyme inhibitors, precursors of substances such as angiotension and bradykinin, and many other types of proteins. [EU]

Plasma Volume: Volume of plasma in the circulation. It is usually measured by indicator dilution techniques. [NIH]

Plasmids: Any extrachromosomal hereditary determinant. Plasmids are self-replicating circular molecules of DNA that are found in a variety of bacterial, archaeal, fungal, algal, and plant species. [NIH]

Platelet Aggregation: The attachment of platelets to one another. This clumping together can be induced by a number of agents (e.g., thrombin, collagen) and is part of the mechanism leading to the formation of a thrombus. [NIH]

Platelets: A type of blood cell that helps prevent bleeding by causing blood clots to form. Also called thrombocytes. [NIH]

Plethysmography: Recording of change in the size of a part as modified by the circulation in it. [NIH]

Pneumonia: Inflammation of the lungs. [NIH]

Poisoning: A condition or physical state produced by the ingestion, injection or inhalation of, or exposure to a deleterious agent. [NIH]

Polymers: Compounds formed by the joining of smaller, usually repeating, units linked by covalent bonds. These compounds often form large macromolecules (e.g., polypeptides, proteins, plastics). [NIH]

Polypeptide: A peptide which on hydrolysis yields more than two amino acids; called tripeptides, tetrapeptides, etc. according to the number of amino acids contained. [EU]

Polyposis: The development of numerous polyps (growths that protrude from a mucous membrane). [NIH]

Polysaccharide: A type of carbohydrate. It contains sugar molecules that are linked together chemically. [NIH]

Pons: The part of the central nervous system lying between the medulla oblongata and the mesencephalon, ventral to the cerebellum, and consisting of a pars dorsalis and a pars ventralis. [NIH]

Posterior: Situated in back of, or in the back part of, or affecting the back or dorsal surface of the body. In lower animals, it refers to the caudal end of the body. [EU]

Postmenopausal: Refers to the time after menopause. Menopause is the time in a woman's life when menstrual periods stop permanently; also called "change of life." [NIH]

Postoperative: After surgery. [NIH]

Practicability: A non-standard characteristic of an analytical procedure. It is dependent on the scope of the method and is determined by requirements such as sample throughout and costs. [NIH]

Practice Guidelines: Directions or principles presenting current or future rules of policy for the health care practitioner to assist him in patient care decisions regarding diagnosis, therapy, or related clinical circumstances. The guidelines may be developed by government agencies at any level, institutions, professional societies, governing boards, or by the convening of expert panels. The guidelines form a basis for the evaluation of all aspects of health care and delivery. [NIH]

Precipitation: The act or process of precipitating. [EU]

Preclinical: Before a disease becomes clinically recognizable. [EU]

Precursor: Something that precedes. In biological processes, a substance from which another, usually more active or mature substance is formed. In clinical medicine, a sign or symptom that heralds another. [EU]

Prednisolone: A glucocorticoid with the general properties of the corticosteroids. It is the drug of choice for all conditions in which routine systemic corticosteroid therapy is indicated, except adrenal deficiency states. [NIH]

Preeclampsia: A toxaemia of late pregnancy characterized by hypertension, edema, and proteinuria, when convulsions and coma are associated, it is called eclampsia. [EU]

Prefrontal Cortex: The rostral part of the frontal lobe, bounded by the inferior precentral fissure in humans, which receives projection fibers from the mediodorsal nucleus of the thalamus. The prefrontal cortex receives afferent fibers from numerous structures of the diencephalon, mesencephalon, and limbic system as well as cortical afferents of visual, auditory, and somatic origin. [NIH]

Prenatal: Existing or occurring before birth, with reference to the fetus. [EU]

Preoperative: Preceding an operation. [EU]

Prevalence: The total number of cases of a given disease in a specified population at a designated time. It is differentiated from incidence, which refers to the number of new cases in the population at a given time. [NIH]

Primary Biliary Cirrhosis: A chronic liver disease. Slowly destroys the bile ducts in the liver. This prevents release of bile. Long-term irritation of the liver may cause scarring and cirrhosis in later stages of the disease. [NIH]

Probe: An instrument used in exploring cavities, or in the detection and dilatation of strictures, or in demonstrating the potency of channels; an elongated instrument for exploring or sounding body cavities. [NIH]

Prodrug: A substance that gives rise to a pharmacologically active metabolite, although not

itself active (i. e. an inactive precursor). [NIH]

Progeny: The offspring produced in any generation. [NIH]

Progestogen: A term applied to any substance possessing progestational activity. [EU]

Progression: Increase in the size of a tumor or spread of cancer in the body. [NIH]

Progressive: Advancing; going forward; going from bad to worse; increasing in scope or severity. [EU]

Projection: A defense mechanism, operating unconsciously, whereby that which is emotionally unacceptable in the self is rejected and attributed (projected) to others. [NIH]

Proline: A non-essential amino acid that is synthesized from glutamic acid. It is an essential component of collagen and is important for proper functioning of joints and tendons. [NIH]

Prone: Having the front portion of the body downwards. [NIH]

Prophylaxis: An attempt to prevent disease. [NIH]

Propofol: A widely used anesthetic. [NIH]

Prospective study: An epidemiologic study in which a group of individuals (a cohort), all free of a particular disease and varying in their exposure to a possible risk factor, is followed over a specific amount of time to determine the incidence rates of the disease in the exposed and unexposed groups. [NIH]

Prostate: A gland in males that surrounds the neck of the bladder and the urethra. It secretes a substance that liquifies coagulated semen. It is situated in the pelvic cavity behind the lower part of the pubic symphysis, above the deep layer of the triangular ligament, and rests upon the rectum. [NIH]

Prostate gland: A gland in the male reproductive system just below the bladder. It surrounds part of the urethra, the canal that empties the bladder, and produces a fluid that forms part of semen. [NIH]

Prostatectomy: Complete or partial surgical removal of the prostate. Three primary approaches are commonly employed: suprapubic - removal through an incision above the pubis and through the urinary bladder; retropubic - as for suprapubic but without entering the urinary bladder; and transurethral (transurethral resection of prostate). [NIH]

Prostatic Hyperplasia: Enlargement or overgrowth of the prostate gland as a result of an increase in the number of its constituent cells. [NIH]

Protein C: A vitamin-K dependent zymogen present in the blood, which, upon activation by thrombin and thrombomodulin exerts anticoagulant properties by inactivating factors Va and VIIIa at the rate-limiting steps of thrombin formation. [NIH]

Protein S: The vitamin K-dependent cofactor of activated protein C. Together with protein C, it inhibits the action of factors VIIIa and Va. A deficiency in protein S can lead to recurrent venous and arterial thrombosis. [NIH]

Proteins: Polymers of amino acids linked by peptide bonds. The specific sequence of amino acids determines the shape and function of the protein. [NIH]

Proteinuria: The presence of protein in the urine, indicating that the kidneys are not working properly. [NIH]

