Ewing's Sarcoma

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

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

ICON Health Publications
ICON Group International, Inc.
4370 La Jolla Village Drive, 4th Floor
San Diego, CA 92122 USA

Printed in the United States of America.

Last digit indicates print number: 10 9 8 7 6 4 5 3 2 1

Publisher, Health Care: Philip Parker, Ph.D.
Editor(s): James Parker, M.D., Philip Parker, Ph.D.

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Cataloging-in-Publication Data

Parker, James N., 1961-
Parker, Philip M., 1960-

Ewing's Sarcoma: A Medical Dictionary, Bibliography, and Annotated Research Guide to Internet References / James N. Parker and Philip M. Parker, editors
p. cm.
Includes bibliographical references, glossary, and index.
ISBN: 0-497-00426-7
1. Ewing's Sarcoma-Popular works. I. Title.

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Acknowledgements

The collective knowledge generated from academic and applied research summarized in various references has been critical in the creation of this book which is best viewed as a comprehensive compilation and collection of information prepared by various official agencies which produce publications on Ewing's sarcoma. Books in this series draw from various agencies and institutions associated with the United States Department of Health and Human Services, and in particular, the Office of the Secretary of Health and Human Services (OS), the Administration for Children and Families (ACF), the Administration on Aging (AOA), the Agency for Healthcare Research and Quality (AHRQ), the Agency for Toxic Substances and Disease Registry (ATSDR), the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), the Healthcare Financing Administration (HCFA), the Health Resources and Services Administration (HRSA), the Indian Health Service (IHS), the institutions of the National Institutes of Health (NIH), the Program Support Center (PSC), and the Substance Abuse and Mental Health Services Administration (SAMHSA). In addition to these sources, information gathered from the National Library of Medicine, the United States Patent Office, the European Union, and their related organizations has been invaluable in the creation of this book. Some of the work represented was financially supported by the Research and Development Committee at INSEAD. This support is gratefully acknowledged. Finally, special thanks are owed to Tiffany Freeman for her excellent editorial support.

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Table of Contents

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 Ewing's sarcoma 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 Ewing's sarcoma, 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 Ewing's sarcoma, 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 Ewing's sarcoma. 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 Ewing's sarcoma, 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 Ewing's sarcoma.

The Editors

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

CHAPTER 1. STUDIES ON EWING'S SARCOMA

Overview

In this chapter, we will show you how to locate peer-reviewed references and studies on Ewing's sarcoma.

Federally Funded Research on Ewing's Sarcoma

The U.S. Government supports a variety of research studies relating to Ewing's sarcoma. 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 Ewing's sarcoma.

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 Ewing's sarcoma. The following is typical of the type of information found when searching the CRISP database for Ewing's sarcoma:

- **Project Title: CHARACTERIZATION OF THE EWS/FLI-1 CHIMERIC GENE**

  Principal Investigator & Institution: Rorie, Checo J.; Pharmacology; University of North Carolina Chapel Hill Aob 104 Airport Drive Cb#1350 Chapel Hill, Nc 27599

  Timing: Fiscal Year 2002; Project Start 01-SEP-2002

  Summary: (provided by applicant): Neuroblastomas (NB) and Ewing's Sarcoma/peripheral Primitive Neuro-ectodermal Tumors (ES/PNET) are pediatric

[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).

cancers of neural crest orgin. It has been suggested that the control of the differentiation program o f the sympathetic lineage of NBs versus the parasympathetic lineage of ES/PNETs proceed in a linear fashion. Somatic cell hybridization of NB cell lines and ES/PNET cell lines show that NB-specific markers are repressed, and the transfection of NB with the Ews/FLI-1 chimeric gene characteriztically found in ES/PNETs show similar results. This project will characterize the Ews/FLI-1's role in cell cycle control utilizing western blot analysis to monitor expression of p53 and pRb, immunofluorescence to monitor p53 localization and protein half life experiments to monitor p53 stability. This project will also utilize microchip array techinology to study the mechanism and pathway of the Ews/FLI-1 oncogene.

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

- **Project Title: DEFINING MECHANISMS OF TUMORIGENESIS BY EWS/ETS FUSIONS**

  Principal Investigator & Institution: Denny, Christopher T.; Professor; Pediatrics; University of California Los Angeles 10920 Wilshire Blvd., Suite 1200 Los Angeles, Ca 90024

  Timing: Fiscal Year 2002; Project Start 01-JUL-2000; Project End 30-JUN-2005

  Summary: (Adapted from the investigator's abstract) Tumor associated genomic rearrangements can give raise to structurally altered products with aberrant biological properties. Chromosomal translocations frequently result in gene fusions that can behave as dominant oncogenes. One such family of translocations occurs in Ewing's sarcoma/primitive neuroectodermal tumor (ES/PNET), and juxtaposes the N-terminus of EWS to the C-terminus of 5 possible ETS proteins. Inhibition of EWS/FLI1 fusion attenuates growth of ES/PNET cells, implicating EWS/FLI1 in the genesis and maintenance of these tumors. Present data suggest that EWS/FLI1 fusion promotes anchorage independent growth and tumorigenesis by acting as aberrant transcription factors. While a cohort of EWS/FLI1 target genes have been identified, it appears that transcriptional modulation of a larger network of genes is necessary to cause these biological effects. This proposal aims to clarify how EWS/ETS genes promote oncogenesis by 1) identifying and cataloging a more complete set of genes whose expression is altered by the EWS/FLI1 fusion protein(s); 2) defining which of the aberrantly modulated target genes are the direct/immediate targets of EWS/FLI1 transcriptional modulation (as opposed to downstream members of a gene expression cascade); and 3) developing better model systems to determine which combinations of EWS/FLI1 target genes play causal roles in EWS/FLI1-driven process of oncogenesis.

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

- **Project Title: DYNAMIC MAGNETIC RESONANCE IMAGING OF BONE TUMORS**

  Principal Investigator & Institution: Koutcher, Jason A.; Associate Attending Physicist; Sloan-Kettering Institute for Cancer Res New York, Ny 100216007

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

  Summary: (provided by applicant): Primary bone tumors are the third most frequent tumors of adolescents and young adults. Osteogenic sarcomas (OS) (35% of all primary bone sarcomas) and **Ewing's sarcoma** are the most and second most common bone tumors. The most accurate prognostic indicator is percent tumor necrosis post neoadjuvant chemotherapy, as estimated by an experienced pathologist post surgery. A pre-surgical estimate of tumor necrosis and an early or a priori marker of response are necessary to further advance treatment in these diseases. The goals of this proposal are

to: 1A) To determine if dynamic contrast enhanced magnetic resonance imaging (DCE-MRI) can reliably predict percent necrosis. 1B) Evaluate the hypothesis that in patients with Ewing's or OS, the a priori or early (18-24 days) DCE-MRI study predicts percent necrosis measured by pathological analysis performed at surgery and disease free survival 2) Compare the predictive value of using "semi-quantitative" analyses vs. quantitative models. We will also compare the effects of measuring the input function directly in order to determine if more complex modeling schemes are more accurate in predicting tumor response. The value of the 2 site exchange model analysis and the effect of relaxing the assumption that equilibrium transcytolemmal water transport remains in the "fast exchange limit" and replacing this concept with a more rigorous two site exchange (2SX) model, and its effect on evaluating the DCE-MRI data relationship to tumor necrosis and response will also be analyzed. This will determine if the method of analysis impacts accuracy of predicting tumor response or percent necrosis. 3) Determine if the DCE-MRI results are superior and independent markers of tumor response compared to current clinical markers. We will compare the prognostic value of the DCE-MRI studies vs. molecular and clinical prognosticators. This project will determine the potential of DCE-MRI to predict tumor necrosis and as an a priori or early marker of tumor response to neoadjuvant therapy. If successful, it will provide a tool to predict failure/response to chemotherapy, resulting in patient specific treatment which will likely enhance outcome.

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

- **Project Title: DYSREGULATION OF THE TRANSCRIPTION FACTOR ER81**

  Principal Investigator & Institution: Janknecht, Ralf G.; Mayo Clinic Coll of Medicine, Rochester 200 1St St Sw Rochester, Mn 55905

  Timing: Fiscal Year 2002; Project Start 01-FEB-2001; Project End 31-JAN-2005

  Summary: (Adapted from the investigator's abstract) The precise control of gene transcription is of fundamental importance to prevent pathological disorders and carcinogenesis. Dysregulation of the transcription factor ER81 is involved in breast cancer, where ER81 is a downstream effector of HER2/Neu, and in those Ewing's sarcomas, where the ER81 gene is affected by a chromosomal translocation. They hypothesize that ER81 is activated by HER2/Neu via the mitogen-activated protein kinase signaling pathways. Activated ER81, in conjunction with the coactivators CBP and p300, leads to stimulation of target genes, similarly as in **Ewing's sarcoma** due to the presence of a constitutively active EWS-ER81 fusion protein. This dysregulation of ER81 target genes leads to pathological levels of certain proteins contributing to cell transformation. Two specific aims are proposed to test these hypothesis. (1) They will study how mitogen-activated protein kinases stimulate ER81 upon HER2/Neu overexpression and how CBP/p300 support ER81-dependent transcription. Utilizing in vitro and in vivo phoyphorylation studies, they will determine the phosphoylation sites within ER81 and identify the protein kinases involved. Mutation of the phosphorylation sites will demonstrate how they affect ER81 and identify the protein kinases involved. Mutation of the phosphorylation sites will demonstrate how they affect ER81 function. Furthermore, it will be analyzed whether acetylation of ER81 by CBP/p300 regulates its transactivation function. Additionally, the impact of HER2/Neu on the interaction between ER81 and CBP/p300 will be investigated. (2) In order to identify ER81 target genes, human cells will be transfected with the constitutively active EWS-ER81 molecule. RNA from these cells and control cells will be employed to identify target genes utilizing DNA microarrays. Identified target genes will then be analyzed for their capacity to transform cells and contribute to metastasis. The analysis how the ER81-

CBP/p300 complex is stimulated by HER2/Neu may point out novel strategies of interference with breast cancer development. The identification of ER81 target genes will shed light on how the pathological disorders in breast cancer and **Ewing's sarcoma** are elicited and how they could be cured.

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

- **Project Title: EWS/FLI-1: TARGET FOR RADIOSENSITIZATION & GROWTH INHIBITION OF EWING TUMORS**

  Principal Investigator & Institution: Notario, Vicente; Professor; Georgetown University Washington, Dc 20057

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

  Summary: (provided by applicant): **Ewing's sarcoma** (ES) is a solid highly malignant neoplasm of the bone and soft tissues. Most often it affects children and young adolescents, being the second most common malignant bone tumor in young adults. ES is formed by poorly differentiated round cells of neuroectodermal origin. Current ES treatment includes a combined modality with radiotherapy and chemotherapy. Clinically, ES tumors are generally responsive to such treatment, but the overall cure rate is low because ES is an aggressive osteolytic tumor that frequently presents with metastatic disease. ES cells are characterized for having, in nearly 100 percent of the cases a reciprocal translocation between chromosomes 11 and 22 or, much less frequently, 21 and 22. This translocation results in the synthesis in these cells of fusion proteins with their N-terminus encoded by EWS gene sequences and their C- terminus encoded by sequences of either the FLI-1 gene, most frequently, or the ERG gene, both members of the ETS family of transcription factors. There is a limited repertoire of fusion types, with those involving EWS/FLI-1 being most frequently detected in ES patients. We have found that down-regulation of EWS/FLI-1 in ES cells caused both growth inhibition and sensitization to apoptosis by ionizing radiation and chemotherapeutic agents. Our overall objective is to define antisense oligonucleotides targeted to the EWS/FLI-1 (or EWS/ERG) junction as highly specific therapeutic tools for ES management, because there are no target fusion sequences in normal cells. Our central hypothesis is that antisense EWS/FLI-1 oligonucleotides targeted to the translocation junction will specifically render ES cells sensitive to DNA-damaging agents and, in addition, will prevent the oncogenic activity of the EWS/FLI-1 protein product. Treatment with antisense EWS/FLI-1 oligonucleotides will have a dual effect, enhancing ES cell killing and down-regulating cellular neoplastic properties. Two specific aims are proposed, which include experiments designed to study the effects of antisense EWS/FLI-1 oligonucleotides in vitro, on cultures ES cell lines, and in vivo, on tumors induced in mice by injection of ES cells. These studies should advance technological and scientific understanding for the translational application of antisense EWS/FLI-1 oligonucleotides to ES treatment in the future.

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

- **Project Title: MECHANISMS OF CELLULAR RESPONSES TO IONIZING RADIATION**

  Principal Investigator & Institution: Dritschilo, Anatoly; Professor and Chairman; Radiation Medicine; Georgetown University Washington, Dc 20057

  Timing: Fiscal Year 2002; Project Start 27-JUN-1997; Project End 30-JUN-2007

  Summary: (provided by applicant): Cellular responses to exposure to ionizing radiation are determined by differential gene expression patterns. Signaling pathways regulate

the cell cycle, repair processes and programmed cell death. The product of these biochemical events underlies radiation sensitivity or resistance. Our previous investigations have identified Raf-1, NF-kB and PARP as potential target molecules for cellular radiation sensitization strategies. We propose to advanced our investigations of antisense Raf-1 to a Phase II clinical trial in Project 6. NF-kB related targets will be verified in preclinical investigations using antisense to p65, or Ikk in Project 2. Novel mechanisms of PARP activity in transcriptional regulation, and in programmed cell death will be investigated to identify additional, potential, PARP-related targets in Projects 8 and 3. The EWS/Fli target for radiation sensitization of **Ewing's sarcoma** cells is the product of our previous investigations of PARP regulation. This molecule will be verified in preclinical studies for potential use in the treatment of **Ewing's sarcoma** in Project 4. Two cores are proposed: Core A to provide the needed administrative support and to foster scientific interactions among the program project members, and Core B to provide microarray analysis, atomic force microscopy, statistics, and radiation services; demanding technologies of common interest to investigators. The proposed projects build on our proven record of clinical translational research which centers on molecular mechanisms underlying cellular radiation responses. Data from these projects will identify and validate targets for use in clinical radiation sensitizing strategies to improve the therapeutic ratio for the treatment of human cancers.

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

- **Project Title: MEDIATORS OF EWS/FLI ONCOGENESIS IN EWING'S SARCOMA**

  Principal Investigator & Institution: May, William A.; Pediatrics; University of Alabama at Birmingham Uab Station Birmingham, Al 35294

  Timing: Fiscal Year 2002; Project Start 01-MAR-2001; Project End 31-JAN-2003

  Summary: (Investigator's abstract): A wide variety of human malignancies are associated with aberrant transcription factors in a high proportion of cases. In none of these instances is that association stronger than that found between the EWS/FLI (and other EWS/ets) chimeric transcription factor and the Ewing Family Tumors, **Ewing's Sarcoma** and peripheral Primitive Neuroectodermal Tumor (PNET). Multiple lines of evidence demonstrate that the biology of these chimeric transcription factors is central to the development and sustenance of these tumors. The key to understanding the biology of these unique proteins is to elucidate those targets of biologic consequence which are aberrantly regulated as a result of EWS/FLI and its congeners. This proposal will accomplish this goal though the use of an expression cloning approach in which biologically relevant genes that act downstream of EWS/FLI will be isolated and identified. Using the MaRX expression cloning system and a model transformation system, genes mediating the in vitro phenotype of EWS/FLI will be elucidated. Genetic variables in the system will be tightly controlled. Measures will be taken to screen out false positives as well as to enhance the ability to detect important targets that may be expressed at low levels. Through a variety of measures, the role of these downstream effectors in human tumors will then be established. The in vivo phenotype of EWS/FLI will also be investigated. A population-based cycle cloning strategy will be used in an in vivo tumorigenesis assay. Those species that are enriched in this system will be characterized for their involvement in human tumorigenesis. Finally, an in vitro assay system will be used to isolate genes that work in concert with EWS/FLI to permit EWS/FLI transformability. Data from these studies will enhance our understanding of this enigmatic family of human tumors. This understanding will provide a valuable paradigm for the study of the wide array of malignancies that are associated with aberrant transcription factors.