Proteoglycan: A molecule that contains both protein and glycosaminoglycans, which are a type of polysaccharide. Proteoglycans are found in cartilage and other connective tissues. [NIH]

Proteolytic: 1. Pertaining to, characterized by, or promoting proteolysis. 2. An enzyme that promotes proteolysis (= the splitting of proteins by hydrolysis of the peptide bonds with

formation of smaller polypeptides). [EU]

Protocol: The detailed plan for a clinical trial that states the trial's rationale, purpose, drug or vaccine dosages, length of study, routes of administration, who may participate, and other aspects of trial design. [NIH]

Protons: Stable elementary particles having the smallest known positive charge, found in the nuclei of all elements. The proton mass is less than that of a neutron. A proton is the nucleus of the light hydrogen atom, i.e., the hydrogen ion. [NIH]

Protozoa: A subkingdom consisting of unicellular organisms that are the simplest in the animal kingdom. Most are free living. They range in size from submicroscopic to macroscopic. Protozoa are divided into seven phyla: Sarcomastigophora, Labyrinthomorpha, Apicomplexa, Microspora, Ascetospora, Myxozoa, and Ciliophora. [NIH]

Protozoan: 1. Any individual of the protozoa; protozoon. 2. Of or pertaining to the protozoa; protozoal. [EU]

Proximal: Nearest; closer to any point of reference; opposed to distal. [EU]

Pseudocysts: A collection of enzyme-rich pancreatic fluid and tissue debris arising within areas of necrosis or an obstructed smaller duct. [NIH]

Psychiatric: Pertaining to or within the purview of psychiatry. [EU]

Psychiatry: The medical science that deals with the origin, diagnosis, prevention, and treatment of mental disorders. [NIH]

Psychic: Pertaining to the psyche or to the mind; mental. [EU]

Psychology: The science dealing with the study of mental processes and behavior in man and animals. [NIH]

Public Health: Branch of medicine concerned with the prevention and control of disease and disability, and the promotion of physical and mental health of the population on the international, national, state, or municipal level. [NIH]

Public Policy: A course or method of action selected, usually by a government, from among alternatives to guide and determine present and future decisions. [NIH]

Publishing: "The business or profession of the commercial production and issuance of literature" (Webster's 3d). It includes the publisher, publication processes, editing and editors. Production may be by conventional printing methods or by electronic publishing. [NIH]

Puerperium: Period from delivery of the placenta until return of the reproductive organs to their normal nonpregnant morphologic state. In humans, the puerperium generally lasts for six to eight weeks. [NIH]

Pulmonary: Relating to the lungs. [NIH]

Pulmonary Artery: The short wide vessel arising from the conus arteriosus of the right ventricle and conveying unaerated blood to the lungs. [NIH]

Pulmonary Embolism: Embolism in the pulmonary artery or one of its branches. [NIH]

Pulse: The rhythmical expansion and contraction of an artery produced by waves of pressure caused by the ejection of blood from the left ventricle of the heart as it contracts. [NIH]

Pupil: The aperture in the iris through which light passes. [NIH]

Purpura: Purplish or brownish red discoloration, easily visible through the epidermis, caused by hemorrhage into the tissues. [NIH]

Pyogenic: Producing pus; pyopoietic (= liquid inflammation product made up of cells and a

thin fluid called liquor puris). [EU]

Race: A population within a species which exhibits general similarities within itself, but is both discontinuous and distinct from other populations of that species, though not sufficiently so as to achieve the status of a taxon. [NIH]

Radiation: Emission or propagation of electromagnetic energy (waves/rays), or the waves/rays themselves; a stream of electromagnetic particles (electrons, neutrons, protons, alpha particles) or a mixture of these. The most common source is the sun. [NIH]

Radiation oncologist: A doctor who specializes in using radiation to treat cancer. [NIH]

Radiation therapy: The use of high-energy radiation from x-rays, gamma rays, neutrons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or it may come from radioactive material placed in the body in the area near cancer cells (internal radiation therapy, implant radiation, or brachytherapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. Also called radiotherapy. [NIH]

Radical prostatectomy: Surgery to remove the entire prostate. The two types of radical prostatectomy are retropubic prostatectomy and perineal prostatectomy. [NIH]

Radicular Cyst: Slow-growing fluid-filled epithelial sac at the apex of a tooth with a nonvital pulp or defective root canal filling. [NIH]

Radiculopathy: Disease involving a spinal nerve root (see spinal nerve roots) which may result from compression related to intervertebral disk displacement; spinal cord injuries; spinal diseases; and other conditions. Clinical manifestations include radicular pain, weakness, and sensory loss referable to structures innervated by the involved nerve root. [NIH]

Radioactive: Giving off radiation. [NIH]

Radioactive iodine: A radioactive form of the chemical element iodine, often used for imaging tests or as a treatment for cancer. [NIH]

Radioactivity: The quality of emitting or the emission of corpuscular or electromagnetic radiations consequent to nuclear disintegration, a natural property of all chemical elements of atomic number above 83, and possible of induction in all other known elements. [EU]

Radiography: Examination of any part of the body for diagnostic purposes by means of roentgen rays, recording the image on a sensitized surface (such as photographic film). [NIH]

Radioimmunotherapy: Radiotherapy where cytotoxic radionuclides are linked to antibodies in order to deliver toxins directly to tumor targets. Therapy with targeted radiation rather than antibody-targeted toxins (immunotoxins) has the advantage that adjacent tumor cells, which lack the appropriate antigenic determinants, can be destroyed by radiation cross-fire. Radioimmunotherapy is sometimes called targeted radiotherapy, but this latter term can also refer to radionuclides linked to non-immune molecules (radiotherapy). [NIH]

Radioisotope: An unstable element that releases radiation as it breaks down. Radioisotopes can be used in imaging tests or as a treatment for cancer. [NIH]

Radiolabeled: Any compound that has been joined with a radioactive substance. [NIH]

Radiological: Pertaining to radiodiagnostic and radiotherapeutic procedures, and interventional radiology or other planning and guiding medical radiology. [NIH]

Radiologist: A doctor who specializes in creating and interpreting pictures of areas inside the body. The pictures are produced with x-rays, sound waves, or other types of energy. [NIH]

Radiology: A specialty concerned with the use of x-ray and other forms of radiant energy in

the diagnosis and treatment of disease. [NIH]

Radiolucent: Partly or wholly permeable to X-rays or other forms of radiation contrasted with radiopaque. [NIH]

Radionuclide Ventriculography: Imaging of a ventricle of the heart after the injection of a radioactive contrast medium. The technique is less invasive than cardiac catheterization and is used to assess ventricular function. [NIH]

Radiopharmaceutical: Any medicinal product which, when ready for use, contains one or more radionuclides (radioactive isotopes) included for a medicinal purpose. [NIH]

Radiotherapy: The use of ionizing radiation to treat malignant neoplasms and other benign conditions. The most common forms of ionizing radiation used as therapy are x-rays, gamma rays, and electrons. A special form of radiotherapy, targeted radiotherapy, links a cytotoxic radionuclide to a molecule that targets the tumor. When this molecule is an antibody or other immunologic molecule, the technique is called radioimmunotherapy. [NIH]

Randomized: Describes an experiment or clinical trial in which animal or human subjects are assigned by chance to separate groups that compare different treatments. [NIH]

Receptor: A molecule inside or on the surface of a cell that binds to a specific substance and causes a specific physiologic effect in the cell. [NIH]

Receptors, Serotonin: Cell-surface proteins that bind serotonin and trigger intracellular changes which influence the behavior of cells. Several types of serotonin receptors have been recognized which differ in their pharmacology, molecular biology, and mode of action. [NIH]

Recombinant: A cell or an individual with a new combination of genes not found together in either parent; usually applied to linked genes. [EU]

Recombination: The formation of new combinations of genes as a result of segregation in crosses between genetically different parents; also the rearrangement of linked genes due to crossing-over. [NIH]

Rectal: By or having to do with the rectum. The rectum is the last 8 to 10 inches of the large intestine and ends at the anus. [NIH]

Rectum: The last 8 to 10 inches of the large intestine. [NIH]

Recur: To occur again. Recurrence is the return of cancer, at the same site as the original (primary) tumor or in another location, after the tumor had disappeared. [NIH]

Recurrence: The return of a sign, symptom, or disease after a remission. [NIH]

Red Nucleus: A pinkish-yellow portion of the midbrain situated in the rostral mesencephalic tegmentum. It receives a large projection from the contralateral half of the cerebellum via the superior cerebellar peduncle and a projection from the ipsilateral motor cortex. [NIH]

Refer: To send or direct for treatment, aid, information, de decision. [NIH]

Reference point: The midpoint of a line connecting the centers of the two end faces of the acoustic test fixture. [NIH]

Reflex: An involuntary movement or exercise of function in a part, excited in response to a stimulus applied to the periphery and transmitted to the brain or spinal cord. [NIH]

Reflux: The term used when liquid backs up into the esophagus from the stomach. [NIH]

Refraction: A test to determine the best eyeglasses or contact lenses to correct a refractive error (myopia, hyperopia, or astigmatism). [NIH]

Regimen: A treatment plan that specifies the dosage, the schedule, and the duration of treatment. [NIH]

Regurgitation: A backward flowing, as the casting up of undigested food, or the backward flowing of blood into the heart, or between the chambers of the heart when a valve is incompetent. [EU]

Reliability: Used technically, in a statistical sense, of consistency of a test with itself, i. e. the extent to which we can assume that it will yield the same result if repeated a second time. [NIH]

Remission: A decrease in or disappearance of signs and symptoms of cancer. In partial remission, some, but not all, signs and symptoms of cancer have disappeared. In complete remission, all signs and symptoms of cancer have disappeared, although there still may be cancer in the body. [NIH]

Renal Artery: A branch of the abdominal aorta which supplies the kidneys, adrenal glands and ureters. [NIH]

Renal cell carcinoma: A type of kidney cancer. [NIH]

Renal pelvis: The area at the center of the kidney. Urine collects here and is funneled into the ureter, the tube that connects the kidney to the bladder. [NIH]

Renin: An enzyme which is secreted by the kidney and is formed from prorenin in plasma and kidney. The enzyme cleaves the Leu-Leu bond in angiotensinogen to generate angiotensin I. EC 3.4.23.15. (Formerly EC 3.4.99.19). [NIH]

Renin-Angiotensin System: A system consisting of renin, angiotensin-converting enzyme, and angiotensin II. Renin, an enzyme produced in the kidney, acts on angiotensinogen, an alpha-2 globulin produced by the liver, forming angiotensin I. The converting enzyme contained in the lung acts on angiotensin I in the plasma converting it to angiotensin II, the most powerful directly pressor substance known. It causes contraction of the arteriolar smooth muscle and has other indirect actions mediated through the adrenal cortex. [NIH]

Renovascular: Of or pertaining to the blood vessels of the kidneys. [EU]

Resection: Removal of tissue or part or all of an organ by surgery. [NIH]

Residual disease: Cancer cells that remain after attempts have been made to remove the cancer. [NIH]

Respiration: The act of breathing with the lungs, consisting of inspiration, or the taking into the lungs of the ambient air, and of expiration, or the expelling of the modified air which contains more carbon dioxide than the air taken in (Blakiston's Gould Medical Dictionary, 4th ed.). This does not include tissue respiration (= oxygen consumption) or cell respiration (= cell respiration). [NIH]

Resuscitation: The restoration to life or consciousness of one apparently dead; it includes such measures as artificial respiration and cardiac massage. [EU]

Retina: The ten-layered nervous tissue membrane of the eye. It is continuous with the optic nerve and receives images of external objects and transmits visual impulses to the brain. Its outer surface is in contact with the choroid and the inner surface with the vitreous body. The outer-most layer is pigmented, whereas the inner nine layers are transparent. [NIH]

Retinoids: Derivatives of vitamin A. Used clinically in the treatment of severe cystic acne, psoriasis, and other disorders of keratinization. Their possible use in the prophylaxis and treatment of cancer is being actively explored. [NIH]

Retreatment: The therapy of the same disease in a patient, with the same agent or procedure repeated after initial treatment, or with an additional or alternate measure or follow-up. It does not include therapy which requires more than one administration of a therapeutic agent or regimen. Retreatment is often used with reference to a different modality when the original one was inadequate, harmful, or unsuccessful. [NIH]

Retrograde: 1. Moving backward or against the usual direction of flow. 2. Degenerating, deteriorating, or catabolic. [EU]

Retroperitoneal: Having to do with the area outside or behind the peritoneum (the tissue that lines the abdominal wall and covers most of the organs in the abdomen). [NIH]

Retropubic: A potential space between the urinary bladder and the symphisis and body of the pubis. [NIH]

Retropubic prostatectomy: Surgery to remove the prostate through an incision made in the abdominal wall. [NIH]

Retrospective: Looking back at events that have already taken place. [NIH]

Retrospective study: A study that looks backward in time, usually using medical records and interviews with patients who already have or had a disease. [NIH]

Rhabdomyosarcoma: A malignant tumor of muscle tissue. [NIH]

Rheumatic Diseases: Disorders of connective tissue, especially the joints and related structures, characterized by inflammation, degeneration, or metabolic derangement. [NIH]

Rheumatoid: Resembling rheumatism. [EU]

Rheumatoid arthritis: A form of arthritis, the cause of which is unknown, although infection, hypersensitivity, hormone imbalance and psychologic stress have been suggested as possible causes. [NIH]

Ribosome: A granule of protein and RNA, synthesized in the nucleolus and found in the cytoplasm of cells. Ribosomes are the main sites of protein synthesis. Messenger RNA attaches to them and there receives molecules of transfer RNA bearing amino acids. [NIH]