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

- **Project Title: MOLECULAR MECHANISMS IN CHRONDROSARCOMA METASTASIS**

  Principal Investigator & Institution: Scully, Sean P.; Associate Professor; Mayo Clinic Coll of Medicine, Rochester 200 1St St Sw Rochester, Mn 55905

  Timing: Fiscal Year 2004; Project Start 01-FEB-2004; Project End 31-JAN-2009

  Summary: (provided by applicant): Chondrosarcoma is the most common primary skeletal malignancy occurring at approximately twice the incidence of either **Ewing's sarcoma** or osteogenic sarcoma. Unlike the latter malignancies that have seen significant increases in long-term survival with effective adjuvant therapies aimed at treating metastatic disease, chondrosarcoma remains resistant to existing adjuvant therapies and survival has not improved over the previous several decades. We have determined that metalloproteinase (MMP) gene expression serves as a highly significant prognostic indicator for recurrence and metastasis in patients with chondrosarcoma. The underlying hypothesis for this proposal is that fibrillar collagenase activity produced by the chondrosarcoma cells facilitates cell dissociation from the primary tumor and initiates invasive and metastatic properties of this neoplasm. We will evaluate this premise through the following hypotheses: (1) chondrosarcoma interstitial collagenase gene expression correlates with clinical recurrence and in vitro invasiveness, both of which can be predicted by the presence of a 2G MMP-1 promoter polymorphism that produces an Ets binding site; (2) cell dissociation from tumor tissue is mediated by interstitial collagenase activity; and (3) MMP-1 in the reactive zone of the tumor is synthesized by chondrosarcoma cells rather than by the surrounding stromal cells. Currently, the treatment of patients with chondrosarcoma is hampered by the absence of an effective adjuvant therapy. The current proposal represents a unique opportunity to improve the care of these patients both in a diagnostic and a therapeutic capacity. These clinical advances can only come through a more comprehensive understanding of the cellular activities that contribute to the metastatic cascade. I have provided preliminary evidence that MMP-1 gene expression correlates with clinical outcome in chondrosarcoma, a malignancy in urgent need of an effective adjuvant therapy. The Mayo Clinic has the volume of patients necessary to support this study (greater than 50/yr), and I have established the techniques to permit the quantitation of MMP in surgical specimens. I have established methods of modulation of MMP translation as a potential adjuvant gene therapy in these patients. The application of this approach to patients will require the proposed studies as a means of verification and extension of previous observations. The results of the proposed studies are likely to have clinical implications for identifying patients at increased risk for metastasis and for the development of novel therapeutic approaches to chondrosarcoma. It is also plausible that lessons learned in the proposed studies of chondrosarcoma can be applicable to a wider spectrum of neoplastic processes.

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

- **Project Title: PEDIATRIC ONCOLOGY GROUP**

  Principal Investigator & Institution: Link, Michael P.; Professor; Pediatrics; Stanford University Stanford, Ca 94305

  Timing: Fiscal Year 2002; Project Start 01-JAN-1983; Project End 31-DEC-2002

  Summary: The overall goal of this research proposal is for Stanford University, the University of Arizona, and the Kaiser Permanente Medical Centers of the South San

Francisco Bay Area to continue their active involvement in Pediatric Oncology Group research activities. Stanford faculty and the University of Arizona faculty have already assumed key leadership positions in POG and have or have had major roles in the scientific and administrative aspects of the Group. Further, Stanford, the University of Arizona, and Kaiser have maintained excellent performance ratings in their participation in POG studies and have received commendations for the large numbers of evaluable patients placed on therapeutic protocols. Specifically: l) We plan to continue to enter patients on appropriate POG studies where they exist. The number of patient entries from Stanford has increased each year as appropriate POG studies become available. We anticipate that between 65 and 80 patients will be entered on front-line therapeutic studies each year from Stanford in addition to patients who will be entered from the affiliates; in addition, 40-50 patients or more will be entered on POG non-therapeutic studies. 2) We anticipate that the activities of individual investigators from Stanford and the University of Arizona will continue and increase during the period of this research proposal. Currently, our faculty serve as study coordinators for front- line therapeutic studies in lymphoma and leukemia, and they have coordinated and analyzed data from recently closed protocols in osteosarcoma, lymphoma, leukemia, and **Ewing's sarcoma.** Our faculty also serve key scientific and administrative roles as Group Vice Chair, Disease and Discipline Committee Chairmen and Co-Chairmen, as members of Disease and Discipline Core Committees, and as members of the Executive Committee. Thus, our faculty are in position to influence the future direction of the scientific activities of POG. 3) We anticipate that involvement of Stanford faculty in the laboratory scientific activities of POG will continue. The laboratories of Drs. Link and Cleary have served as immunology reference laboratories and molecular biologic reference laboratories for leukemia studies of POG. 4) We anticipate that non-POG related laboratory and clinical research conducted at Stanford University and its affiliates will become increasingly relevant to POG activities. Some of these activities have already been incorporated into POG laboratory and therapeutic studies and others are targeted for incorporation into future POG studies.

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

- **Project Title: PHASE I TRIAL OF 90Y OCTREOTIDE IN CHILDHOOD SOLID TUMOR**

  Principal Investigator & Institution: O'dorisio, M. Susan.; Professor of Pediatrics; Pediatrics; University of Iowa Iowa City, Ia 52242

  Timing: Fiscal Year 2002; Project Start 16-AUG-2001; Project End 31-MAY-2004

  Summary: (Provided by applicant) Through this QUICK TRIAL, we propose to offer a new therapy to children with relapsed solid tumors.Previous work from our laboratory and from other investigators has established the expression of somatostatin receptors in neuroblastoma, medulloblastoma, the **Ewing's sarcoma** family of tumors and osteogenic sarcoma. These solid tumors of childhood are challenges to pediatric oncologists because they often present at advanced stages of disease and few treatment options are available for children whose disease relapses or progresses. We hypothesize that somatostatin receptors can be exploited as a therapeutic target in the subset of pediatric solid tumors that can be demonstrated to express somatostatin receptors. The Specific Aims are: I. Conduct a Phase I trial to determine the maximum tolerated dose of 90Y-DOTA-tyr3-Octreotide in children with refractory neuroblastoma, medulloblastoma, and other somatostatin receptor positive tumors. Patients with progressive disease after completion of front line therapy will be screened using 1111n-DTPA-Octreotide scintigraphy. Children who have at least one somatostatin receptor positive lesion

documented by histology (previous or current) and by scintigraphy will be eligible to receive 90Y-DOTA-tyr3-Octreotide. Dose escalation will be based on dosimetry measurements in kidney, the predicted organ of limiting toxicity. II. Estimate tumor dose and determine response to therapy (in the context of a Phase I trial).Tumor dosimetry will be estimated using co-registration of CT or MRI images of tumor and functional SPECT images of 111ln-DTPA-Octreotide uptake. Number of complete responses, partial responses, stable disease and tumor progressions will be compared with tumor dose within the limited number of patients/dose in this Phase I trial. III. Test if tumor dose correlates with somatostatin receptor type 2 (sst2) expression as measured by real time RT-PCR and immunohistochemistry. Patients will undergo biopsy of at least one co-registered lesion for histology and quantification of somatostatin receptor expression by Real-time RT-PCR using receptor specific primers and probes developed in our laboratory. Somatostatin receptor protein will be examined by semiquantitative immunohistochemistry using specific sst2 antisera generated in our laboratory. The sst2 expression will be compared with tumor dosimetry and tumor response in order to determine if Real-time RT-PCR analysis of tumor receptor expression can predict response.

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

- **Project Title: PILOT--CONNECTIVE TISSUE ONCOLOGY**

  Principal Investigator & Institution: Baker, Laurence H.; Professor of Internal Medicine; University of Michigan at Ann Arbor 3003 South State, Room 1040 Ann Arbor, Mi 481091274

  Timing: Fiscal Year 2002; Project Start 01-JUN-2002; Project End 31-MAY-2003

  Summary: The Connective Tissue Oncology Program (CTOP) studies two populations of patients with cancer of the connective tissues: the skeleton and its supporting soft tissues. It is composed of 26 members from 11 department with more than $3.3 million in annual direct support. The cancers studied are either primary or metastatic to these groups of tissues. Sarcomas, or primary cancers of connective tissues, are uncommon forms of malignancy, particularly in comparison to the epithelial cancers, yet represent a raison d'etre of cancer centers: multi-disciplinary oncology. All current practice guidelines underscore the need to have multi- disciplinary teams of physicians and other professionals to care for patients with these uncommon malignancies. Success has been clearly achieved with the approach of combining the medical or pediatric oncologist with the surgeon to produce markedly improved cure rates for bone cancer (osteosarcoma, Ewing's sarcoma), and to a lesser extent, of soft tissue sarcomas. While cancers of the connective tissue are much more common in soft tissue than in bone, the reverse is true when one considers metastatic cancers where metastasis to the skeleton is far more common that metastasis to the soft tissue supporting that skeleton. Metastasis to the skeleton is a very common phenomenon associated with human cancer. The prevalence and predilection of metastasis to the bones, despite its commonality, is one of the more poorly understood processes associated with cancer. Even more devastating are the symptoms caused by the metastasis and the relative ineffectiveness of current treatments. The research areas related to sarcomas and metastatic bone tumors represent a common research foci. For example, the bone microenvironment primarily consists of mesenchymal cells similar to the cells from which sarcomas originates from. Additionally, the biology of sarcomas and metastatic cancers is similar in terms of growth characteristics (e.g. slow growth). Accordingly, we think combining these two areas of concern into a single program makes good sense, and in particular, unifies the strengths at this Cancer Center.

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

- **Project Title: ROLE OF IGF SIGNALING UPON EWINGS SARCOMA PATIENT**

  Principal Investigator & Institution: Toretsky, Jeffrey A.; Lombardi Comprehensive Cancer Center; Georgetown University Washington, Dc 20057

  Timing: Fiscal Year 2002; Project Start 13-FEB-2001; Project End 31-MAY-2004

  Summary: The **Ewing's sarcoma** family of tumors (ESFT) affects patients between the ages of 3 and 40 years, with most cases occurring in the second decade of life. Patients who present with localized tumors have approximately 70 percent disease-free survival, while those who present with metastatic ESFT have a poor prognosis despite high dose chemotherapy. Two challenges arise. The first is to stratify patients with localized or metastatic tumors into those who will survive with current therapies and those who will require more intensive therapy. The second is to develop novel strategies for treating those ESFT patients who are not currently surviving despite intensive therapies such as bone marrow transplantation. The insulin-like growth factor type 1 (IGF-I) and its receptor (IGF-IR) are known to play a significant role in ESFT growth and transformation. The applicant's recent work shows that IGF-I signaling participates in ESFT chemoresistance. ESFT contain a tumor specific translocation, t(11;22), with various exonal combinatorial possibilities between individual tumors. One of these translocation types, type l, has been associated with increased survival of patients with localized disease and with decreased expression of the IGF-IR. Therefore, the applicant hypothesizes that increased IGF signaling in patients with ESFT predicts for decreased survival. Understanding altered IGF signaling could thus provide patient stratification and therapeutic targets. In order to define the relevance of IGF signaling in ESFT patients, the components of the IGF signaling system need to be analyzed. This proposal seeks to understand if quantitative changes in ligand, binding proteins, or receptor predict clinical course by utilizing a prospective clinical trial. The applicant proposes three aims: (1) To measure the IGF-I and IGFBP-3 serum levels in all patients enrolled in the upcoming localized and metastatic ESFT protocols. Serum IGF-I, IGFBP-3 and IGFBP-3:IGF-I will be analyzed to identify if these indices predict differences in clinical presentation chemo-responsiveness and event-free survival, (2) To measure the IGF-IR levels in ESFT tumors at the time of diagnosis from all patients enrolled in both the localized and metastatic ESFT protocols and correlate IGF-IR number and tumor IGF-I levels with clinical presentation, response to chemotherapy, and prognosis, and (3) To correlate the findings with the ESFT translocation types. The strengths of this proposal are that the proposed pediatric clinical trials offer an opportunity to compare similarly treated patients for effects of IGF signaling components. The applicant's findings could be utilized for future patient stratification, and the methods developed here can be applied to any malignancy in which IGF signaling may play a key role, including breast, prostate, and colon. This application proposes to measure IGF-I, IGFBP-3, and IGF-IR levels in all patients enrolled in upcoming clinical trials for **Ewing's sarcoma** family of tumors [ESFT] conducted by the Children's Cancer Group/Pediatric Oncology Group, evaluate correlation of indices with response to therapy and survival, and correlated findings with ESFT translocation subtypes.

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

- **Project Title: TARGETED RADIOTHERAPY FOR EWING'S SARCOMA**

  Principal Investigator & Institution: Hawkins, Douglas S.; Children's Hospital and Reg Medical Ctr Box 5371, 4800 Sand Point Way Ne, Ms 6D-1 Seattle, Wa 98105

  Timing: Fiscal Year 2002; Project Start 04-AUG-2000; Project End 31-JUL-2005

Summary: (Applicant's Description) Dr. Douglas Hawkins seeks to become a patient-oriented clinical investigator committed to improving the prognosis for pediatric sarcomas by developing a bone-seeking radiopharmaceutical. The prognosis for patients with recurrent or refractory **Ewing's sarcoma** family of tumors (ESFT) is quite poor, particularly for those with bone metastases. Although ESFT are radiosensitive, effective treatment with radiation therapy is limited by the toxicity of standard external beam radiation therapy to normal tissues, especially when bone metastases are widespread. A strategy that targets radiation to bone while sparing non-osseous tissue could allow the delivery of radiation to bone metastases with acceptable toxicity to normal organs. Holmium-166 (Ho)-DOTMP is a beta-particle emitting radiopharmaceutical that localizes to trabecular bone, with enhanced uptake in areas of active bone turnover. Studies in animals and in patients with multiple myeloma demonstrate that Ho-166-DOTMP delivers high doses of radiation to bone and bone marrow, with minimal non-hematopoietic toxicity. Dr. Hawkins will conduct a Phase I/II study of Ho-166-DOTMP in the treatment of recurrent or refractory ESFT with bone disease. The first specific aim of the project is to define the MTD and the range of toxicity for Ho-166-DOTMP using peripheral blood progenitor calls (PBPC) to support hematopoietic recovery. The second specific aim of the project is to determine the biodistribution and pharmacokinetics of Ho-166-DOTMP in ESFT, including estimation of the radiation dose to bone lesions. Because all patients will be required to have evaluable disease, the third specific aim of this project is to evaluate response to Ho-166-DOTMP. Once the MTD of Ho-166-DOTMP is defined, the fourth specific aim is to initiate a phase II study to estimate the response rate for recurrent or refractory ESFT with bone disease and to initiate a trial incorporating Ho-166-DOTMP into myeloablative therapy for poor risk ESFT. The clinical research environment at Children's Hospital and Regional Medical Center, the University of Washington, and the Fred Hutchinson Cancer Research Center are particularly well suited to the development of his clinical investigation. Dr. Irwin Bernstein, who has extensive clinical research and training experience, will serve as Dr. Hawkins' mentor. Dr. Hawkins also proposes to take courses in radiation biology, radiation pharmacology, biostatistics, and medical ethics at the University of Washington and Children's Hospital and Regional Medical Center. Upon completion of the five-year K23 award, he anticipates having acquired a strong foundation biostatistics and radiation biology, as well as considerable experience planning and conducting clinical trials enabling him to emerge as an independent clinical investigator.

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

- **Project Title: THE ROLE OF FLI1 IN CELLULAR DIFFERENTIATION AND DEVELOPMENT**

  Principal Investigator & Institution: Watson, Dennis K.; Professor; Medical University of South Carolina P O Box 250854 Charleston, Sc 29425

  Timing: Fiscal Year 2002

  Summary: The ETS family of transcription factors has been implicated in the development of leukemias, lymphomas and sarcomas. We have previously identified a member of this family, FLI1, whose retroviral activation results in the development of hematological tumors. The FLI1 gene is oncogenically activated in the transformed cells of patients with **Ewing's sarcoma** by the t(11;22) translocation. The long range goal of this research is to understand the function of FLI1 in the regulation of cellular differentiation and development and how dysregulated FLI1 can lead to the development of disease. Our preliminary data indicate that FLI1 expression can promote differentiation of leukemic cells towards the megakaryocytic lineage. In

addition, we have generated targeted cell lines that carry a mutant allele for the Fli1 gene. We propose to use these in vitro and in vivo systems to examine the consequences of over- and under-expression of FLI1. Ultimately, this will help us identify relevant target genes controlled by this member of the ETS gene family. We hypothesize that FLI1 functionally regulates genes that are critical for cellular differentiation, specifically genes encoding cell-specific proteins and genes that encode proteins that control cellular proliferation. The specific aims of this project are to: (1) define the role of FLI1 in the differentiation of human erythroleukemia cells (K562) by deletion analysis of FLI1; identify the domains required for its biological effects; to determine if ERG can functionally substitute for FLI1; (2) identify FLI1 target genes associated with promotion of cellular differentiation and regulation of cell growth by analysis of gene expression in an inducible system; and (3) to define the role of FLi1 in development by disruption of Fli1 gene in ES cells and in mice by homologous recombination; characterize the pathology of the mutant mice; including hematopoietic cell lineage profile analysis. The experiments proposed will provide important understanding into the mechanisms that control lineage selection during hematopoiesis and cellular proliferation, and insights into oncogenesis caused by the disruption of these controls.