Risk factor: A habit, trait, condition, or genetic alteration that increases a person's chance of developing a disease. [NIH]

Saliva: The clear, viscous fluid secreted by the salivary glands and mucous glands of the mouth. It contains mucins, water, organic salts, and ptylin. [NIH]

Salivary: The duct that convey saliva to the mouth. [NIH]

Salivary Gland Calculi: Calculi occurring in a salivary gland. Most salivary gland calculi occur in the submandibular gland, but can also occur in the parotid gland and in the sublingual and minor salivary glands. [NIH]

Salivary glands: Glands in the mouth that produce saliva. [NIH]

Scans: Pictures of structures inside the body. Scans often used in diagnosing, staging, and monitoring disease include liver scans, bone scans, and computed tomography (CT) or computerized axial tomography (CAT) scans and magnetic resonance imaging (MRI) scans. In liver scanning and bone scanning, radioactive substances that are injected into the bloodstream collect in these organs. A scanner that detects the radiation is used to create pictures. In CT scanning, an x-ray machine linked to a computer is used to produce detailed pictures of organs inside the body. MRI scans use a large magnet connected to a computer to create pictures of areas inside the body. [NIH]

Scatter: The extent to which relative success and failure are divergently manifested in qualitatively different tests. [NIH]

Sciatica: A condition characterized by pain radiating from the back into the buttock and posterior/lateral aspects of the leg. Sciatica may be a manifestation of sciatic neuropathy; radiculopathy (involving the L4, L5, S1 or S2 spinal nerve roots; often associated with intervertebral disk displacement); or lesions of the cauda equina. [NIH]

Sclerosis: A pathological process consisting of hardening or fibrosis of an anatomical structure, often a vessel or a nerve. [NIH]

Screening: Checking for disease when there are no symptoms. [NIH]

Secondary tumor: Cancer that has spread from the organ in which it first appeared to another organ. For example, breast cancer cells may spread (metastasize) to the lungs and cause the growth of a new tumor. When this happens, the disease is called metastatic breast cancer, and the tumor in the lungs is called a secondary tumor. Also called secondary cancer. [NIH]

Sedimentation: The act of causing the deposit of sediment, especially by the use of a centrifugal machine. [EU]

Segmental: Describing or pertaining to a structure which is repeated in similar form in successive segments of an organism, or which is undergoing segmentation. [NIH]

Segmental mastectomy: The removal of the cancer as well as some of the breast tissue around the tumor and the lining over the chest muscles below the tumor. Usually some of the lymph nodes under the arm are also taken out. Sometimes called partial mastectomy. [NIH]

Segmentation: The process by which muscles in the intestines move food and wastes through the body. [NIH]

Seizures: Clinical or subclinical disturbances of cortical function due to a sudden, abnormal, excessive, and disorganized discharge of brain cells. Clinical manifestations include abnormal motor, sensory and psychic phenomena. Recurrent seizures are usually referred to as epilepsy or "seizure disorder." [NIH]

Selective estrogen receptor modulator: SERM. A drug that acts like estrogen on some tissues, but blocks the effect of estrogen on other tissues. Tamoxifen and raloxifene are SERMs. [NIH]

Semen: The thick, yellowish-white, viscid fluid secretion of male reproductive organs discharged upon ejaculation. In addition to reproductive organ secretions, it contains spermatozoa and their nutrient plasma. [NIH]

Senile: Relating or belonging to old age; characteristic of old age; resulting from infirmity of old age. [NIH]

Senile Plaques: Spherical masses consisting of amyloid fibrils and neuronal processes. [NIH]

Sensor: A device designed to respond to physical stimuli such as temperature, light, magnetism or movement and transmit resulting impulses for interpretation, recording, movement, or operating control. [NIH]

Sensory loss: A disease of the nerves whereby the myelin or insulating sheath of myelin on the nerves does not stay intact and the messages from the brain to the muscles through the nerves are not carried properly. [NIH]

Sepsis: The presence of bacteria in the bloodstream. [NIH]

Septic: Produced by or due to decomposition by microorganisms; putrefactive. [EU]

Sequencer: Device that reads off the order of nucleotides in a cloned gene. [NIH]

Serotonin: A biochemical messenger and regulator, synthesized from the essential amino acid L-tryptophan. In humans it is found primarily in the central nervous system, gastrointestinal tract, and blood platelets. Serotonin mediates several important physiological functions including neurotransmission, gastrointestinal motility, hemostasis, and cardiovascular integrity. Multiple receptor families (receptors, serotonin) explain the broad physiological actions and distribution of this biochemical mediator. [NIH]

Serum: The clear liquid part of the blood that remains after blood cells and clotting proteins have been removed. [NIH]

Serum Albumin: A major plasma protein that serves in maintaining the plasma colloidal osmotic pressure and transporting large organic anions. [NIH]

Shock: The general bodily disturbance following a severe injury; an emotional or moral upset occasioned by some disturbing or unexpected experience; disruption of the circulation, which can upset all body functions: sometimes referred to as circulatory shock. [NIH]

Side effect: A consequence other than the one(s) for which an agent or measure is used, as the adverse effects produced by a drug, especially on a tissue or organ system other than the one sought to be benefited by its administration. [EU]

Signs and Symptoms: Clinical manifestations that can be either objective when observed by a physician, or subjective when perceived by the patient. [NIH]

Silicon: A trace element that constitutes about 27.6% of the earth's crust in the form of silicon dioxide. It does not occur free in nature. Silicon has the atomic symbol Si, atomic number 14, and atomic weight 28.09. [NIH]

Silicon Dioxide: Silica. Transparent, tasteless crystals found in nature as agate, amethyst, chalcedony, cristobalite, flint, sand, quartz, and tridymite. The compound is insoluble in water or acids except hydrofluoric acid. [NIH]

Sinusitis: An inflammatory process of the mucous membranes of the paranasal sinuses that occurs in three stages: acute, subacute, and chronic. Sinusitis results from any condition causing ostial obstruction or from pathophysiologic changes in the mucociliary transport mechanism. [NIH]

Skeletal: Having to do with the skeleton (boney part of the body). [NIH]

Skeleton: The framework that supports the soft tissues of vertebrate animals and protects many of their internal organs. The skeletons of vertebrates are made of bone and/or cartilage. [NIH]

Skull: The skeleton of the head including the bones of the face and the bones enclosing the brain. [NIH]

Small cell lung cancer: A type of lung cancer in which the cells appear small and round when viewed under the microscope. Also called oat cell lung cancer. [NIH]

Small intestine: The part of the digestive tract that is located between the stomach and the large intestine. [NIH]

Social Support: Support systems that provide assistance and encouragement to individuals with physical or emotional disabilities in order that they may better cope. Informal social support is usually provided by friends, relatives, or peers, while formal assistance is provided by churches, groups, etc. [NIH]

Soft tissue: Refers to muscle, fat, fibrous tissue, blood vessels, or other supporting tissue of the body. [NIH]