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

- **Project Title: THERAPY-RELATED LEUKEMIA--CLINICAL/BIOLOGIC PREDICTORS**

  Principal Investigator & Institution: Davies, Stella; Professor and Jacob G. Schmidlapp Endowe; Pediatrics; University of Minnesota Twin Cities 200 Oak Street Se Minneapolis, Mn 554552070

  Timing: Fiscal Year 2002; Project Start 01-MAY-1998; Project End 20-SEP-2002

  Summary: (Applicant's Abstract) Over the last 20 years marked improvements in survival from childhood cancer have been achieved, at least in part by significant increases in the dose intensity of chemotherapy administered. While this has improved survival from the primary malignancy, increases in dose intensity have been associated with a marked increase in the frequency of therapy-related acute myeloid leukemia or myelodysplasia (t-MDS/AML), with frequencies as high as 22% in a Children's Cancer Group (CCG) treatment protocol for children with **Ewing's sarcoma.** The applicant hypothesizes that it is possible to identify genetic markers of alkylator damage to predict risk of t-MDS/AML in children receiving high dose-alkylating agent chemotherapy for sarcoma. Additionally, she hypothesizes that host genetic polymorphisms in drug metabolizing enzymes will influence genetic susceptibility to t-MDS/AML and could be used in the future to guide therapy. In this study she will investigate markers of genetic susceptibility and increased risk of t-MDS/AML in 321 children enrolled on CCG sarcoma treatment protocols. She will ask whether genetic susceptibility to alkylating agent damage can be measured prospectively (using analysis of glutathione-S-transferase genotype and glycophorin A mutation frequency). She will look for early signs of development of myeloid malignancy (clonal hematopoiesis), and for acquisition of later genetic events associated with myeloid malignancy (presence of ras gene mutations in peripheral blood leukocytes) in patients who have completed intensive chemotherapy. The identification of markers of genetic susceptibility to t-MDS/AML will allow future modification of therapy for individual patients. The identification of markers of early progression to t-MDS/AML during or after therapy will also allow modification of therapy and/or the development of treatment with chemopreventive agents such as retinoids.

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

- **Project Title: TREATMENT OF CHILDHOOD CANCER**

  Principal Investigator & Institution: Brecher, Martin L.; Roswell Park Cancer Institute Corp Buffalo, Ny 14263

  Timing: Fiscal Year 2002; Project Start 01-JUL-1980; Project End 31-DEC-2002

  Summary: Cooperative trials in pediatric cancer patients have played a major role in the remarkable improvement in cure of childhood cancers. Because most childhood cancers are rare, it is only through this mechanism that adequate numbers of patients can be accrued in reasonable lengths of time for randomized controlled studies. The Department of Pediatrics at Roswell Park Cancer Institute (RPCI) has actively participated in cooperative group trials via the Pediatric Oncology Group (POG) to answer treatment questions which would be impossible to answer were we to conduct only single institution studies. Some pediatric solid tumors are so rare that national intergroup studies are required. We also participate in these intergroup studies. RPCI investigators are coordinators for a number of POG protocols including front-line studies for the treatment of advanced Hodgkin's disease, advanced small non- cleaved cell lymphoma, non-rhabdomyosarcoma soft tissue sarcomas, acute lymphoblastic leukemia in relapse, the National Wilms Tumor Study, brain tumors in infants, and the Intergroup **Ewing's Sarcoma** Study. Roswell Park investigators have also developed POG phase II studies of continuous infusion 5-fluouracil and the combination of cisplatin, ifosfamide and etoposide. Roswell Park investigators chair the Wilms Tumor Committee, the Neuroscience Subcommittee of the Brain Tumor Committee, and co-chair the Pathology Discipline Core Committee, as well as being active on a number of other POG Core Committees. They have made major contributions over the last few years in the areas of solid tumor oncology, neuro- oncology and the treatment of lymphoid malignancies. We are strongly committed to the interdisciplinary approach to pediatric cancer and have established collaboration with the necessary clinical specialties including Radiation Medicine, Pediatric Surgery, Pediatric Neurology, Neurosurgery, and Orthopedic Surgery, as well as with researchers in immunology, pharmacology and molecular biology. As more children are cured of their cancers, the identification and prevention, when feasible, of complications of therapy have become imperative. We have been a major contributor to the identification and understanding of the long-term medical and psychosocial effects of the treatment of leukemia, Hodgkin's disease, and a number of solid tumors, both through the cooperative group mechanism and through institutional studies.

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

- **Project Title: TUMOR SUPPRESSORS IN EWING'S SARCOMA**

  Principal Investigator & Institution: Lessnick, Stephen L.; Dana-Farber Cancer Institute 44 Binney St Boston, Ma 02115

  Timing: Fiscal Year 2002; Project Start 31-JUL-2002; Project End 30-JUN-2007

  Summary: (provided by applicant): The mechanisms of cancer development in children are poorly understood. Molecular analysis of the recurrent chromosomal translocations found in many pediatric solid tumors has identified unique fusion oncogenes for each tumor type. **Ewing's sarcoma** is a pediatric tumor of uncertain histologic origin that is defined by the presence of a specific chromosomal rearrangement, t(11;22)(q24;q12). This translocation generates the EWS/FLI fusion oncogene. While EWS/FLI expression appears to be required for **Ewing's sarcoma** development, it is unlikely to be the only genetic alteration present in this tumor. The goal of this proposal, therefore, is to identify additional genetic events that are required in the genesis of **Ewing's sarcoma.**

While expression of EWS/FLI in immortalized murine fibroblasts results in cellular transformation, our preliminary work demonstrates that expression of EWS/FLI in primary human fibroblasts results in growth arrest. Our hypothesis is that primary cells have growth-inhibitory pathways in place that prevent neoplastic transformation by oncogenes, and that these pathways are likely to be abrogated in **Ewing's sarcoma.** We propose a multifaceted approach to identify these pathways. First, we will use data obtained from expression analysis to identify and validate pathways that mediate this growth arrest. Next, we will identify new pathways by suppressor screening. Finally, we will determine whether these pathways are altered in **Ewing's sarcoma** clinical samples to identify which are biologically relevant to the development of this tumor. The results generated by these studies will not only identify cooperative mutations important for **Ewing's sarcoma** development, but will also provide unique insights into the mechanisms that primary cells use to inhibit oncogenic transformation.

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

- **Project Title: VASCULOGENESIS IN EWING'S SARCOMA: IMPLICATIONS FOR THER**

  Principal Investigator & Institution: Kleinerman, Eugenie S.; Professor & Head; Pediatrics; University of Texas Md Anderson Can Ctr Cancer Center Houston, Tx 77030

  Timing: Fiscal Year 2004; Project Start 01-JUL-2004; Project End 30-JUN-2007

  Summary: (provided by applicant): Despite multiple changes in the chemotherapeutic approach for **Ewing's sarcoma,** the 2 year disease-free survival remains at 40-50% depending on disease site. Better understanding of the tumor biology may uncover therapeutic approaches. Using a nude mouse model, we demonstrated that **Ewing's sarcoma** cells overexpress VEGF and that bone marrow stem cells contribute to the development of new tumor vasculature as the tumor grows (a process known as vasculogenesis as opposed to angiogenesis). Approximately 10% of the new tumor vessels could be attributed to vasculogenesis. We further demonstrated the chemotactic capability of VEGF for bone marrow cells both in vitro (using Boyden Chambers) and in vivo (using matrigel-VEGF plugs). Together these data suggest that bone marrow cells travel to the tumor area in response to VEGF and subsequently contribute to the expansion of the tumor vasculature that is required to support the growing tumor. Our goal is to determine whether VEGF is the chemotactic stimulus, if suppressing VEGF has an impact on bone marrow cell migration and subsequent tumor vasculogenesis, and finally whether these bone marrow cells can be modified to deliver genes to the tumor area. We propose to (1) define the bone marrow cell subpopulations that contribute to this vasculogenesis process. (2) Determine whether cell division of migrated bone marrow cells contributes to vasculogenesis. (3) Determine whether tumor VEGF165 production influences tumor vasculogenesis. This will be done by inhibiting VEGF165 by siRNA. (4) Determine whether CD34+ (or mesenchymal cells as an alternative) can be used to deliver genes to the tumor area. Understanding the biology and the role that vasculogenesis plays in the development of **Ewing's sarcoma** may provide new therapeutic targets. Our goal is to identify whether VEGF165 is the chemotactic signal, to determine whether interfering with VEGF165 has an impact on the migration of bone marrow cells and explore whether these cells can be used to deliver genes to the tumor area.

  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 "Ewing's sarcoma" (or synonyms) into the search box. This search gives you access to full-text articles. The following is a sample of items found for Ewing's sarcoma in the PubMed Central database:

- **EWS-erg and EWS-Fli1 fusion transcripts in Ewing's sarcoma and primitive neuroectodermal tumors with variant translocations.** by Giovannini M, Biegel JA, Serra M, Wang JY, Wei YH, Nycum L, Emanuel BS, Evans GA.; 1994 Aug; http://www.pubmedcentral.gov/picrender.fcgi?tool=pmcentrez&action=stream&blobtype=pdf&artid=295111
- **Identification of target genes for the Ewing's sarcoma EWS/FLI fusion protein by representational difference analysis.** by Braun BS, Frieden R, Lessnick SL, May WA, Denny CT.; 1995 Aug; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&rendertype=abstract&artid=230703
- **The Ewing's sarcoma EWS/FLI-1 fusion gene encodes a more potent transcriptional activator and is a more powerful transforming gene than FLI-1.** by May WA, Lessnick SL, Braun BS, Klemsz M, Lewis BC, Lunsford LB, Hromas R, Denny CT.; 1993 Dec; http://www.pubmedcentral.gov/picrender.fcgi?tool=pmcentrez&action=stream&blobtype=pdf&artid=364810

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 Ewing's sarcoma, simply go to the PubMed Web site at **http://www.ncbi.nlm.nih.gov/pubmed**. Type "Ewing's sarcoma"

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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.

[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.

(or synonyms) into the search box, and click "Go." The following is the type of output you can expect from PubMed for Ewing's sarcoma (hyperlinks lead to article summaries):

- **A case of metastatic spinal Ewing's sarcoma misdiagnosed as brucellosis and transverse myelitis.**
  Author(s): Caksen H, Odabas D, Demirtas M, Kiymaz N, Anlar O, Unal O, Ugras S.
  Source: Neurological Sciences : Official Journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology. 2004 February; 24(6): 414-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14767689

- **A case of primary Ewing's sarcoma of the occipital bone presenting with obstructive hydrocephalus.**
  Author(s): Yasuda T, Inagaki T, Yamanouchi Y, Kawamoto K, Kohdera U, Kawasaki H, Nakano T.
  Source: Child's Nervous System : Chns : Official Journal of the International Society for Pediatric Neurosurgery. 2003 December; 19(12): 792-9. Epub 2003 October 30. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14586633

- **A case with extraosseous Ewing's sarcoma: a late effect related to bone marrow transplantation for thalassemia or a component of a familial cancer syndrome?**
  Author(s): Mutafoglu Uysal K, Olgun N, Sarialioglu F, Kargi A, Cevik N.
  Source: Pediatric Hematology and Oncology. 2000 July-August; 17(5): 415-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10914053

- **A long-term review of the treatment of patients with Ewing's sarcoma in one institution (EJSO 2001; 27: 569-73).**
  Author(s): Renard AJ, Veth RP, Schreuder HW.
  Source: European Journal of Surgical Oncology : the Journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology. 2002 December; 28(8): 896.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12481783

- **A long-term review of the treatment of patients with Ewing's sarcoma in one institution.**
  Author(s): Sluga M, Windhager R, Lang S, Heinzl H, Krepler P, Mittermayer F, Dominkus M, Zoubek A, Kotz R.
  Source: European Journal of Surgical Oncology : the Journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology. 2001 September; 27(6): 569-73.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11520091

- **A national case-control study of Ewing's sarcoma family of tumours in Australia.**
  Author(s): Valery PC, McWhirter W, Sleigh A, Williams G, Bain C.
  Source: International Journal of Cancer. Journal International Du Cancer. 2003 July 20; 105(6): 825-30.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12767069

- **A novel chimera gene between EWS and E1A-F, encoding the adenovirus E1A enhancer-binding protein, in extraosseous Ewing's sarcoma.**
  Author(s): Urano F, Umezawa A, Hong W, Kikuchi H, Hata J.
  Source: Biochemical and Biophysical Research Communications. 1996 February 15; 219(2): 608-12.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8605035

- **A sinonasal primary Ewing's sarcoma.**
  Author(s): Howarth KL, Khodaei I, Karkanevatos A, Clarke RW.
  Source: International Journal of Pediatric Otorhinolaryngology. 2004 February; 68(2): 221-4.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14725990

- **A systematic review and evaluation of the use of tumour markers in paediatric oncology: Ewing's sarcoma and neuroblastoma.**
  Author(s): Riley RD, Burchill SA, Abrams KR, Heney D, Lambert PC, Jones DR, Sutton AJ, Young B, Wailoo AJ, Lewis IJ.
  Source: Health Technology Assessment (Winchester, England). 2003; 7(5): 1-162. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12633526

- **A systematic review of molecular and biological markers in tumours of the Ewing's sarcoma family.**
  Author(s): Riley RD, Burchill SA, Abrams KR, Heney D, Sutton AJ, Jones DR, Lambert PC, Young B, Wailoo AJ, Lewis IJ.
  Source: European Journal of Cancer (Oxford, England : 1990). 2003 January; 39(1): 19-30. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12504654

- **A tetraspanin-family protein, T-cell acute lymphoblastic leukemia-associated antigen 1, is induced by the Ewing's sarcoma-Wilms' tumor 1 fusion protein of desmoplastic small round-cell tumor.**
  Author(s): Ito E, Honma R, Imai J, Azuma S, Kanno T, Mori S, Yoshie O, Nishio J, Iwasaki H, Yoshida K, Gohda J, Inoue J, Watanabe S, Semba K.
  Source: American Journal of Pathology. 2003 December; 163(6): 2165-72.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14633590

- **A viral etiology for Ewing's sarcoma.**
  Author(s): Cope JU.
  Source: Medical Hypotheses. 2000 November; 55(5): 369-72.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11058415

- **Absence of HER2/neu gene expression in osteosarcoma and skeletal Ewing's sarcoma.**
  Author(s): Thomas DG, Giordano TJ, Sanders D, Biermann JS, Baker L.
  Source: Clinical Cancer Research : an Official Journal of the American Association for Cancer Research. 2002 March; 8(3): 788-93.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11895910

- **Acetabular osteoarticular allograft after Ewing's sarcoma resection.**
  Author(s): Verma NN, Kuo KN, Gitelis S.
  Source: Clinical Orthopaedics and Related Research. 2004 February; (419): 149-54.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15021146

- **Adamantinoma-like Ewing's sarcoma and Ewing's-like adamantinoma. The t(11; 22), t(21; 22) status.**
  Author(s): Hauben E, van den Broek LC, Van Marck E, Hogendoorn PC.
  Source: The Journal of Pathology. 2001 September; 195(2): 218-21.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11592101

- **An uncommon case of simultaneous malignant tumors: bronchioloalveolar cancer and Ewing's sarcoma in a 17-year-old girl: report of a case.**
  Author(s): Takanami I, Takeuchi K, Naruke M.
  Source: Surgery Today. 2000; 30(9): 835-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11039714

- **Apoptotic responsiveness of the Ewing's sarcoma family of tumours to tumour necrosis factor-related apoptosis-inducing ligand (TRAIL).**
  Author(s): Van Valen F, Fulda S, Truckenbrod B, Eckervogt V, Sonnemann J, Hillmann A, Rodl R, Hoffmann C, Winkelmann W, Schafer L, Dockhorn-Dworniczak B, Wessel T, Boos J, Debatin KM, Jurgens H.
  Source: International Journal of Cancer. Journal International Du Cancer. 2000 October 15; 88(2): 252-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11004677

- **Beta-adrenergic agonist- and prostaglandin-mediated regulation of cAMP levels in Ewing's sarcoma cells in culture.**
  Author(s): van Valen F, Jurgens H, Winkelmann W, Keck E.
  Source: Biochemical and Biophysical Research Communications. 1987 July 31; 146(2): 685-91.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2887164

- **beta-Adrenergic receptors in pediatric tumors: uncoupled beta 1-adrenergic receptor in Ewing's sarcoma.**
  Author(s): Whitsett JA, Burdsall J, Workman L, Hollinger B, Neely J.
  Source: Journal of the National Cancer Institute. 1983 October; 71(4): 779-86.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6312152

- **Beta-platelet-derived growth factor receptor mediates motility and growth of Ewing's sarcoma cells.**
  Author(s): Uren A, Merchant MS, Sun CJ, Vitolo MI, Sun Y, Tsokos M, Illei PB, Ladanyi M, Passaniti A, Mackall C, Toretsky JA.
  Source: Oncogene. 2003 April 17; 22(15): 2334-42.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12700668

- **Bilateral proptosis due to metastatic Ewing's sarcoma of the orbit: fine needle aspiration cytology (FNAC) and histopathology of a case.**
  Author(s): Khurana AK, Ahluwalia BK, Gupta S, Rajan C, Arora BB.
  Source: Indian J Ophthalmol. 1992 January-March; 40(1): 15-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1464447

- **Biochemical and genetic characterization of the HBA71 Ewing's sarcoma cell surface antigen.**
  Author(s): Fellinger EJ, Garin-Chesa P, Su SL, DeAngelis P, Lane JM, Rettig WJ.
  Source: Cancer Research. 1991 January 1; 51(1): 336-40.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1988096

- **Biologic characterization of human bone tumors. I. Ewing's sarcoma. A comparative electron and immunofluorescence microscopic study.**
  Author(s): Roessner A, Voss B, Rauterberg J, Immenkamp M, Grundmann E.
  Source: Journal of Cancer Research and Clinical Oncology. 1982; 104(1-2): 171-80.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6813337

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CHAPTER 2. NUTRITION AND EWING'S SARCOMA

Overview

In this chapter, we will show you how to find studies dedicated specifically to nutrition and Ewing's sarcoma.