Soft tissue sarcoma: A sarcoma that begins in the muscle, fat, fibrous tissue, blood vessels, or other supporting tissue of the body. [NIH]

Solvent: 1. Dissolving; effecting a solution. 2. A liquid that dissolves or that is capable of dissolving; the component of a solution that is present in greater amount. [EU]

Soma: The body as distinct from the mind; all the body tissue except the germ cells; all the axial body. [NIH]

Somatic: 1. Pertaining to or characteristic of the soma or body. 2. Pertaining to the body wall in contrast to the viscera. [EU]

Somatic cells: All the body cells except the reproductive (germ) cells. [NIH]

Sound wave: An alteration of properties of an elastic medium, such as pressure, particle displacement, or density, that propagates through the medium, or a superposition of such alterations. [NIH]

Spasm: An involuntary contraction of a muscle or group of muscles. Spasms may involve skeletal muscle or smooth muscle. [NIH]

Spastic: 1. Of the nature of or characterized by spasms. 2. Hypertonic, so that the muscles are stiff and the movements awkward. 3. A person exhibiting spasticity, such as occurs in spastic paralysis or in cerebral palsy. [EU]

Specialist: In medicine, one who concentrates on 1 special branch of medical science. [NIH]

Species: A taxonomic category subordinate to a genus (or subgenus) and superior to a subspecies or variety, composed of individuals possessing common characters distinguishing them from other categories of individuals of the same taxonomic level. In taxonomic nomenclature, species are designated by the genus name followed by a Latin or Latinized adjective or noun. [EU]

Specificity: Degree of selectivity shown by an antibody with respect to the number and types of antigens with which the antibody combines, as well as with respect to the rates and the extents of these reactions. [NIH]

Spectroscopic: The recognition of elements through their emission spectra. [NIH]

Spectrum: A charted band of wavelengths of electromagnetic vibrations obtained by refraction and diffraction. By extension, a measurable range of activity, such as the range of bacteria affected by an antibiotic (antibacterial s.) or the complete range of manifestations of a disease. [EU]

Sperm: The fecundating fluid of the male. [NIH]

Spinal cord: The main trunk or bundle of nerves running down the spine through holes in the spinal bone (the vertebrae) from the brain to the level of the lower back. [NIH]

Spinal Cord Injuries: Penetrating and non-penetrating injuries to the spinal cord resulting from traumatic external forces (e.g., wounds, gunshot; whiplash injuries; etc.). [NIH]

Spinal Nerve Roots: The paired bundles of nerve fibers entering and leaving the spinal cord at each segment. The dorsal and ventral nerve roots join to form the mixed segmental spinal nerves. The dorsal roots are generally afferent, formed by the central projections of the spinal (dorsal root) ganglia sensory cells, and the ventral roots efferent, comprising the axons of spinal motor and autonomic preganglionic neurons. There are, however, some exceptions to this afferent/efferent rule. [NIH]

Spirochete: Lyme disease. [NIH]

Spleen: An organ that is part of the lymphatic system. The spleen produces lymphocytes, filters the blood, stores blood cells, and destroys old blood cells. It is located on the left side of the abdomen near the stomach. [NIH]

Splenic Artery: The largest branch of the celiac trunk with distribution to the spleen, pancreas, stomach and greater omentum. [NIH]

Spondylitis: Inflammation of the vertebrae. [EU]

Sporadic: Neither endemic nor epidemic; occurring occasionally in a random or isolated manner. [EU]

Sprains and Strains: A collective term for muscle and ligament injuries without dislocation or fracture. A sprain is a joint injury in which some of the fibers of a supporting ligament are ruptured but the continuity of the ligament remains intact. A strain is an overstretching or overexertion of some part of the musculature. [NIH]

Sprue: A non febrile tropical disease of uncertain origin. [NIH]

Squamous: Scaly, or platelike. [EU]

Squamous cell carcinoma: Cancer that begins in squamous cells, which are thin, flat cells resembling fish scales. Squamous cells are found in the tissue that forms the surface of the skin, the lining of the hollow organs of the body, and the passages of the respiratory and digestive tracts. Also called epidermoid carcinoma. [NIH]

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Staging: Performing exams and tests to learn the extent of the cancer within the body, especially whether the disease has spread from the original site to other parts of the body. [NIH]

Steady state: Dynamic equilibrium. [EU]

Steatosis: Fatty degeneration. [EU]

Stenosis: Narrowing or stricture of a duct or canal. [EU]

Stereotactic: Radiotherapy that treats brain tumors by using a special frame affixed directly to the patient's cranium. By aiming the X-ray source with respect to the rigid frame, technicians can position the beam extremely precisely during each treatment. [NIH]

Sterile: Unable to produce children. [NIH]

Sterility: 1. The inability to produce offspring, i.e., the inability to conceive (female s.) or to induce conception (male s.). 2. The state of being aseptic, or free from microorganisms. [EU]

Stimulus: That which can elicit or evoke action (response) in a muscle, nerve, gland or other excitable issue, or cause an augmenting action upon any function or metabolic process. [NIH]

Stomach: An organ of digestion situated in the left upper quadrant of the abdomen between the termination of the esophagus and the beginning of the duodenum. [NIH]

Stool: The waste matter discharged in a bowel movement; feces. [NIH]

Strand: DNA normally exists in the bacterial nucleus in a helix, in which two strands are coiled together. [NIH]

Stress: Forcibly exerted influence; pressure. Any condition or situation that causes strain or tension. Stress may be either physical or psychologic, or both. [NIH]

Stress management: A set of techniques used to help an individual cope more effectively with difficult situations in order to feel better emotionally, improve behavioral skills, and often to enhance feelings of control. Stress management may include relaxation exercises, assertiveness training, cognitive restructuring, time management, and social support. It can be delivered either on a one-to-one basis or in a group format. [NIH]

Stricture: The abnormal narrowing of a body opening. Also called stenosis. [NIH]

Stroke: Sudden loss of function of part of the brain because of loss of blood flow. Stroke may be caused by a clot (thrombosis) or rupture (hemorrhage) of a blood vessel to the brain. [NIH]

Stroke Volume: The amount of blood pumped out of the heart per beat not to be confused with cardiac output (volume/time). [NIH]

Stroma: The middle, thickest layer of tissue in the cornea. [NIH]

Stromal: Large, veil-like cell in the bone marrow. [NIH]

Strontium: An element of the alkaline earth family of metals. It has the atomic symbol Sr, atomic number 38, and atomic weight 87.62. [NIH]

Subacute: Somewhat acute; between acute and chronic. [EU]

Subarachnoid: Situated or occurring between the arachnoid and the pia mater. [EU]

Subclinical: Without clinical manifestations; said of the early stage(s) of an infection or other disease or abnormality before symptoms and signs become apparent or detectable by clinical examination or laboratory tests, or of a very mild form of an infection or other disease or abnormality. [EU]