Finding Nutrition Studies on Ewing's Sarcoma

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 "Ewing's sarcoma" (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 "Ewing's sarcoma" (or a synonym):

- **3-[123I]Iodo-L-alpha-methyl tyrosine transport into human fibroblasts and comparison with Ewing's sarcoma cells.**
  Author(s): Department of Nuclear Medicine, University Hospital, Muenster, Germany. franziu@uni-muenster.de
  Source: Franzius, C Kopka, K van Valen, F Riemann, B Sciuk, J Schober, O Nucl-Med-Biol. 2002 May; 29(4): 483-90 0969-8051

- **A link between basic fibroblast growth factor (bFGF) and EWS/FLI-1 in Ewing's sarcoma cells.**
  Author(s): Department of Oncology and Pathology, Cellular and Molecular Tumor Pathology, CCK, R8:04, Karolinska Hospital, SE-171 76 Stockholm, Sweden.
  Source: Girnita, L Girnita, A Wang, M Meis Kindblom, J M Kindblom, L G Larsson, O Oncogene. 2000 August 31; 19(37): 4298-301 0950-9232

- **Abnormal expression of neurofilament proteins in Ewing's sarcoma cell cultures.**
  Author(s): Centre Georges-Francois-Leclerc, Dijon, France.
  Source: Lizard Nacol, S Volk, C Lizard, G Turc Carel, C Tumour-Biol. 1992; 13(1-2): 36-43 0289-5447

- **Addition of ifosfamide and etoposide to standard chemotherapy for Ewing's sarcoma and primitive neuroectodermal tumor of bone.**
  Author(s): Department of Pediatric Hematology, Dana-Farber Cancer Institute and Children's Hospital, Boston, MA 02115, USA. holcombe_grier@dfci.harvard.edu
  Source: Grier, H E Krailo, M D Tarbell, N J Link, M P Fryer, C J Pritchard, D J Gebhardt, M C Dickman, P S Perlman, E J Meyers, P A Donaldson, S S Moore, S Rausen, A R Vietti, T J Miser, J S N-Engl-J-Med. 2003 February 20; 348(8): 694-701 1533-4406

- **Adenovirus-E1A gene therapy enhances the in vivo sensitivity of Ewing's sarcoma to VP-16.**
  Author(s): Division of Pediatrics, The University of Texas M. D. Anderson Cancer Center, Houston, Texas 77030, USA.
  Source: Zhou, R R Jia, S F Zhou, Z Wang, Y Bucana, C D Kleinerman, E S Cancer-Gene-Ther. 2002 May; 9(5): 407-13 0929-1903

- **Blockage of insulin-like growth factor-I receptor inhibits the growth of Ewing's sarcoma in athymic mice.**
  Author(s): Laboratorio di Ricerca Oncologica, Istituti Ortopedici Rizzoli, Bologna, Italy.
  Source: Scotlandi, K Benini, S Nanni, P Lollini, P L Nicoletti, G Landuzzi, L Serra, M Manara, M C Picci, P Baldini, N Cancer-Res. 1998 September 15; 58(18): 4127-31 0008-5472

- **High-dose melphalan +/- total body irradiation and autologous hematopoietic stem cell rescue for adult patients with Ewing's sarcoma or peripheral neuroectodermal tumor.**
  Author(s): Department of Medical Oncology, Tom Baker Cancer Centre, Calgary, Alberta, Canada.
  Source: Stewart, D A Gyonyor, E Paterson, A H Arthur, K Temple, W Schachar, N S Klassen, J Brown, C Russell, J A Bone-Marrow-Transplant. 1996 August; 18(2): 315-8 0268-3369

- **High-dose melphalan, etoposide, total-body irradiation, and autologous stem-cell reconstitution as consolidation therapy for high-risk Ewing's sarcoma does not improve prognosis.**
  Author(s): Memorial Sloan-Kettering Cancer Center, New York, NY, USA. meyersp@mskcc.org
  Source: Meyers, P A Krailo, M D Ladanyi, M Chan, K W Sailer, S L Dickman, P S Baker, D L Davis, J H Gerbing, R B Grovas, A Herzog, C E Lindsley, K L Liu Mares, W Nachman, J B Sieger, L Wadman, J Gorlick, R G J-Clin-Oncol. 2001 June 1; 19(11): 2812-20 0732-183X

- **Ifosfamide and actinomycin-D, added in the induction phase to vincristine, cyclophosphamide and doxorubicin, improve histologic response and prognosis in patients with non metastatic Ewing's sarcoma of the extremity.**
  Author(s): Department of Chemotherapy, Istituto Ortopedico Rizzoli-Bologna, Italy. chemior@sextant.it
  Source: Ferrari, S Mercuri, M Rosito, P Mancini, A Barbieri, E Longhi, A Rimondini, S Cesari, M Ruggieri, P Di Liddo, M Bacci, G J-Chemother. 1998 December; 10(6): 484-91 1120-009X

- **Ifosfamide plus etoposide in newly diagnosed Ewing's sarcoma of bone.**
  Author(s): Department of Hematology-Oncology, St Jude Children's Research Hospital, Memphis, TN 38101-0318.
  Source: Meyer, W H Kun, L Marina, N Roberson, P Parham, D Rao, B Fletcher, B Pratt, C B J-Clin-Oncol. 1992 November; 10(11): 1737-42 0732-183X

- **Improved relapse free survival in patients with poor prognosis Ewing's sarcoma after consolidation with hyperfractionated total body irradiation and fractionated high dose melphalan followed by high dose etoposide and hematopoietic rescue.**
  Author(s): Bone Marrow Transplantation Program, Heinrich Heine University Medical Center, Dusseldorf, FRG.
  Source: Burdach, S Peters, C Paulussen, M Nurnberger, W Wurm, R Wernet, P Dilloo, D Voehringer, R Gadner, H Gobel, U et al. Bone-Marrow-Transplant. 1991; 7 Suppl 295 0268-3369

- **Inhibition of insulin-like growth factor I receptor increases the antitumor activity of doxorubicin and vincristine against Ewing's sarcoma cells.**
  Author(s): Laboratorio di Ricerca Oncologica, Istituti Ortopedici Rizzoli, 40136 Bologna, Italy.
  Source: Benini, S Manara, M C Baldini, N Cerisano, V Massimo Serra Mercuri, M Lollini, P L Nanni, P Picci, P Scotlandi, K Clin-Cancer-Res. 2001 June; 7(6): 1790-7 1078-0432

- **Insulin-like growth factor-I-dependent growth and in vitro chemosensitivity of Ewing's sarcoma and peripheral primitive neuroectodermal tumour cell lines.**
  Author(s): Department of Surgery, University of Vienna, Austria.
  Source: Hofbauer, S Hamilton, G Theyer, G Wollmann, K Gabor, F Eur-J-Cancer. 1993; 29A(2): 241-5 0959-8049

- **Localized Ewing tumor of bone: final results of the cooperative Ewing's Sarcoma Study CESS 86.**
  Author(s): Department of Pediatric Hematology/Oncology, University of Munster, Munster, Germany. michael.paulussen@uni-muenster.de
  Source: Paulussen, M Ahrens, S Dunst, J Winkelmann, W Exner, G U Kotz, R Amann, G Dockhorn Dworniczak, B Harms, D Muller Weihrich, S Welte, K Kornhuber, B Janka Schaub, G Gobel, U Treuner, J Voute, P A Zoubek, A Gadner, H Jurgens, H J-Clin-Oncol. 2001 March 15; 19(6): 1818-29 0732-183X

- **Lung irradiation for Ewing's sarcoma with pulmonary metastases at diagnosis: results of the CESS-studies.**
  Author(s): Department of Radiotherapy, University of Erlangen, Germany.
  Source: Dunst, J Paulussen, M Jurgens, H Strahlenther-Onkol. 1993 October; 169(10): 621-3 0179-7158

- **Multimodal therapy for the management of localized Ewing's sarcoma of pelvic and sacral bones: a report from the second intergroup study.**
  Author(s): Department of Pediatrics, Mayo Clinic, Rochester, MN.
  Source: Evans, R G Nesbit, M E Gehan, E A Garnsey, L A Burgert, O Vietti, T J Cangir, A Tefft, M Thomas, P Askin, F B et al. J-Clin-Oncol. 1991 July; 9(7): 1173-80 0732-183X

- **Neoadjuvant chemotherapy for Ewing's sarcoma of bone: no benefit observed after adding ifosfamide and etoposide to vincristine, actinomycin, cyclophosphamide, and doxorubicin in the maintenance phase--results of two sequential studies.**
  Author(s): Department of Chemotherapy, Istituto Ortopedico Rizzoli, Bologna, Italy.
  Source: Bacci, G Picci, P Ferrari, S Mercuri, M Brach del Prever, A Rosito, P Barbieri, E Tienghi, A Forni, C Cancer. 1998 March 15; 82(6): 1174-83 0008-543X

- **No advantages in the addition of ifosfamide and VP-16 to the standard four-drug regimen in the maintenance phase of neoadjuvant chemotherapy of Ewing's sarcoma of bone: results of two sequential studies.**
  Author(s): Department of Internal Medicine and Oncology, Istituto Ortopedico Rizzoli, Bologna, Italy.
  Source: Bacci, G Picci, P Ruggieri, P Ferrari, S Mercuri, M Fabbri, N Rosito, P Barbieri, E Ferraro, A Casadei, R et al. J-Chemother. 1993 August; 5(4): 247-57 1120-009X

- **Prognostic factors in nonmetastatic Ewing's sarcoma of bone treated with adjuvant chemotherapy: analysis of 359 patients at the Istituto Ortopedico Rizzoli.**
  Author(s): Departments of Musculo-Skeletal Oncology, Istituto Ortopedico Rizzoli, Bologna, Italy. chemioterapia@ior.it
  Source: Bacci, G Ferrari, S Bertoni, F Rimondini, S Longhi, A Bacchini, P Forni, C Manfrini, M Donati, D Picci, P J-Clin-Oncol. 2000 January; 18(1): 4-11 0732-183X

- **Radiotherapy in Ewing's sarcoma and PNET of the chest wall: results of the trials CESS 81, CESS 86 and EICESS 92.**
  Author(s): Department of Radiotherapy, University of Muenster, Germany.
  Source: Schuck, A Hofmann, J Rube, C Hillmann, A Ahrens, S Paulussen, M Jurgens, H Dunst, J Willich, N Int-J-Radiat-Oncol-Biol-Phys. 1998 December 1; 42(5): 1001-6 0360-3016

- **RT-PCR evaluation of peripheral blood, bone marrow and peripheral blood stem cells in children and adolescents undergoing VACIME chemotherapy for Ewing's sarcoma and alveolar rhabdomyosarcoma.**
  Author(s): Fred Hutchinson Cancer Research Center, Seattle, WA, USA.
  Source: Thomson, B Hawkins, D Felgenhauer, J Radich, J Bone-Marrow-Transplant. 1999 September; 24(5): 527-33 0268-3369

- **Second malignancies after ewing tumor treatment in 690 patients from a cooperative German/Austrian/Dutch study.**
  Author(s): Department of Pediatric Hematology/Oncology, University of Munster Germany. michael.paulussen@uni-muenster.de
  Source: Paulussen, M Ahrens, S Lehnert, M Taeger, D Hense, H W Wagner, A Dunst, J Harms, D Reiter, A Henze, G Niemeyer, C Gobel, U Kremens, B Folsch, U R Aulitzky, W E Voute, P A Zoubek, A Jurgens, H Ann-Oncol. 2001 November; 12(11): 1619-30 0923-7534

- **Synergistic effects of 8-chlorocyclic-AMP and retinoic acid on induction of apoptosis in Ewing's sarcoma CHP-100 cells.**
  Author(s): Cellular Biochemistry Section, Laboratory of Tumor Immunology and Biology, National Cancer Institute, Bethesda, Maryland 20892, USA.
  Source: Srivastava, R K Srivastava, A R Cho Chung, Y S Clin-Cancer-Res. 1998 March; 4(3): 755-61 1078-0432
- **Ukrain and hyperthermia treatment in a patient with Ewing's sarcoma (case report).**
  Source: Aschhoff, B Drugs-Exp-Clin-Res. 1998; 24(5-6): 241-2 0378-6501

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**

CHAPTER 3. ALTERNATIVE MEDICINE AND EWING'S SARCOMA

Overview

In this chapter, we will begin by introducing you to official information sources on complementary and alternative medicine (CAM) relating to Ewing's sarcoma. 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 Ewing's sarcoma 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 "Ewing's sarcoma" (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 Ewing's sarcoma:

- **A link between basic fibroblast growth factor (bFGF) and EWS/FLI-1 in Ewing's sarcoma cells.**
  Author(s): Girnita L, Girnita A, Wang M, Meis-Kindblom JM, Kindblom LG, Larsson O.
  Source: Oncogene. 2000 August 31; 19(37): 4298-301.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10980604

- **A multidisciplinary study investigating radiotherapy in Ewing's sarcoma: end results of POG #8346. Pediatric Oncology Group.**
  Author(s): Donaldson SS, Torrey M, Link MP, Glicksman A, Gilula L, Laurie F, Manning J, Neff J, Reinus W, Thompson E, Shuster JJ.
  Source: International Journal of Radiation Oncology, Biology, Physics. 1998 August 1; 42(1): 125-35.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9747829

- **Acute and late effects on normal tissues following combined chemo- and radiotherapy for childhood rhabdomyosarcoma and Ewing's sarcoma.**
  Author(s): Tefft M, Lattin PB, Jereb B, Cham W, Ghavimi G, Rosen G, Exelby P, Marcove R, Murphy ML, D'Angio GJ.
  Source: Cancer. 1976 February; 37(2 Suppl): 1201-17.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1253131

- **Addition of ifosfamide and etoposide to standard chemotherapy for Ewing's sarcoma and primitive neuroectodermal tumor of bone.**
  Author(s): Grier HE, Krailo MD, Tarbell NJ, Link MP, Fryer CJ, Pritchard DJ, Gebhardt MC, Dickman PS, Perlman EJ, Meyers PA, Donaldson SS, Moore S, Rausen AR, Vietti TJ, Miser JS.
  Source: The New England Journal of Medicine. 2003 February 20; 348(8): 694-701.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12594313

- **Adenovirus-E1A gene therapy enhances the in vivo sensitivity of Ewing's sarcoma to VP-16.**
  Author(s): Zhou RR, Jia SF, Zhou Z, Wang Y, Bucana CD, Kleinerman ES.
  Source: Cancer Gene Therapy. 2002 May; 9(5): 407-13.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11961663

- **Adjuvant chemotherapy in Ewing's sarcoma patients.**
  Author(s): Gasparini M, Lombardi F.
  Source: Recent Results Cancer Res. 1982; 80: 120-3.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7036274

- **Adjuvant chemotherapy in Ewing's sarcoma.**
  Author(s): Advani SH, Rao DN, Dinshaw KA, Nair CN, Gopal R, Vyas JJ, Desai PB.
  Source: Journal of Surgical Oncology. 1986 June; 32(2): 76-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3724198

- **Adjuvant chemotherapy in the treatment of clinically localised Ewing's sarcoma.**
  Author(s): Bacci G, Campanacci M, Pagani PA.
  Source: The Journal of Bone and Joint Surgery. British Volume. 1978 November; 60-B(4): 567-74.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=711809

- **Adults with Ewing's sarcoma. An analysis of 16 patients at the Dana-Farber Cancer Institute.**
  Author(s): Siegel RD, Ryan LM, Antman KH.

Source: American Journal of Clinical Oncology : the Official Publication of the American Radium Society. 1988 December; 11(6): 614-7.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3189226

- **Altered pattern of metastasis following treatment of Ewing's sarcoma with radiotherapy and adjuvant chemotherapy.**
Author(s): Marsa GW, Johnson RE.
Source: Cancer. 1971 May; 27(5): 1051-4.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=4325741

- **Analysis of local tumor control in Ewing's sarcoma: preliminary results of a cooperative intergroup study.**
Author(s): Perez CA, Razek A, Tefft M, Nesbit M, Burgert EO Jr, Kissane J, Vietti T, Gehan EA.
Source: Cancer. 1977 December; 40(6): 2864-73.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=338138

- **Calla positive acute lymphoblastic leukemia after etoposide-based therapy for Ewing's sarcoma.**
Author(s): Kapoor G, Bajpai S, Nair CN, Badrinath Y, Gladstone B, Advani SH.
Source: Leukemia Research. 1995 October; 19(10): 771-2.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7500656

- **Chest wall resection for Ewing's sarcoma of the rib: an unnecessary procedure.**
Author(s): Rao BN, Hayes FA, Thompson EI, Kumar AP, Fleming ID, Green AA, Austin BA, Pate JW, Hustu HO.
Source: The Annals of Thoracic Surgery. 1988 July; 46(1): 40-4.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3382285

- **Combined modality therapy of Ewing's sarcoma.**
Author(s): Pomeroy TC, Johnson RE.
Source: Cancer. 1975 January; 35(1): 36-47.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1109774

- **Curability of Ewing's sarcoma and considerations for future therapeutic trials.**
Author(s): Rosen G, Caparros B, Mosende C, McCormick B, Huvos AG, Marcove RC.
Source: Cancer. 1978 March; 41(3): 888-99.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=638976

- **Current results with a combined treatment approach to localized Ewing's sarcoma.**
Author(s): Gasparini M, Fossati-Bellani F, Bonadonna G.

Source: Recent Results Cancer Res. 1978; 68: 45-51. No Abstract Available.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=752881

- **Differential regulation of the response to DNA damage in Ewing's sarcoma cells by ETS1 and EWS/FLI-1.**
  Author(s): Soldatenkov VA, Trofimova IN, Rouzaut A, McDermott F, Dritschilo A, Notario V.
  Source: Oncogene. 2002 April 25; 21(18): 2890-5.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11973649

- **E1A sensitizes HER2/neu-overexpressing Ewing's sarcoma cells to topoisomerase II-targeting anticancer drugs.**
  Author(s): Zhou Z, Jia SF, Hung MC, Kleinerman ES.
  Source: Cancer Research. 2001 April 15; 61(8): 3394-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11309298

- **EORTC/GTO adjuvant chemotherapy program for primary Ewing's sarcoma: results at 5 years.**
  Author(s): Le Mevel BP, Hoerni B, Durant D, Kenesi C, Salle M, Trifaud A, Liegey-Bagari D, Bainvel JV, Rogez JM, Fumoleau P, Mazabraud A, Dumont J, Tomend B, Brossel E, Garetta M, Guerrin D, Jasmin C, Sancho-Garnier H, Gimenez M.
  Source: Recent Results Cancer Res. 1978; 68: 52-9. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=752883

- **Evaluation of chemotherapy in children with metastatic Ewing's sarcoma and osteogenic sarcoma.**
  Author(s): Sutow WW, Vietti TJ, Fernbach DJ, Lane DM, Donaldson MH, Lonsdale D.
  Source: Cancer Chemother Rep. 1971 February; 55(1): 67-78. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=5287340

- **Evaluation of therapeutic results in Ewing's sarcoma.**
  Author(s): Johnson RE, Pomeroy TC.
  Source: Am J Roentgenol Radium Ther Nucl Med. 1975 March; 123(3): 583-7. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1124835

- **Ewing's sarcoma of bone: clinicopathologic aspects of 303 cases from the Intergroup Ewing's Sarcoma Study.**
  Author(s): Kissane JM, Askin FB, Foulkes M, Stratton LB, Shirley SF.
  Source: Human Pathology. 1983 September; 14(9): 773-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6885037

- **Ewing's sarcoma of the lumbar spine: a case report of long-term survival.**
  Author(s): Russin LA, Robinson MJ, Engle HA, Sonni A.
  Source: Clinical Orthopaedics and Related Research. 1982 April; (164): 126-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7067273

- **Ewing's sarcoma of the mandible: a case report.**
  Author(s): Berk R, Heller A, Heller D, Schwartz S, Klein EA.
  Source: Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics. 1995 February; 79(2): 159-62.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7614177

- **Ewing's sarcoma of the mandible: a combined approach to treatment.**
  Author(s): Fielding AF, Lindemeyer R, Wood-Harris J, Hartman MJ.
  Source: J Clin Pediatr Dent. 2002 Summer; 26(4): 409-12.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12175138

- **Ewing's sarcoma of the scapula with metastases to the lung and eye.**
  Author(s): Green DM, Marinello MJ, Fisher J, Mindell ER, Zak TA, Allen JE, Khan AR, Brecher ML.
  Source: Am J Pediatr Hematol Oncol. 1986 Summer; 8(2): 134-43.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3740367

- **Ewing's sarcoma treatment in Scandinavia 1984-1990--ten-year results of the Scandinavian Sarcoma Group Protocol SSGIV.**
  Author(s): Nilbert M, Saeter G, Elomaa I, Monge OR, Wiebe T, Alvegard TA.
  Source: Acta Oncologica (Stockholm, Sweden). 1998; 37(4): 375-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9743460

- **Ewing's sarcoma, adjuvant chemotherapy and pathologic fracture.**
  Author(s): Rosenstock JG, Jones PM, Pearson D, Palmer MK.
  Source: European Journal of Cancer (Oxford, England : 1990). 1978 July; 14(7): 799-803.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=658105

- **Ewing's sarcoma.**
  Author(s): Iyer RS, Rao SR, Gurjal A, Nair CN, Pai SK, Kurkure PA, Pande SC, Advani SH.
  Source: Journal of Surgical Oncology. 1993 March; 52(3): 188-92.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8441279

- **Ewing's sarcoma.**
  Author(s): Nesbit ME.

Source: Ca: a Cancer Journal for Clinicians. 1976 May-June; 26(3): 174-80.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=819115

- **Ewing's sarcoma: 5-year survival under adjuvant chemotherapy.**
Author(s): Le Mevel BP.
Source: Recent Results Cancer Res. 1982; 80: 128-33.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7036275

- **Ewing's sarcoma: a trial of adjuvant chemotherapy and sequential half-body irradiation.**
Author(s): Berry MP, Jenkin RD, Harwood AR, Cummings BJ, Quirt IC, Sonley MJ, Rider WD.
Source: International Journal of Radiation Oncology, Biology, Physics. 1986 January; 12(1): 19-24.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3943988

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Author(s): Attawia MA, Borden MD, Herbert KM, Katti DS, Asrari F, Uhrich KE, Laurencin CT.
Source: Journal of Controlled Release : Official Journal of the Controlled Release Society. 2001 April 2; 71(2): 193-202.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11274751

- **Results of multimodal therapy in Ewing's sarcoma: a retrospective analysis of 20 patients.**
Author(s): Ben-Arush M, Kuten A, Perez-Nahum M, Cohen Y, Bialik V.
Source: Journal of Surgical Oncology. 1991 September; 48(1): 51-5.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1890840

- **RT-PCR evaluation of peripheral blood, bone marrow and peripheral blood stem cells in children and adolescents undergoing VACIME chemotherapy for Ewing's sarcoma and alveolar rhabdomyosarcoma.**
Author(s): Thomson B, Hawkins D, Felgenhauer J, Radich J.

Source: Bone Marrow Transplantation. 1999 September; 24(5): 527-33.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10482938

- **Salvage chemotherapy for recurrent Ewing's sarcomas.**
  Author(s): Ozaki T, Sugihara S, Hamada M, Nakagawa Y, Inoue H.
  Source: Neoplasma. 1995; 42(1): 39-42.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7617074

- **Second malignancies after treatment for Ewing's sarcoma: a report of the CESS-studies.**
  Author(s): Dunst J, Ahrens S, Paulussen M, Rube C, Winkelmann W, Zoubek A, Harms D, Jurgens H.
  Source: International Journal of Radiation Oncology, Biology, Physics. 1998 September 1; 42(2): 379-84.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9788419

- **Significance of surgical margin on the prognosis of patients with Ewing's sarcoma. A report from the Cooperative Ewing's Sarcoma Study.**
  Author(s): Ozaki T, Hillmann A, Hoffmann C, Rube C, Blasius S, Dunst J, Jurgens H, Winkelmann W.
  Source: Cancer. 1996 August 15; 78(4): 892-900.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8756387

- **Ten years experience with Ewing's sarcoma.**
  Author(s): Gasparini M, Barni S, Lattuada A, Musumeci R, Bonadonna G, Fossati-Bellani F.
  Source: Tumori. 1977 January-February; 63(1): 77-90.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=878024

- **The frequency of isolated CNS involvement in Ewing's sarcoma.**
  Author(s): Trigg ME, Glaubiger D, Nesbit ME Jr.
  Source: Cancer. 1982 June 1; 49(11): 2404-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7074552

- **The response to initial chemotherapy as a prognostic factor in localized Ewing's sarcoma.**
  Author(s): Oberlin O, Patte C, Demeocq F, Lacombe MJ, Brunat-Mentigny M, Demaille MC, Tron P, N'Guyen Bui B, Lemerle J.
  Source: Eur J Cancer Clin Oncol. 1985 April; 21(4): 463-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3839188

- **The role of radiation therapy in the management of non-metastatic Ewing's sarcoma of bone. Report of the Intergroup Ewing's Sarcoma Study.**

Author(s): Perez CA, Tefft M, Nesbit M, Burgert EO Jr, Vietti T, Kissane J, Pritchard DJ, Gehan EA.
Source: International Journal of Radiation Oncology, Biology, Physics. 1981 February; 7(2): 141-9.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7012102

- **Treatment of clinically localized Ewing's sarcoma with radiotherapy and combination chemotherapy.**
Author(s): Hustu HO, Pinkel D, Pratt CB.
Source: Cancer. 1972 December; 30(6): 1522-7.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=4641761

- **Treatment of Ewing's sarcoma with concurrent radiotherapy and chemotherapy.**
Author(s): Hustu HO, Holton C, James D Jr, Pinkel D.
Source: The Journal of Pediatrics. 1968 August; 73(2): 249-51.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=5668376

- **Treatment of Ewing's sarcoma with local irradiation and systemic chemotherapy. A progress report.**
Author(s): Johnson RE, Senyszyn JJ, Rabson AS, Peterson KA.
Source: Radiology. 1970 April; 95(1): 195-7.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=4984678

- **Treatment options in primary Ewing's sarcoma of the spine: report of seven cases and review of the literature.**
Author(s): Sharafuddin MJ, Haddad FS, Hitchon PW, Haddad SF, el-Khoury GY.
Source: Neurosurgery. 1992 April; 30(4): 610-8; Discussion 618-9. Review.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1374853

- **Very-high-dose short-term chemotherapy for poor-risk peripheral primitive neuroectodermal tumors, including Ewing's sarcoma, in children and young adults.**
Author(s): Kushner BH, Meyers PA, Gerald WL, Healey JH, La Quaglia MP, Boland P, Wollner N, Casper ES, Aledo A, Heller G, et al.
Source: Journal of Clinical Oncology : Official Journal of the American Society of Clinical Oncology. 1995 November; 13(11): 2796-804.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7595741

- **VM-26 and dimethyl triazeno imidazole carboxamide in Ewing's sarcoma.**
Author(s): Campbell AM, Ekert H, Waters KD.
Source: Aust Paediatr J. 1983 March; 19(1): 30-3.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6347162

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/**

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. PERIODICALS AND NEWS ON EWING'S SARCOMA

Overview

In this chapter, we suggest a number of news sources and present various periodicals that cover Ewing's sarcoma.

News Services and Press Releases

One of the simplest ways of tracking press releases on Ewing's sarcoma 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 "Ewing's sarcoma" (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 Ewing's sarcoma. 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 "Ewing's sarcoma" (or synonyms). The following was recently listed in this archive for Ewing's sarcoma:

- **Prognostic factors for patients with Ewing's sarcoma of the bone identified**
  Source: Reuters Medical News
  Date: September 22, 2000

- **Independent Prognostic Factor In Ewing's Sarcoma Confirmed**
  Source: Reuters Medical News
  Date: April 08, 1998

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 "Ewing's sarcoma" (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 "Ewing's sarcoma" (or synonyms). If you know the name of a company that is relevant to Ewing's sarcoma, 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 "Ewing's sarcoma" (or synonyms).

Academic Periodicals covering Ewing's Sarcoma

Numerous periodicals are currently indexed within the National Library of Medicine's PubMed database that are known to publish articles relating to Ewing's sarcoma. In addition to these sources, you can search for articles covering Ewing's sarcoma 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 5. 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 Ewing's sarcoma. 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 Ewing's sarcoma. 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 Ewing's sarcoma:

Cyclophosphamide

- **Systemic - U.S. Brands:** Cytoxan; Neosar
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202174.html

Doxorubicin

- **Systemic - U.S. Brands:** Adriamycin PFS; Adriamycin RDF; Rubex
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202209.html

Etoposide

- **Systemic - U.S. Brands:** Etopophos; Toposar; VePesid
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202234.html

Ifosfamide

- **Systemic - U.S. Brands:** IFEX
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202293.html

Leucovorin

- **Systemic - U.S. Brands:** Wellcovorin
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202321.html

Vincristine

- **Systemic - U.S. Brands:** Oncovin; Vincasar PFS; Vincrex
  http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202594.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 Ewing's sarcoma 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 "Ewing's sarcoma" (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 Ewing's sarcoma:

- **Liposomal N-Acetylglucosminyl-N-Acetylmurmaly-L-Al (trade name: ImmTher)**
  http://www.rarediseases.org/nord/search/nodd_full?code=925

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[8]:

- 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/**

[8] 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.[9] 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:[10]

- **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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[9] 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**).

[10] 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[11]

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.[12] To use the NLM Gateway, simply go to the search site at **http://gateway.nlm.nih.gov/gw/Cmd**. Type "Ewing's sarcoma" (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	4398
Books / Periodicals / Audio Visual	17
Consumer Health	228
Meeting Abstracts	0
Other Collections	15
Total	4658

HSTAT[13]

HSTAT is a free, Web-based resource that provides access to full-text documents used in healthcare decision-making.[14] 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.[15] Simply search by "Ewing's sarcoma" (or synonyms) at the following Web site: **http://text.nlm.nih.gov**.

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[11] Adapted from NLM: **http://gateway.nlm.nih.gov/gw/Cmd?Overview.x**.

[12] 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).

[13] Adapted from HSTAT: **http://www.nlm.nih.gov/pubs/factsheets/hstat.html**.

[14] The HSTAT URL is **http://hstat.nlm.nih.gov/**.

[15] 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[16]

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.[17] 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.[18] 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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[16] Adapted from **http://www.ncbi.nlm.nih.gov/Coffeebreak/Archive/FAQ.html**.

[17] 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.