Subcutaneous: Beneath the skin. [NIH]

Sublingual: Located beneath the tongue. [EU]

Submandibular: Four to six lymph glands, located between the lower jaw and the submandibular salivary gland. [NIH]

Subspecies: A category intermediate in rank between species and variety, based on a smaller number of correlated characters than are used to differentiate species and generally conditioned by geographical and/or ecological occurrence. [NIH]

Substance P: An eleven-amino acid neurotransmitter that appears in both the central and peripheral nervous systems. It is involved in transmission of pain, causes rapid contractions of the gastrointestinal smooth muscle, and modulates inflammatory and immune responses. [NIH]

Substrate: A substance upon which an enzyme acts. [EU]

Substrate Specificity: A characteristic feature of enzyme activity in relation to the kind of substrate on which the enzyme or catalytic molecule reacts. [NIH]

Sudden death: Cardiac arrest caused by an irregular heartbeat. The term "death" is somewhat misleading, because some patients survive. [NIH]

Supine: Having the front portion of the body upwards. [NIH]

Supine Position: The posture of an individual lying face up. [NIH]

Supplementation: Adding nutrients to the diet. [NIH]

Support group: A group of people with similar disease who meet to discuss how better to cope with their cancer and treatment. [NIH]

Suppression: A conscious exclusion of disapproved desire contrary with repression, in which the process of exclusion is not conscious. [NIH]

Surfactant: A fat-containing protein in the respiratory passages which reduces the surface tension of pulmonary fluids and contributes to the elastic properties of pulmonary tissue. [NIH]

Survival Rate: The proportion of survivors in a group, e.g., of patients, studied and followed over a period, or the proportion of persons in a specified group alive at the beginning of a time interval who survive to the end of the interval. It is often studied using life table methods. [NIH]

Suspensions: Colloids with liquid continuous phase and solid dispersed phase; the term is used loosely also for solid-in-gas (aerosol) and other colloidal systems; water-insoluble drugs may be given as suspensions. [NIH]

Sympathetic Nervous System: The thoracolumbar division of the autonomic nervous system. Sympathetic preganglionic fibers originate in neurons of the intermediolateral column of the spinal cord and project to the paravertebral and prevertebral ganglia, which in turn project to target organs. The sympathetic nervous system mediates the body's response to stressful situations, i.e., the fight or flight reactions. It often acts reciprocally to the parasympathetic system. [NIH]

Symphysis: A secondary cartilaginous joint. [NIH]

Symptomatic: Having to do with symptoms, which are signs of a condition or disease. [NIH]

Synchrotron: An accelerator in which the particles are guided by an increasing magnetic field while they are accelerated several times in an approximately circular path by electric fields produced by a high-frequency generator. [NIH]

Syncope: A temporary suspension of consciousness due to generalized cerebral schemia, a faint or swoon. [EU]

Synovial: Of pertaining to, or secreting synovia. [EU]

Synovial Membrane: The inner membrane of a joint capsule surrounding a freely movable joint. It is loosely attached to the external fibrous capsule and secretes synovial fluid. [NIH]

Synovitis: Inflammation of a synovial membrane. It is usually painful, particularly on motion, and is characterized by a fluctuating swelling due to effusion within a synovial sac. Synovitis is qualified as fibrinous, gonorrhoeal, hyperplastic, lipomatous, metritic, puerperal, rheumatic, scarlatinal, syphilitic, tuberculous, urethral, etc. [EU]

Syphilis: A contagious venereal disease caused by the spirochete Treponema pallidum. [NIH]

Systemic: Affecting the entire body. [NIH]

Systole: Period of contraction of the heart, especially of the ventricles. [NIH]

Systolic: Indicating the maximum arterial pressure during contraction of the left ventricle of the heart. [EU]

Talus: The second largest of the tarsal bones and occupies the middle and upper part of the tarsus. [NIH]

Tamoxifen: A first generation selective estrogen receptor modulator (SERM). It acts as an agonist for bone tissue and cholesterol metabolism but is an estrogen antagonist in mammary and uterine. [NIH]

Tau Proteins: One of the two major classes of microtubule-associated proteins isolated from the brain. The proteins have two domains: one that binds to microtubules and a second that binds to other cell components. By binding to several unpolymerized tubulin molecules simultaneously, tau proteins speed up the nucleation process in tubulin polymerization. Chemically modified tau proteins also appear to be involved in the formation and/or composition of the neurofibrillary tangles and neuropil threads found in Alzheimer disease. [NIH]

Technetium: The first artificially produced element and a radioactive fission product of uranium. The stablest isotope has a mass number 99 and is used diagnostically as a radioactive imaging agent. Technetium has the atomic symbol Tc, atomic number 43, and atomic weight 98.91. [NIH]

Telecommunications: Transmission of information over distances via electronic means. [NIH]

Telemedicine: Delivery of health services via remote telecommunications. This includes interactive consultative and diagnostic services. [NIH]

Temporal: One of the two irregular bones forming part of the lateral surfaces and base of the skull, and containing the organs of hearing. [NIH]

Temporal Lobe: Lower lateral part of the cerebral hemisphere. [NIH]

Testicles: The two egg-shaped glands found inside the scrotum. They produce sperm and male hormones. Also called testes. [NIH]

Testicular: Pertaining to a testis. [EU]

Testis: Either of the paired male reproductive glands that produce the male germ cells and

the male hormones. [NIH]

Tetany: 1. Hyperexcitability of nerves and muscles due to decrease in concentration of extracellular ionized calcium, which may be associated with such conditions as parathyroid hypofunction, vitamin D deficiency, and alkalosis or result from ingestion of alkaline salts; it is characterized by carpopedal spasm, muscular twitching and cramps, laryngospasm with inspiratory stridor, hyperreflexia and choreiform movements. 2. Tetanus. [EU]

Thalamic: Cell that reaches the lateral nucleus of amygdala. [NIH]

Thalamic Diseases: Disorders of the centrally located thalamus, which integrates a wide range of cortical and subcortical information. Manifestations include sensory loss, movement disorders; ataxia, pain syndromes, visual disorders, a variety of neuropsychological conditions, and coma. Relatively common etiologies include cerebrovascular disorders; craniocerebral trauma; brain neoplasms; brain hypoxia; intracranial hemorrhages; and infectious processes. [NIH]

Thalamus: Paired bodies containing mostly gray substance and forming part of the lateral wall of the third ventricle of the brain. The thalamus represents the major portion of the diencephalon and is commonly divided into cellular aggregates known as nuclear groups. [NIH]

Therapeutics: The branch of medicine which is concerned with the treatment of diseases, palliative or curative. [NIH]

Thermal: Pertaining to or characterized by heat. [EU]

Thermography: Measurement of the regional temperature of the body or an organ by infrared sensing devices, based on self-emanating infrared radiation. [NIH]

Thigh: A leg; in anatomy, any elongated process or part of a structure more or less comparable to a leg. [NIH]