[18] 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 Ewing's sarcoma 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 Ewing's sarcoma. 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 Ewing's sarcoma. 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 "Ewing's sarcoma":

Bone Cancer
http://www.nlm.nih.gov/medlineplus/bonecancer.html

Bone Diseases
http://www.nlm.nih.gov/medlineplus/bonediseases.html

Bone Marrow Diseases
http://www.nlm.nih.gov/medlineplus/bonemarrowdiseases.html

Bone Marrow Transplantation
http://www.nlm.nih.gov/medlineplus/bonemarrowtransplantation.html

Brain Cancer
http://www.nlm.nih.gov/medlineplus/braincancer.html

Breast Cancer
http://www.nlm.nih.gov/medlineplus/breastcancer.html

Cancer
http://www.nlm.nih.gov/medlineplus/cancer.html

Carcinoid Tumors
http://www.nlm.nih.gov/medlineplus/carcinoidtumors.html

Clinical Trials
http://www.nlm.nih.gov/medlineplus/clinicaltrials.html

Lymphoma
http://www.nlm.nih.gov/medlineplus/lymphoma.html

Multiple Myeloma
http://www.nlm.nih.gov/medlineplus/multiplemyeloma.html

Soft Tissue Sarcoma
http://www.nlm.nih.gov/medlineplus/softtissuesarcoma.html

Within the health topic page dedicated to Ewing's sarcoma, the following was listed:

- Diagnosis/Symptoms

Bone Markers
Source: American Association for Clinical Chemistry
http://www.labtestsonline.org/understanding/analytes/bone_markers/glance.html

Bone Scan
Source: National Institutes of Health, Clinical Center
http://www.cc.nih.gov/ccc/patient_education/procdiag/bonescan.pdf

Bone Scan: Using Nuclear Medicine to Look for Bone Abnormalities
Source: Mayo Foundation for Medical Education and Research
http://www.mayoclinic.com/invoke.cfm?id=CA00020

Can Bone Cancer Be Found Early?
Source: American Cancer Society
http://www.cancer.org/docroot/cri/content/cri_2_4_3x_can_bone_cancer_be_found_early_2.asp

Glossary of Orthopaedic Diagnostic Tests
Source: American Academy of Orthopaedic Surgeons
http://orthoinfo.aaos.org/fact/thr_report.cfm?Thread_ID=372&topcategory=About%2520Orthopaedics

How Is Bone Cancer Diagnosed?
Source: American Cancer Society
http://www.cancer.org/docroot/cri/content/cri_2_4_3x_how_is_bone_cancer_diagnosed_2.asp?

How Is Bone Cancer Staged?
Source: American Cancer Society
http://www.cancer.org/docroot/CRI/content/CRI_2_4_3X_How_is_bone_cancer_staged_2.asp?sitearea=

How Is Bone Metastasis Diagnosed?
Source: American Cancer Society
http://www.cancer.org/docroot/cri/content/cri_2_4_3x_how_is_bone_metastasis_diagnosed_66.asp?

How Is Ewing's Family of Tumors Diagnosed?
Source: American Cancer Society
http://www.cancer.org/docroot/cri/content/cri_2_4_3x_how_is_ewings_family_of_tumors_diagnosed_48.asp?

How Is Osteosarcoma Found?
Source: American Cancer Society
http://www.cancer.org/docroot/cri/content/cri_2_2_3x_how_is_osteosarcoma_found_52.asp?

- Treatment

Ewing's Family of Tumors (PDQ): Treatment
Source: National Cancer Institute
http://www.cancer.gov/cancerinfo/pdq/treatment/ewings/patient/

How Is Bone Cancer Treated?
Source: American Cancer Society
http://www.cancer.org/docroot/CRI/content/CRI_2_4_4X_How_Is_Bone_Cancer_Treated_2.asp?rnav=cri

How Is Bone Metastasis Treated?
Source: American Cancer Society
http://www.cancer.org/docroot/cri/content/cri_2_2_4x_how_is_bone_metastasis_treated_66.asp?

How is Osteosarcoma Treated?
Source: American Cancer Society
http://www.cancer.org/docroot/cri/content/cri_2_4_4x_how_is_osteosarcoma_treated_52.asp?sitearea=cri

Limb Salvage after Bone Cancer
Source: National Childhood Cancer Foundation
http://www.childrensoncologygroup.org/Disc/LE/pdf/LimbSalvageafterBoneCancer.pdf

Osteosarcoma/Malignant Fibrous Histiocytoma of Bone (PDQ): Treatment
Source: National Cancer Institute
http://www.cancer.gov/cancerinfo/pdq/treatment/osteosarcoma/Patient

What Can You Tell Me about Bone and Tissue Transplantation?
Source: American Academy of Orthopaedic Surgeons
http://orthoinfo.aaos.org/brochure/thr_report.cfm?Thread_ID=53&topcategory=About%2520Orthopaedics&all=all

- Children

Childhood Cancer: Osteosarcoma
Source: Nemours Foundation
http://kidshealth.org/parent/medical/cancer/cancer_osteosarcoma.html

Childhood Osteosarcoma
Source: American Society of Clinical Oncology
http://www.peoplelivingwithcancer.org/plwc/MainConstructor/1%2C1744%2C_04-0065-00_12-001043-00_17-001029-00_18-0025950-00_19-000-00_20-001-00_21-008%2C00.asp

- From the National Institutes of Health

Bone Cancer: Questions and Answers
Source: National Cancer Institute
http://cis.nci.nih.gov/fact/6_26.htm

- Organizations

American Cancer Society
http://www.cancer.org/

National Cancer Institute
http://www.cancer.gov/

- Prevention/Screening

What Are the Risk Factors for Bone Cancer?
Source: American Cancer Society
http://www.cancer.org/docroot/cri/content/cri_2_4_2x_what_are_the_risk_factors_for_bone_cancer_2.asp?

What Are the Risk Factors for Ewing's Family of Tumors?
Source: American Cancer Society
http://www.cancer.org/docroot/CRI/content/CRI_2_4_2X_What_are_the_risk_factors_for_Ewings_Family_of_tumors_48.asp?rnav=cri

What Causes Osteosarcoma? Can It Be Prevented?
Source: American Cancer Society
http://www.cancer.org/docroot/cri/content/cri_2_2_2x_what_causes_osteosarcoma_can_it_be_prevented_52.asp?

- Research

  Single-Dose Radiation Cost Effective for Cancer Bone Pain
  Source: American Cancer Society
  http://www.cancer.org/docroot/NWS/content/NWS_2_1x_Single-Dose_Radiation_Cost_Effective_For_Cancer_Bone_Pain.asp

  What's New in Bone Cancer Research and Treatment?
  Source: American Cancer Society
  http://www.cancer.org/docroot/cri/content/cri_2_4_6x_whats_new_in_bone_cancer_research_and_treatment_2.asp?

  What's New in Bone Metastasis Research and Treatment?
  Source: American Cancer Society
  http://www.cancer.org/docroot/cri/content/cri_2_4_6x_whats_new_in_bone_metastasis_research_and_treatment_66.asp?

  What's New in Ewing's Family of Tumors Research and Treatment?
  Source: American Cancer Society
  http://www.cancer.org/docroot/CRI/content/CRI_2_4_6X_Whats_new_in_Ewings_Family_of_tumors_research_and_treatment_48.asp?rnav=cri

  What's New in Osteosarcoma Research and Treatment?
  Source: American Cancer Society
  http://www.cancer.org/docroot/cri/content/cri_2_4_6x_whats_new_in_osteosarcoma_research_and_treatment_52.asp?

- Statistics

  How Many People Get Bone Metastasis?
  Source: American Cancer Society
  http://www.cancer.org/docroot/CRI/content/CRI_2_2_1X_How_many_people_get_bone_metastasis_66.asp?sitearea=

  What Are The Key Statistics About Osteosarcoma?
  Source: American Cancer Society
  http://www.cancer.org/docroot/cri/content/cri_2_4_1x_what_are_the_key_statistics_for_osteosarcoma_52.asp?

  What Are the Key Statistics For Bone Cancer?
  Source: American Cancer Society
  http://www.cancer.org/docroot/cri/content/cri_2_4_1x_what_are_the_key_statistics_for_bone_cancer_2.asp?

  What Are the Key Statistics for Ewing's Family of Tumors?
  Source: American Cancer Society
  http://www.cancer.org/docroot/cri/content/cri_2_4_1x_what_are_the_key_statistics_for_ewings_family_of_tumors_48.asp?

- Teenagers

  Dealing with Osteosarcoma
  Source: Indiana University Cancer Center
  http://iucc.iu.edu/osteosarcoma/patients/dealing_with_os/

Family and Friends of an Osteosarcoma Patient
Source: Indiana University Cancer Center
http://iucc.iu.edu/osteosarcoma/family_friends/

Patient Info About Osteosarcoma
Source: Indiana University Cancer Center
http://iucc.iu.edu/osteosarcoma/patients/patient_info/

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 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 Ewing's sarcoma. 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 Ewing's sarcoma. By consulting all of associations

listed in this chapter, you will have nearly exhausted all sources for patient associations concerned with Ewing's sarcoma.

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 Ewing's sarcoma. 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 "Ewing's sarcoma" (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 "Ewing's sarcoma". 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 "Ewing's sarcoma" (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 "Ewing's sarcoma" (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.[19]

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

[19] 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)[20]:

- **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/**

[20] 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 Ewing's sarcoma:

- **Basic Guidelines for Ewing's Sarcoma**

  Ewing's sarcoma
  Web site: http://www.nlm.nih.gov/medlineplus/ency/article/001302.htm

- **Signs & Symptoms for Ewing's Sarcoma**

  Fever
  Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003090.htm

  Swelling
  Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003103.htm

- **Diagnostics and Tests for Ewing's Sarcoma**

  Biopsy
  Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003416.htm

  Bone scan
  Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003833.htm

Chest X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003804.htm

CT scan of the chest
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003788.htm

X-ray
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/003337.htm

- **Background Topics for Ewing's Sarcoma**

Chemotherapy
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/002324.htm

Flat bones
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/002366.htm

Long bones
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/002249.htm

Metastasis
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/002260.htm

Radiation therapy
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/001918.htm

Surgical excision
Web site: http://www.nlm.nih.gov/medlineplus/ency/article/002305.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**

EWING'S SARCOMA DICTIONARY

The definitions below are derived from official public sources, including the National Institutes of Health [NIH] and the European Union [EU].

Aberrant: Wandering or deviating from the usual or normal course. [EU]

Acetylglucosamine: The N-acetyl derivative of glucosamine. [NIH]

Acne: A disorder of the skin marked by inflammation of oil glands and hair glands. [NIH]

Acute leukemia: A rapidly progressing cancer of the blood-forming tissue (bone marrow). [NIH]

Acute lymphoblastic leukemia: ALL. A quickly progressing disease in which too many immature white blood cells called lymphoblasts are found in the blood and bone marrow. Also called acute lymphocytic leukemia. [NIH]

Acute lymphocytic leukemia: ALL. A quickly progressing disease in which too many immature white blood cells called lymphoblasts are found in the blood and bone marrow. Also called acute lymphoblastic leukemia. [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]

Adaptability: Ability to develop some form of tolerance to conditions extremely different from those under which a living organism evolved. [NIH]

Adenosine: A nucleoside that is composed of adenine and d-ribose. Adenosine or adenosine derivatives play many important biological roles in addition to being components of DNA and RNA. Adenosine itself is a neurotransmitter. [NIH]

Adenovirus: A group of viruses that cause respiratory tract and eye infections. Adenoviruses used in gene therapy are altered to carry a specific tumor-fighting gene. [NIH]

Adenylate Cyclase: An enzyme of the lyase class that catalyzes the formation of cyclic AMP and pyrophosphate from ATP. EC 4.6.1.1. [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]

Adjuvant Therapy: Treatment given after the primary treatment to increase the chances of a cure. Adjuvant therapy may include chemotherapy, radiation therapy, or hormone therapy. [NIH]

Adrenergic: Activated by, characteristic of, or secreting epinephrine or substances with similar activity; the term is applied to those nerve fibres that liberate norepinephrine at a synapse when a nerve impulse passes, i.e., the sympathetic fibres. [EU]

Adverse Effect: An unwanted side effect of treatment. [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]

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]

Algorithms: A procedure consisting of a sequence of algebraic formulas and/or logical steps to calculate or determine a given task. [NIH]

Allergen: An antigenic substance capable of producing immediate-type hypersensitivity (allergy). [EU]

Allograft: An organ or tissue transplant between two humans. [NIH]

Alopecia: Absence of hair from areas where it is normally present. [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]

Amifostine: A phosphorothioate proposed as a radiation-protective agent. It causes splenic vasodilation and may block autonomic ganglia. [NIH]

Amino acid: Any organic compound containing an amino (-NH2 and a carboxyl (- COOH) group. The 20 a-amino acids listed in the accompanying table are the amino acids from which proteins are synthesized by formation of peptide bonds during ribosomal translation of messenger RNA; all except glycine, which is not optically active, have the L configuration. Other amino acids occurring in proteins, such as hydroxyproline in collagen, are formed by posttranslational enzymatic modification of amino acids residues in polypeptide chains. There are also several important amino acids, such as the neurotransmitter y-aminobutyric acid, that have no relation to proteins. Abbreviated AA. [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]

Anal: Having to do with the anus, which is the posterior opening of the large bowel. [NIH]

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]

Analytes: A component of a test sample the presence of which has to be demonstrated. The term "analyte" includes where appropriate formed from the analyte during the analyses. [NIH]

Anemia: A reduction in the number of circulating erythrocytes or in the quantity of hemoglobin. [NIH]

Angiogenesis: Blood vessel formation. Tumor angiogenesis is the growth of blood vessels from surrounding tissue to a solid tumor. This is caused by the release of chemicals by the tumor. [NIH]

Annealing: The spontaneous alignment of two single DNA strands to form a double helix. [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]

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-inflammatory: Having to do with reducing inflammation. [NIH]

Antimetabolite: A chemical that is very similar to one required in a normal biochemical reaction in cells. Antimetabolites can stop or slow down the reaction. [NIH]

Antineoplastic: Inhibiting or preventing the development of neoplasms, checking the maturation and proliferation of malignant cells. [EU]

Antineoplastic Agents: Substances that inhibit or prevent the proliferation of neoplasms. [NIH]

Antiviral: Destroying viruses or suppressing their replication. [EU]

Anus: The opening of the rectum to the outside of the body. [NIH]

Apoptosis: One of the two mechanisms by which cell death occurs (the other being the pathological process of necrosis). Apoptosis is the mechanism responsible for the physiological deletion of cells and appears to be intrinsically programmed. It is characterized by distinctive morphologic changes in the nucleus and cytoplasm, chromatin cleavage at regularly spaced sites, and the endonucleolytic cleavage of genomic DNA (DNA fragmentation) at internucleosomal sites. This mode of cell death serves as a balance to mitosis in regulating the size of animal tissues and in mediating pathologic processes associated with tumor growth. [NIH]

Arteries: The vessels carrying blood away from the heart. [NIH]

Articular: Of or pertaining to a joint. [EU]

Aspiration: The act of inhaling. [NIH]

Assay: Determination of the amount of a particular constituent of a mixture, or of the biological or pharmacological potency of a drug. [EU]

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]

Attenuated: Strain with weakened or reduced virulence. [NIH]

Atypical: Irregular; not conformable to the type; in microbiology, applied specifically to strains of unusual type. [EU]

Autoimmune disease: A condition in which the body recognizes its own tissues as foreign and directs an immune response against them. [NIH]

Autologous: Taken from an individual's own tissues, cells, or DNA. [NIH]

Autologous bone marrow transplantation: A procedure in which bone marrow is removed from a person, stored, and then given back to the person after intensive treatment. [NIH]

Autonomic: Self-controlling; functionally independent. [EU]

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]

Basophils: Granular leukocytes characterized by a relatively pale-staining, lobate nucleus and cytoplasm containing coarse dark-staining granules of variable size and stainable by basic dyes. [NIH]

Benign: Not cancerous; does not invade nearby tissue or spread to other parts of the 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]

Biochemical: Relating to biochemistry; characterized by, produced by, or involving chemical reactions in living organisms. [EU]

Biological Markers: Measurable and quantifiable biological parameters (e.g., specific enzyme concentration, specific hormone concentration, specific gene phenotype distribution in a population, presence of biological substances) which serve as indices for health- and physiology-related assessments, such as disease risk, psychiatric disorders, environmental exposure and its effects, disease diagnosis, metabolic processes, substance abuse, pregnancy, cell line development, epidemiologic studies, etc. [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]

Bladder: The organ that stores urine. [NIH]

Blood Groups: The classification systems (or schemes) of the different antigens located on erythrocytes.The antigens are the phenotypic expression of the genetic differences characteristic of specific blood groups. [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]

Blot: To transfer DNA, RNA, or proteins to an immobilizing matrix such as nitrocellulose. [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 Marrow Cells: Cells contained in the bone marrow including fat cells, stromal cells, megakaryocytes, and the immediate precursors of most blood cells. [NIH]

Bone Marrow Transplantation: The transference of bone marrow from one human or animal to another. [NIH]

Bone metastases: Cancer that has spread from the original (primary) tumor to the bone. [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]

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]

Brain Neoplasms: Neoplasms of the intracranial components of the central nervous system, including the cerebral hemispheres, basal ganglia, hypothalamus, thalamus, brain stem, and cerebellum. Brain neoplasms are subdivided into primary (originating from brain tissue) and secondary (i.e., metastatic) forms. Primary neoplasms are subdivided into benign and malignant forms. In general, brain tumors may also be classified by age of onset, histologic type, or presenting location in the brain. [NIH]