Thoracic: Having to do with the chest. [NIH]

Threshold: For a specified sensory modality (e. g. light, sound, vibration), the lowest level (absolute threshold) or smallest difference (difference threshold, difference limen) or intensity of the stimulus discernible in prescribed conditions of stimulation. [NIH]

Thrombin: An enzyme formed from prothrombin that converts fibrinogen to fibrin. (Dorland, 27th ed) EC 3.4.21.5. [NIH]

Thromboembolism: Obstruction of a vessel by a blood clot that has been transported from a distant site by the blood stream. [NIH]

Thrombomodulin: A cell surface glycoprotein of endothelial cells that binds thrombin and serves as a cofactor in the activation of protein C and its regulation of blood coagulation. [NIH]

Thrombosis: The formation or presence of a blood clot inside a blood vessel. [NIH]

Thymidine: A chemical compound found in DNA. Also used as treatment for mucositis. [NIH]

Thyroid: A gland located near the windpipe (trachea) that produces thyroid hormone, which helps regulate growth and metabolism. [NIH]

Thyroid Gland: A highly vascular endocrine gland consisting of two lobes, one on either side of the trachea, joined by a narrow isthmus; it produces the thyroid hormones which are concerned in regulating the metabolic rate of the body. [NIH]

Thyrotoxicosis: The clinical syndrome that reflects the response of the peripheral tissues to an excess of thyroid hormone. [NIH]

Tibia: The second longest bone of the skeleton. It is located on the medial side of the lower

leg, articulating with the fibula laterally, the talus distally, and the femur proximally. [NIH]

Tissue: A group or layer of cells that are alike in type and work together to perform a specific function. [NIH]

Tissue Culture: Maintaining or growing of tissue, organ primordia, or the whole or part of an organ in vitro so as to preserve its architecture and/or function (Dorland, 28th ed). Tissue culture includes both organ culture and cell culture. [NIH]

Tomography: Imaging methods that result in sharp images of objects located on a chosen plane and blurred images located above or below the plane. [NIH]

Tone: 1. The normal degree of vigour and tension; in muscle, the resistance to passive elongation or stretch; tonus. 2. A particular quality of sound or of voice. 3. To make permanent, or to change, the colour of silver stain by chemical treatment, usually with a heavy metal. [EU]

Tonus: A state of slight tension usually present in muscles even when they are not undergoing active contraction. [NIH]

Torsion: A twisting or rotation of a bodily part or member on its axis. [NIH]

Toxaemia: 1. The condition resulting from the spread of bacterial products (toxins) by the bloodstream. 2. A condition resulting from metabolic disturbances, e.g. toxaemia of pregnancy. [EU]

Toxic: Having to do with poison or something harmful to the body. Toxic substances usually cause unwanted side effects. [NIH]

Toxicity: The quality of being poisonous, especially the degree of virulence of a toxic microbe or of a poison. [EU]

Toxicology: The science concerned with the detection, chemical composition, and pharmacologic action of toxic substances or poisons and the treatment and prevention of toxic manifestations. [NIH]

Toxins: Specific, characterizable, poisonous chemicals, often proteins, with specific biological properties, including immunogenicity, produced by microbes, higher plants, or animals. [NIH]

Toxoplasmosis: The acquired form of infection by Toxoplasma gondii in animals and man. [NIH]

Trace element: Substance or element essential to plant or animal life, but present in extremely small amounts. [NIH]

Tracer: A substance (such as a radioisotope) used in imaging procedures. [NIH]

Trachea: The cartilaginous and membranous tube descending from the larynx and branching into the right and left main bronchi. [NIH]

Transfection: The uptake of naked or purified DNA into cells, usually eukaryotic. It is analogous to bacterial transformation. [NIH]

Transillumination: Passage of light through body tissues or cavities for examination of internal structures. [NIH]

Translation: The process whereby the genetic information present in the linear sequence of ribonucleotides in mRNA is converted into a corresponding sequence of amino acids in a protein. It occurs on the ribosome and is unidirectional. [NIH]

Trauma: Any injury, wound, or shock, must frequently physical or structural shock, producing a disturbance. [NIH]

Treatment Outcome: Evaluation undertaken to assess the results or consequences of

management and procedures used in combating disease in order to determine the efficacy, effectiveness, safety, practicability, etc., of these interventions in individual cases or series. [NIH]

Triage: The sorting out and classification of patients or casualties to determine priority of need and proper place of treatment. [NIH]

Tryptophan: An essential amino acid that is necessary for normal growth in infants and for nitrogen balance in adults. It is a precursor serotonin and niacin. [NIH]

Tuberculosis: Any of the infectious diseases of man and other animals caused by species of Mycobacterium. [NIH]

Tubulin: A microtubule subunit protein found in large quantities in mammalian brain. It has also been isolated from sperm flagella, cilia, and other sources. Structurally, the protein is a dimer with a molecular weight of approximately 120,000 and a sedimentation coefficient of 5.8S. It binds to colchicine, vincristine, and vinblastine. [NIH]

Tumor model: A type of animal model which can be used to study the development and progression of diseases and to test new treatments before they are given to humans. Animals with transplanted human cancers or other tissues are called xenograft models. [NIH]

Tumour: 1. Swelling, one of the cardinal signs of inflammations; morbid enlargement. 2. A new growth of tissue in which the multiplication of cells is uncontrolled and progressive; called also neoplasm. [EU]

Tunica: A rather vague term to denote the lining coat of hollow organs, tubes, or cavities. [NIH]

Tunica Intima: The innermost coat of blood vessels, consisting of a thin lining of endothelial cells longitudinally oriented and continuous with the endothelium of capillaries on the one hand and the endocardium of the heart on the other. [NIH]

Ubiquitin: A highly conserved 76 amino acid-protein found in all eukaryotic cells. [NIH]

Ulcerative colitis: Chronic inflammation of the colon that produces ulcers in its lining. This condition is marked by abdominal pain, cramps, and loose discharges of pus, blood, and mucus from the bowel. [NIH]

Ultrasonography: The visualization of deep structures of the body by recording the reflections of echoes of pulses of ultrasonic waves directed into the tissues. Use of ultrasound for imaging or diagnostic purposes employs frequencies ranging from 1.6 to 10 megahertz. [NIH]

Unresectable: Unable to be surgically removed. [NIH]

Uraemia: 1. An excess in the blood of urea, creatinine, and other nitrogenous end products of protein and amino acids metabolism; more correctly referred to as azotemia. 2. In current usage the entire constellation of signs and symptoms of chronic renal failure, including nausea, vomiting anorexia, a metallic taste in the mouth, a uraemic odour of the breath, pruritus, uraemic frost on the skin, neuromuscular disorders, pain and twitching in the muscles, hypertension, edema, mental confusion, and acid-base and electrolyte imbalances. [EU]

Uranium: A radioactive element of the actinide series of metals. It has an atomic symbol U, atomic number 92, and atomic weight 238.03. U-235 is used as the fissionable fuel in nuclear weapons and as fuel in nuclear power reactors. [NIH]

Urease: An enzyme that catalyzes the conversion of urea and water to carbon dioxide and ammonia. EC 3.5.1.5. [NIH]

Ureters: Tubes that carry urine from the kidneys to the bladder. [NIH]

Urethra: The tube through which urine leaves the body. It empties urine from the bladder.

[NIH]

Urinary: Having to do with urine or the organs of the body that produce and get rid of urine. [NIH]

Urinary tract: The organs of the body that produce and discharge urine. These include the kidneys, ureters, bladder, and urethra. [NIH]

Urinary tract infection: An illness caused by harmful bacteria growing in the urinary tract. [NIH]

Urine: Fluid containing water and waste products. Urine is made by the kidneys, stored in the bladder, and leaves the body through the urethra. [NIH]

Urogenital: Pertaining to the urinary and genital apparatus; genitourinary. [EU]

Uterus: The small, hollow, pear-shaped organ in a woman's pelvis. This is the organ in which a fetus develops. Also called the womb. [NIH]

Vaccine: A substance or group of substances meant to cause the immune system to respond to a tumor or to microorganisms, such as bacteria or viruses. [NIH]

Vagina: The muscular canal extending from the uterus to the exterior of the body. Also called the birth canal. [NIH]

Vaginal: Of or having to do with the vagina, the birth canal. [NIH]

Vascular: Pertaining to blood vessels or indicative of a copious blood supply. [EU]

Vasculitis: Inflammation of a blood vessel. [NIH]

Vasodilators: Any nerve or agent which induces dilatation of the blood vessels. [NIH]

Vector: Plasmid or other self-replicating DNA molecule that transfers DNA between cells in nature or in recombinant DNA technology. [NIH]

Vein: Vessel-carrying blood from various parts of the body to the heart. [NIH]

Venereal: Pertaining or related to or transmitted by sexual contact. [EU]

Venous: Of or pertaining to the veins. [EU]

Venous Thrombosis: The formation or presence of a thrombus within a vein. [NIH]

Venter: Belly. [NIH]

Ventral: 1. Pertaining to the belly or to any venter. 2. Denoting a position more toward the belly surface than some other object of reference; same as anterior in human anatomy. [EU]

Ventricle: One of the two pumping chambers of the heart. The right ventricle receives oxygen-poor blood from the right atrium and pumps it to the lungs through the pulmonary artery. The left ventricle receives oxygen-rich blood from the left atrium and pumps it to the body through the aorta. [NIH]

Ventricular: Pertaining to a ventricle. [EU]

Ventricular Function: The hemodynamic and electrophysiological action of the ventricles. [NIH]

Ventricular Remodeling: The geometric and structural changes that the ventricle undergoes, usually following myocardial infarction. It comprises expansion of the infarct and dilatation of the healthy ventricle segments. While most prevalent in the left ventricle, it can also occur in the right ventricle. [NIH]

Venules: The minute vessels that collect blood from the capillary plexuses and join together to form veins. [NIH]

Vertebrae: A bony unit of the segmented spinal column. [NIH]

Vertebral: Of or pertaining to a vertebra. [EU]

Veterinarians: Individuals with a degree in veterinary medicine that provides them with training and qualifications to treat diseases and injuries of animals. [NIH]

Veterinary Medicine: The medical science concerned with the prevention, diagnosis, and treatment of diseases in animals. [NIH]

Vinblastine: An anticancer drug that belongs to the family of plant drugs called vinca alkaloids. It is a mitotic inhibitor. [NIH]

Vincristine: An anticancer drug that belongs to the family of plant drugs called vinca alkaloids. [NIH]

Viral: Pertaining to, caused by, or of the nature of virus. [EU]

Viral Hepatitis: Hepatitis caused by a virus. Five different viruses (A, B, C, D, and E) most commonly cause this form of hepatitis. Other rare viruses may also cause hepatitis. [NIH]

Virulence: The degree of pathogenicity within a group or species of microorganisms or viruses as indicated by case fatality rates and/or the ability of the organism to invade the tissues of the host. [NIH]

Virus: Submicroscopic organism that causes infectious disease. In cancer therapy, some viruses may be made into vaccines that help the body build an immune response to, and kill, tumor cells. [NIH]

Viscera: Any of the large interior organs in any one of the three great cavities of the body, especially in the abdomen. [NIH]

Visceral: , from viscus a viscus) pertaining to a viscus. [EU]

Viscosity: A physical property of fluids that determines the internal resistance to shear forces. [EU]

Vitamin A: A substance used in cancer prevention; it belongs to the family of drugs called retinoids. [NIH]

Vitreous: Glasslike or hyaline; often used alone to designate the vitreous body of the eye (corpus vitreum). [EU]

Vitro: Descriptive of an event or enzyme reaction under experimental investigation occurring outside a living organism. Parts of an organism or microorganism are used together with artificial substrates and/or conditions. [NIH]

Vivo: Outside of or removed from the body of a living organism. [NIH]

Vocal cord: The vocal folds of the larynx. [NIH]

Voiding cystourethrogram: An x-ray image of the bladder and urethra made during voiding. The bladder and urethra are filled with a special fluid to make the urethra clearly visible. [NIH]

White blood cell: A type of cell in the immune system that helps the body fight infection and disease. White blood cells include lymphocytes, granulocytes, macrophages, and others. [NIH]

Windpipe: A rigid tube, 10 cm long, extending from the cricoid cartilage to the upper border of the fifth thoracic vertebra. [NIH]

Womb: A hollow, thick-walled, muscular organ in which the impregnated ovum is developed into a child. [NIH]

Xenograft: The cells of one species transplanted to another species. [NIH]

X-ray: High-energy radiation used in low doses to diagnose diseases and in high doses to treat cancer. [NIH]

X-ray therapy: The use of high-energy radiation from x-rays to kill cancer cells and shrink

tumors. Radiation may come from a machine outside the body (external-beam radiation therapy) or from materials called radioisotopes. Radioisotopes produce radiation and can be placed in or near the tumor or in the area near cancer cells. This type of radiation treatment is called internal radiation therapy, implant radiation, interstitial radiation, or brachytherapy. Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. X-ray therapy is also called radiation therapy, radiotherapy, and irradiation. [NIH]

X-ray tube: Evacuated vessel for the production of X-radiation by the bombardment of a target, contained in an anode, with electrons accelerated by an electric field. [NIH]

Yttrium: An element of the rare earth family of metals. It has the atomic symbol Y, atomic number 39, and atomic weight 88.91. In conjunction with other rare earths, yttrium is used as a phosphor in television receivers and is a component of the yttrium-aluminum garnet (YAG) lasers. [NIH]

Zygote: The fertilized ovum. [NIH]

Zymogen: Inactive form of an enzyme which can then be converted to the active form, usually by excision of a polypeptide, e. g. trypsinogen is the zymogen of trypsin. [NIH]

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