Bromodeoxyuridine: A nucleoside that substitutes for thymidine in DNA and thus acts as an antimetabolite. It causes breaks in chromosomes and has been proposed as an antiviral and antineoplastic agent. It has been given orphan drug status for use in the treatment of primary brain tumors. [NIH]

Brucellosis: Infection caused by bacteria of the genus Brucella mainly involving the reticuloendothelial system. This condition is characterized by fever, weakness, malaise, and weight loss. [NIH]

Calcitonin: A peptide hormone that lowers calcium concentration in the blood. In humans, it is released by thyroid cells and acts to decrease the formation and absorptive activity of osteoclasts. Its role in regulating plasma calcium is much greater in children and in certain diseases than in normal adults. [NIH]

Calcitonin Gene-Related Peptide: Calcitonin gene-related peptide. A 37-amino acid peptide derived from the calcitonin gene. It occurs as a result of alternative processing of mRNA from the calcitonin gene. The neuropeptide is widely distributed in neural tissue of the brain, gut, perivascular nerves, and other tissue. The peptide produces multiple biological effects and has both circulatory and neurotransmitter modes of action. In particular, it is a potent endogenous vasodilator. [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]

Capital Financing: Institutional funding for facilities and for equipment which becomes a part of the assets of the institution. [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]

Carcinogen: Any substance that causes cancer. [NIH]

Carcinogenesis: The process by which normal cells are transformed into cancer cells. [NIH]

Carcinogenic: Producing carcinoma. [EU]

Cardiac: Having to do with the heart. [NIH]

Cardiovascular: Having to do with the heart and blood vessels. [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]

Caspase: Enzyme released by the cell at a crucial stage in apoptosis in order to shred all cellular proteins. [NIH]

Catecholamine: A group of chemical substances manufactured by the adrenal medulla and secreted during physiological stress. [NIH]

Causal: Pertaining to a cause; directed against a cause. [EU]

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 Cycle: The complex series of phenomena, occurring between the end of one cell division and the end of the next, by which cellular material is divided between daughter cells. [NIH]

Cell Death: The termination of the cell's ability to carry out vital functions such as metabolism, growth, reproduction, responsiveness, and adaptability. [NIH]

Cell Division: The fission of a cell. [NIH]

Cell Lineage: The developmental history of cells as traced from the first division of the original cell or cells in the embryo. [NIH]

Cell proliferation: An increase in the number of cells as a result of cell growth and cell division. [NIH]

Cell Transplantation: Transference of cells within an individual, between individuals of the same species, or between individuals of different species. [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]

Cerebral: Of or pertaining of the cerebrum or the brain. [EU]

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]

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]

Chemopreventive: Natural or synthetic compound used to intervene in the early precancerous stages of carcinogenesis. [NIH]

Chemotherapeutic agent: A drug used to treat cancer. [NIH]

Chemotherapy: Treatment with anticancer drugs. [NIH]

Chest wall: The ribs and muscles, bones, and joints that make up the area of the body between the neck and the abdomen. [NIH]

Chimera: An individual that contains cell populations derived from different zygotes. [NIH]

Cholera: An acute diarrheal disease endemic in India and Southeast Asia whose causative agent is vibrio cholerae. This condition can lead to severe dehydration in a matter of hours unless quickly treated. [NIH]

Cholera Toxin: The enterotoxin from Vibrio cholerae. It is a protein that consists of two major components, the heavy (H) or A peptide and the light (L) or B peptide or choleragenoid. The B peptide anchors the protein to intestinal epithelial cells, while the A peptide, enters the cytoplasm, and activates adenylate cyclase, and production of cAMP. Increased levels of cAMP are thought to modulate release of fluid and electrolytes from intestinal crypt cells. [NIH]

Chondrocytes: Polymorphic cells that form cartilage. [NIH]

Chondrosarcoma: A type of cancer that forms in cartilage. [NIH]

Chromatin: The material of chromosomes. It is a complex of DNA, histones, and nonhistone proteins (chromosomal proteins, non-histone) found within the nucleus of a cell. [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]

CIS: Cancer Information Service. The CIS is the National Cancer Institute's link to the public, interpreting and explaining research findings in a clear and understandable manner, and providing personalized responses to specific questions about cancer. Access the CIS by calling 1-800-4-CANCER, or by using the Web site at http://cis.nci.nih.gov. [NIH]

Cisplatin: An inorganic and water-soluble platinum complex. After undergoing hydrolysis, it reacts with DNA to produce both intra and interstrand crosslinks. These crosslinks appear to impair replication and transcription of DNA. The cytotoxicity of cisplatin correlates with cellular arrest in the G2 phase of the cell cycle. [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]

Codon: A set of three nucleotides in a protein coding sequence that specifies individual amino acids or a termination signal (codon, terminator). Most codons are universal, but some organisms do not produce the transfer RNAs (RNA, transfer) complementary to all codons. These codons are referred to as unassigned codons (codons, nonsense). [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]

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]

Combination chemotherapy: Treatment using more than one anticancer drug. [NIH]

Combinatorial: A cut-and-paste process that churns out thousands of potentially valuable compounds at once. [NIH]

Combined Modality Therapy: The treatment of a disease or condition by several different means simultaneously or sequentially. Chemoimmunotherapy, radioimmunotherapy, chemoradiotherapy, cryochemotherapy, and salvage therapy are seen most frequently, but their combinations with each other and surgery are also used. [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]

Complete response: The disappearance of all signs of cancer in response to treatment. This does not always mean the cancer has been cured. [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]

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]

Consolidation: The healing process of a bone fracture. [NIH]

Consolidation therapy: Chemotherapy treatments given after induction chemotherapy to further reduce the number of cancer cells. [NIH]

Continuous infusion: The administration of a fluid into a blood vessel, usually over a prolonged period of time. [NIH]

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]

Cooperative group: A group of physicians, hospitals, or both formed to treat a large number of persons in the same way so that new treatment can be evaluated quickly. Clinical trials of new cancer treatments often require many more people than a single physician or hospital can care for. [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 Thrombosis: Presence of a thrombus in a coronary artery, often causing a myocardial infarction. [NIH]

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]

Crossing-over: The exchange of corresponding segments between chromatids of homologous chromosomes during meiosia, forming a chiasma. [NIH]

Cryostat: A batchwise operating apparatus in which a cryogenic liquid or solid is used to maintain by evaporation a cryotemperature which needs not be constant but may vary in a predetermined fashion. [NIH]

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]

Cyclophosphamide: Precursor of an alkylating nitrogen mustard antineoplastic and immunosuppressive agent that must be activated in the liver to form the active aldophosphamide. It is used in the treatment of lymphomas, leukemias, etc. Its side effect, alopecia, has been made use of in defleecing sheep. Cyclophosphamide may also cause sterility, birth defects, mutations, and cancer. [NIH]

Cytogenetics: A branch of genetics which deals with the cytological and molecular behavior of genes and chromosomes during cell division. [NIH]

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]

Cytotoxicity: Quality of being capable of producing a specific toxic action upon cells of special organs. [NIH]

Daunorubicin: Very toxic anthracycline aminoglycoside antibiotic isolated from Streptomyces peucetius and others, used in treatment of leukemias and other neoplasms. [NIH]

Dehydration: The condition that results from excessive loss of body water. [NIH]

Deletion: A genetic rearrangement through loss of segments of DNA (chromosomes), bringing sequences, which are normally separated, into close proximity. [NIH]

Denaturation: Rupture of the hydrogen bonds by heating a DNA solution and then cooling it rapidly causes the two complementary strands to separate. [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]

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]

Dilation: A process by which the pupil is temporarily enlarged with special eye drops (mydriatic); allows the eye care specialist to better view the inside of the eye. [NIH]

Dilution: A diluted or attenuated medicine; in homeopathy, the diffusion of a given quantity of a medicinal agent in ten or one hundred times the same quantity of water. [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]

Disease-Free Survival: Period after successful treatment in which there is no appearance of the symptoms or effects of the disease. [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]

Dopamine: An endogenous catecholamine and prominent neurotransmitter in several systems of the brain. In the synthesis of catecholamines from tyrosine, it is the immediate precursor to norepinephrine and epinephrine. Dopamine is a major transmitter in the extrapyramidal system of the brain, and important in regulating movement. A family of dopaminergic receptor subtypes mediate its action. Dopamine is used pharmacologically for its direct (beta adrenergic agonist) and indirect (adrenergic releasing) sympathomimetic effects including its actions as an inotropic agent and as a renal vasodilator. [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]

Dose-rate: The strength of a treatment given over a period of time. [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]

Doxorubicin: Antineoplastic antibiotic obtained from Streptomyces peucetics. It is a hydroxy derivative of daunorubicin and is used in treatment of both leukemia and solid tumors. [NIH]

Drug Interactions: The action of a drug that may affect the activity, metabolism, or toxicity of another drug. [NIH]

Drug Resistance: Diminished or failed response of an organism, disease or tissue to the intended effectiveness of a chemical or drug. It should be differentiated from drug tolerance

which is the progressive diminution of the susceptibility of a human or animal to the effects of a drug, as a result of continued administration. [NIH]

Drug Tolerance: Progressive diminution of the susceptibility of a human or animal to the effects of a drug, resulting from its continued administration. It should be differentiated from drug resistance wherein an organism, disease, or tissue fails to respond to the intended effectiveness of a chemical or drug. It should also be differentiated from maximum tolerated dose and no-observed-adverse-effect level. [NIH]

Ectoderm: The outer of the three germ layers of the embryo. [NIH]

Effector: It is often an enzyme that converts an inactive precursor molecule into an active second messenger. [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]

Embryo: The prenatal stage of mammalian development characterized by rapid morphological changes and the differentiation of basic structures. [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]

Endogenous: Produced inside an organism or cell. The opposite is external (exogenous) production. [NIH]

Endothelial cell: The main type of cell found in the inside lining of blood vessels, lymph vessels, and the heart. [NIH]

Enhancer: Transcriptional element in the virus genome. [NIH]

Environmental Exposure: The exposure to potentially harmful chemical, physical, or biological agents in the environment or to environmental factors that may include ionizing radiation, pathogenic organisms, or toxic chemicals. [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]

Epidemiologic Studies: Studies designed to examine associations, commonly, hypothesized

causal relations. They are usually concerned with identifying or measuring the effects of risk factors or exposures. The common types of analytic study are case-control studies, cohort studies, and cross-sectional studies. [NIH]

Epidural: The space between the wall of the spinal canal and the covering of the spinal cord. An epidural injection is given into this space. [NIH]

Epinephrine: The active sympathomimetic hormone from the adrenal medulla in most species. It stimulates both the alpha- and beta- adrenergic systems, causes systemic vasoconstriction and gastrointestinal relaxation, stimulates the heart, and dilates bronchi and cerebral vessels. It is used in asthma and cardiac failure and to delay absorption of local anesthetics. [NIH]

Epithelial: Refers to the cells that line the internal and external surfaces of the body. [NIH]

Epithelial Cells: Cells that line the inner and outer surfaces of the body. [NIH]

Erythrocyte Membrane: The semipermeable outer portion of the red corpuscle. It is known as a 'ghost' after hemolysis. [NIH]

Erythrocytes: Red blood cells. Mature erythrocytes are non-nucleated, biconcave disks containing hemoglobin whose function is to transport oxygen. [NIH]

Erythroleukemia: Cancer of the blood-forming tissues in which large numbers of immature, abnormal red blood cells are found in the blood and bone marrow. [NIH]

Escalation: Progressive use of more harmful drugs. [NIH]

Etoposide: A semisynthetic derivative of podophyllotoxin that exhibits antitumor activity. Etoposide inhibits DNA synthesis by forming a complex with topoisomerase II and DNA. This complex induces breaks in double stranded DNA and prevents repair by topoisomerase II binding. Accumulated breaks in DNA prevent entry into the mitotic phase of cell division, and lead to cell death. Etoposide acts primarily in the G2 and S phases of the cell cycle. [NIH]

Eukaryotic Cells: Cells of the higher organisms, containing a true nucleus bounded by a nuclear membrane. [NIH]

Evaluable disease: Disease that cannot be measured directly by the size of the tumor but can be evaluated by other methods specific to a particular clinical trial. [NIH]

Evaluable patients: Patients whose response to a treatment can be measured because enough information has been collected. [NIH]

Evoke: The electric response recorded from the cerebral cortex after stimulation of a peripheral sense organ. [NIH]

Exophthalmos: Abnormal protrusion of both eyes; may be caused by endocrine gland malfunction, malignancy, injury, or paralysis of the extrinsic muscles of the eye. [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]

Extracellular Matrix Proteins: Macromolecular organic compounds that contain carbon, hydrogen, oxygen, nitrogen, and usually, sulfur. These macromolecules (proteins) form an intricate meshwork in which cells are embedded to construct tissues. Variations in the relative types of macromolecules and their organization determine the type of extracellular

matrix, each adapted to the functional requirements of the tissue. The two main classes of macromolecules that form the extracellular matrix are: glycosaminoglycans, usually linked to proteins (proteoglycans), and fibrous proteins (e.g., collagen, elastin, fibronectins and laminin). [NIH]

Extrapyramidal: Outside of the pyramidal tracts. [EU]

Extremity: A limb; an arm or leg (membrum); sometimes applied specifically to a hand or foot. [EU]

Eye Infections: Infection, moderate to severe, caused by bacteria, fungi, or viruses, which occurs either on the external surface of the eye or intraocularly with probable inflammation, visual impairment, or blindness. [NIH]

Family Planning: Programs or services designed to assist the family in controlling reproduction by either improving or diminishing fertility. [NIH]

Fat: Total lipids including phospholipids. [NIH]

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]

Fibroblast Growth Factor: Peptide isolated from the pituitary gland and from the brain. It is a potent mitogen which stimulates growth of a variety of mesodermal cells including chondrocytes, granulosa, and endothelial cells. The peptide may be active in wound healing and animal limb regeneration. [NIH]

Fibroblasts: Connective tissue cells which secrete an extracellular matrix rich in collagen and other macromolecules. [NIH]

Fine-needle aspiration: The removal of tissue or fluid with a needle for examination under a microscope. Also called needle biopsy. [NIH]

Fistula: Abnormal communication most commonly seen between two internal organs, or between an internal organ and the surface of the body. [NIH]

Fixation: 1. The act or operation of holding, suturing, or fastening in a fixed position. 2. The condition of being held in a fixed position. 3. In psychiatry, a term with two related but distinct meanings : (1) arrest of development at a particular stage, which like regression (return to an earlier stage), if temporary is a normal reaction to setbacks and difficulties but if protracted or frequent is a cause of developmental failures and emotional problems, and (2) a close and suffocating attachment to another person, especially a childhood figure, such as one's mother or father. Both meanings are derived from psychoanalytic theory and refer to 'fixation' of libidinal energy either in a specific erogenous zone, hence fixation at the oral, anal, or phallic stage, or in a specific object, hence mother or father fixation. 4. The use of a fixative (q.v.) to preserve histological or cytological specimens. 5. In chemistry, the process whereby a substance is removed from the gaseous or solution phase and localized, as in carbon dioxide fixation or nitrogen fixation. 6. In ophthalmology, direction of the gaze so that the visual image of the object falls on the fovea centralis. 7. In film processing, the chemical removal of all undeveloped salts of the film emulsion, leaving only the developed silver to form a permanent image. [EU]

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]

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]

Frozen Sections: Thinly cut sections of frozen tissue specimens prepared with a cryostat or freezing microtome. [NIH]

Gallium: A rare, metallic element designated by the symbol, Ga, atomic number 31, and atomic weight 69.72. [NIH]

Gamma irradiation: A type of radiation therapy that uses gamma radiation. Gamma radiation is a type of high-energy radiation that is different from x-rays. [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]

Ganglia: Clusters of multipolar neurons surrounded by a capsule of loosely organized connective tissue located outside the central nervous system. [NIH]

Ganglion: 1. A knot, or knotlike mass. 2. A general term for a group of nerve cell bodies located outside the central nervous system; occasionally applied to certain nuclear groups within the brain or spinal cord, e.g. basal ganglia. 3. A benign cystic tumour occurring on a aponeurosis or tendon, as in the wrist or dorsum of the foot; it consists of a thin fibrous capsule enclosing a clear mucinous fluid. [EU]

Gastric: Having to do with the stomach. [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 Amplification: A selective increase in the number of copies of a gene coding for a specific protein without a proportional increase in other genes. It occurs naturally via the excision of a copy of the repeating sequence from the chromosome and its extrachromosomal replication in a plasmid, or via the production of an RNA transcript of the entire repeating sequence of ribosomal RNA followed by the reverse transcription of the molecule to produce an additional copy of the original DNA sequence. Laboratory techniques have been introduced for inducing disproportional replication by unequal crossing over, uptake of DNA from lysed cells, or generation of extrachromosomal sequences from rolling circle replication. [NIH]

Gene Expression: The phenotypic manifestation of a gene or genes by the processes of gene action. [NIH]

Gene Fusion: Fusion of structural genes to analyze protein behavior or fusion of regulatory sequences with structural genes to determine mechanisms of regulation. [NIH]

Gene Rearrangement: The ordered rearrangement of gene regions by DNA recombination such as that which occurs normally during development. [NIH]

Gene Therapy: The introduction of new genes into cells for the purpose of treating disease by restoring or adding gene expression. Techniques include insertion of retroviral vectors, transfection, homologous recombination, and injection of new genes into the nuclei of single cell embryos. The entire gene therapy process may consist of multiple steps. The new genes may be introduced into proliferating cells in vivo (e.g., bone marrow) or in vitro (e.g., fibroblast cultures) and the modified cells transferred to the site where the gene expression

is required. Gene therapy may be particularly useful for treating enzyme deficiency diseases, hemoglobinopathies, and leukemias and may also prove useful in restoring drug sensitivity, particularly for leukemia. [NIH]

Genetic Engineering: Directed modification of the gene complement of a living organism by such techniques as altering the DNA, substituting genetic material by means of a virus, transplanting whole nuclei, transplanting cell hybrids, etc. [NIH]

Genetic Markers: A phenotypically recognizable genetic trait which can be used to identify a genetic locus, a linkage group, or a recombination event. [NIH]

Genetic testing: Analyzing DNA to look for a genetic alteration that may indicate an increased risk for developing a specific disease or disorder. [NIH]

Genetics: The biological science that deals with the phenomena and mechanisms of heredity. [NIH]

Genotype: The genetic constitution of the individual; the characterization of the genes. [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]

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]

Glycine: A non-essential amino acid. It is found primarily in gelatin and silk fibroin and used therapeutically as a nutrient. It is also a fast inhibitory neurotransmitter. [NIH]

Glycogen: A sugar stored in the liver and muscles. It releases glucose into the blood when cells need it for energy. Glycogen is the chief source of stored fuel in the body. [NIH]

Glycophorin: The major sialoglycoprotein of the human erythrocyte membrane. It consists of at least two sialoglycopeptides and is composed of 60% carbohydrate including sialic acid and 40% protein. It is involved in a number of different biological activities including the binding of MN blood groups, influenza viruses, kidney bean phytohemagglutinin, and wheat germ agglutinin. [NIH]

Glycoprotein: A protein that has sugar molecules attached to it. [NIH]

Glycosylation: The chemical or biochemical addition of carbohydrate or glycosyl groups to other chemicals, especially peptides or proteins. Glycosyl transferases are used in this biochemical reaction. [NIH]

Governing Board: The group in which legal authority is vested for the control of health-related institutions and organizations. [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]

Guanidine: A strong organic base existing primarily as guanidium ions at physiological pH. It is found in the urine as a normal product of protein metabolism. It is also used in laboratory research as a protein denaturant. (From Martindale, the Extra Pharmacopoeia, 30th ed and Merck Index, 12th ed) It is also used in the treatment of myasthenia and as a fluorescent probe in HPLC. [NIH]

Habitual: Of the nature of a habit; according to habit; established by or repeated by force of habit, customary. [EU]

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]

Hematopoiesis: The development and formation of various types of blood cells. [NIH]

Hemipelvectomy: Amputation of a lower limb through the sacroiliac joint. [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]

Hemoglobinopathies: A group of inherited disorders characterized by structural alterations within the hemoglobin molecule. [NIH]

Hemolytic: A disease that affects the blood and blood vessels. It destroys red blood cells, cells that cause the blood to clot, and the lining of blood vessels. HUS is often caused by the Escherichia coli bacterium in contaminated food. People with HUS may develop acute renal failure. [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]

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]

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]

Homologous: Corresponding in structure, position, origin, etc., as (a) the feathers of a bird and the scales of a fish, (b) antigen and its specific antibody, (c) allelic chromosomes. [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 therapy: Treatment of cancer by removing, blocking, or adding hormones. Also called endocrine therapy. [NIH]

Hydrocephalus: Excessive accumulation of cerebrospinal fluid within the cranium which may be associated with dilation of cerebral ventricles, intracranial hypertension; headache; lethargy; urinary incontinence; and ataxia (and in infants macrocephaly). This condition may be caused by obstruction of cerebrospinal fluid pathways due to neurologic abnormalities, intracranial hemorrhages; central nervous system infections; brain

neoplasms; craniocerebral trauma; and other conditions. Impaired resorption of cerebrospinal fluid from the arachnoid villi results in a communicating form of hydrocephalus. Hydrocephalus ex-vacuo refers to ventricular dilation that occurs as a result of brain substance loss from cerebral infarction and other conditions. [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]

Hypercalcemia: Abnormally high level of calcium in the blood. [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]

Hyperthermia: A type of treatment in which body tissue is exposed to high temperatures to damage and kill cancer cells or to make cancer cells more sensitive to the effects of radiation and certain anticancer drugs. [NIH]

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]

Ifosfamide: Positional isomer of cyclophosphamide which is active as an alkylating agent and an immunosuppressive agent. [NIH]

Imidazole: C3H4N2. The ring is present in polybenzimidazoles. [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]

Immunization: Deliberate stimulation of the host's immune response. Active immunization involves administration of antigens or immunologic adjuvants. Passive immunization involves administration of immune sera or lymphocytes or their extracts (e.g., transfer factor, immune RNA) or transplantation of immunocompetent cell producing tissue (thymus or bone marrow). [NIH]

Immunofluorescence: A technique for identifying molecules present on the surfaces of cells or in tissues using a highly fluorescent substance coupled to a specific antibody. [NIH]

Immunogenic: Producing immunity; evoking an immune response. [EU]

Immunoglobulin: A protein that acts as an antibody. [NIH]

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]

Immunosuppressive: Describes the ability to lower immune system responses. [NIH]

Immunotherapy: Manipulation of the host's immune system in treatment of disease. It includes both active and passive immunization as well as immunosuppressive therapy to prevent graft rejection. [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]

In situ: In the natural or normal place; confined to the site of origin without invasion of neighbouring tissues. [EU]

In Situ Hybridization: A technique that localizes specific nucleic acid sequences within intact chromosomes, eukaryotic cells, or bacterial cells through the use of specific nucleic acid-labeled probes. [NIH]

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]

Incontinence: Inability to control the flow of urine from the bladder (urinary incontinence) or the escape of stool from the rectum (fecal incontinence). [NIH]

Indolent: A type of cancer that grows slowly. [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]

Induction therapy: Treatment designed to be used as a first step toward shrinking the cancer and in evaluating response to drugs and other agents. Induction therapy is followed by additional therapy to eliminate whatever cancer remains. [NIH]

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]

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]

Influenza: An acute viral infection involving the respiratory tract. It is marked by inflammation of the nasal mucosa, the pharynx, and conjunctiva, and by headache and severe, often generalized, myalgia. [NIH]

Infusion: A method of putting fluids, including drugs, into the bloodstream. Also called intravenous infusion. [NIH]

Initiation: Mutation induced by a chemical reactive substance causing cell changes; being a step in a carcinogenic process. [NIH]

Inorganic: Pertaining to substances not of organic origin. [EU]

Inotropic: Affecting the force or energy of muscular contractions. [EU]

Insulin: A protein hormone secreted by beta cells of the pancreas. Insulin plays a major role

in the regulation of glucose metabolism, generally promoting the cellular utilization of glucose. It is also an important regulator of protein and lipid metabolism. Insulin is used as a drug to control insulin-dependent diabetes mellitus. [NIH]

Insulin-dependent diabetes mellitus: A disease characterized by high levels of blood glucose resulting from defects in insulin secretion, insulin action, or both. Autoimmune, genetic, and environmental factors are involved in the development of type I diabetes. [NIH]

Insulin-like: Muscular growth factor. [NIH]

Interferon: A biological response modifier (a substance that can improve the body's natural response to disease). Interferons interfere with the division of cancer cells and can slow tumor growth. There are several types of interferons, including interferon-alpha, -beta, and -gamma. These substances are normally produced by the body. They are also made in the laboratory for use in treating cancer and other diseases. [NIH]

Interferon-alpha: One of the type I interferons produced by peripheral blood leukocytes or lymphoblastoid cells when exposed to live or inactivated virus, double-stranded RNA, or bacterial products. It is the major interferon produced by virus-induced leukocyte cultures and, in addition to its pronounced antiviral activity, it causes activation of NK cells. [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]

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]

Interphase: The interval between two successive cell divisions during which the chromosomes are not individually distinguishable and DNA replication occurs. [NIH]

Interstitial: Pertaining to or situated between parts or in the interspaces of a tissue. [EU]

Interstitial Collagenase: A member of the metalloproteinase family of enzymes that is principally responsible for cleaving fibrillar collagen. It can degrade interstitial collagens, types I, II and III. EC 3.4.24.7. [NIH]

Intestinal: Having to do with the intestines. [NIH]

Intestinal Mucosa: The surface lining of the intestines where the cells absorb nutrients. [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]

Intracranial Hemorrhages: Bleeding within the intracranial cavity, including hemorrhages in the brain and within the cranial epidural, subdural, and subarachnoid spaces. [NIH]

Intracranial Hypertension: Increased pressure within the cranial vault. This may result from several conditions, including hydrocephalus; brain edema; intracranial masses; severe systemic hypertension; pseudotumor cerebri; and other disorders. [NIH]

Intravenous: IV. Into a vein. [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]

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]

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]

Ischemia: Deficiency of blood in a part, due to functional constriction or actual obstruction of a blood vessel. [EU]

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]

Kinetic: Pertaining to or producing motion. [EU]

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]

Lesion: An area of abnormal tissue change. [NIH]

Lethal: Deadly, fatal. [EU]

Lethargy: Abnormal drowsiness or stupor; a condition of indifference. [EU]

Leukemia: Cancer of blood-forming tissue. [NIH]

Leukocytes: White blood cells. These include granular leukocytes (basophils, eosinophils, and neutrophils) as well as non-granular leukocytes (lymphocytes and monocytes). [NIH]

Levo: It is an experimental treatment for heroin addiction that was developed by German scientists around 1948 as an analgesic. Like methadone, it binds with opioid receptors, but it is longer acting. [NIH]

Ligament: A band of fibrous tissue that connects bones or cartilages, serving to support and strengthen joints. [EU]

Linkage: 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]

Liver: A large, glandular organ located in the upper abdomen. The liver cleanses the blood and aids in digestion by secreting bile. [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]

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]

Longitudinal study: Also referred to as a "cohort study" or "prospective study"; the analytic method of epidemiologic study in which subsets of a defined population can be identified who are, have been, or in the future may be exposed or not exposed, or exposed in different degrees, to a factor or factors hypothesized to influence the probability of occurrence of a given disease or other outcome. The main feature of this type of study is to observe large numbers of subjects over an extended time, with comparisons of incidence rates in groups that differ in exposure levels. [NIH]

Lumbar: Pertaining to the loins, the part of the back between the thorax and the pelvis. [EU]

Lung metastases: Cancer that has spread from the original (primary) tumor to the lung. [NIH]

Lymph: The almost colorless fluid that travels through the lymphatic system and carries cells that help fight infection and disease. [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]

Lymphoblasts: Interferon produced predominantly by leucocyte cells. [NIH]

Lymphocyte: A white blood cell. Lymphocytes have a number of roles in the immune system, including the production of antibodies and other substances that fight infection and diseases. [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]

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]

Malaise: A vague feeling of bodily discomfort. [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]

Mandible: The largest and strongest bone of the face constituting the lower jaw. It supports the lower teeth. [NIH]

Mandibular Condyle: The posterior process on the ramus of the mandible composed of two parts: a superior part, the articular portion, and an inferior part, the condylar neck. [NIH]

Matrix metalloproteinase: A member of a group of enzymes that can break down proteins, such as collagen, that are normally found in the spaces between cells in tissues (i.e., extracellular matrix proteins). Because these enzymes need zinc or calcium atoms to work properly, they are called metalloproteinases. Matrix metalloproteinases are involved in wound healing, angiogenesis, and tumor cell metastasis. [NIH]

Maximum Tolerated Dose: The highest dose level eliciting signs of toxicity without having major effects on survival relative to the test in which it is used. [NIH]

Medial: Lying near the midsaggital plane of the body; opposed to lateral. [NIH]

Mediate: Indirect; accomplished by the aid of an intervening medium. [EU]

Medical Records: Recording of pertinent information concerning patient's illness or illnesses. [NIH]

MEDLINE: An online database of MEDLARS, the computerized bibliographic Medical Literature Analysis and Retrieval System of the National Library of Medicine. [NIH]

Medulloblastoma: A malignant brain tumor that begins in the lower part of the brain and can spread to the spine or to other parts of the body. Medulloblastomas are sometimes called primitive neuroectodermal tumors (PNET). [NIH]

Megakaryocytes: Very large bone marrow cells which release mature blood platelets. [NIH]

Melanin: The substance that gives the skin its color. [NIH]

Melphalan: An alkylating nitrogen mustard that is used as an antineoplastic in the form of the levo isomer - melphalan, the racemic mixture - merphalan, and the dextro isomer - medphalan; toxic to bone marrow, but little vesicant action; potential carcinogen. [NIH]

Membrane: A very thin layer of tissue that covers a surface. [NIH]

Mental: Pertaining to the mind; psychic. 2. (L. mentum chin) pertaining to the chin. [EU]

Mental Processes: Conceptual functions or thinking in all its forms. [NIH]

Mesenchymal: Refers to cells that develop into connective tissue, blood vessels, and lymphatic tissue. [NIH]

Mesna: A sulfhydryl compound used to prevent urothelial toxicity by inactivating metabolites from antineoplastic agents, such as ifosfamide or cyclophosphamide. [NIH]

Metabolite: Any substance produced by metabolism or by a metabolic process. [EU]

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]

Metastatic cancer: Cancer that has spread from the place in which it started to other parts of the body. [NIH]

Methionine: A sulfur containing essential amino acid that is important in many body functions. It is a chelating agent for heavy metals. [NIH]

MI: 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]

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]

Microfilaments: The smallest of the cytoskeletal filaments. They are composed chiefly of actin. [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]

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]

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]

Mitogen-Activated Protein Kinase Kinases: A serine-threonine protein kinase family whose members are components in protein kinase cascades activated by diverse stimuli. These MAPK kinases phosphorylate mitogen-activated protein kinases and are themselves phosphorylated by MAP kinase kinase kinases. JNK kinases (also known as SAPK kinases) are a subfamily. EC 2.7.10.- [NIH]

Mitogen-Activated Protein Kinases: A superfamily of protein-serine-threonine kinases that are activated by diverse stimuli via protein kinase cascades. They are the final components of the cascades, activated by phosphorylation by mitogen-activated protein kinase kinases which in turn are activated by mitogen-activated protein kinase kinase kinases (MAP kinase kinase kinases). Families of these mitogen-activated protein kinases (MAPKs) include extracellular signal-regulated kinases (ERKs), stress-activated protein kinases (SAPKs) (also known as c-jun terminal kinases (JNKs)), and p38-mitogen-activated protein kinases. EC 2,7,1.- [NIH]

Mitosis: A method of indirect cell division by means of which the two daughter nuclei normally receive identical complements of the number of chromosomes of the somatic cells of the species. [NIH]

Mitotic: Cell resulting from mitosis. [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]

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]

Monocytes: Large, phagocytic mononuclear leukocytes produced in the vertebrate bone marrow and released into the blood; contain a large, oval or somewhat indented nucleus surrounded by voluminous cytoplasm and numerous organelles. [NIH]

Motility: The ability to move spontaneously. [EU]

Mucosa: A mucous membrane, or tunica mucosa. [EU]

Multidrug resistance: Adaptation of tumor cells to anticancer drugs in ways that make the drugs less effective. [NIH]

Multiple Myeloma: A malignant tumor of plasma cells usually arising in the bone marrow; characterized by diffuse involvement of the skeletal system, hyperglobulinemia, Bence-Jones

proteinuria, and anemia. [NIH]

Multivariate Analysis: A set of techniques used when variation in several variables has to be studied simultaneously. In statistics, multivariate analysis is interpreted as any analytic method that allows simultaneous study of two or more dependent variables. [NIH]

Myasthenia: Muscular debility; any constitutional anomaly of muscle. [EU]

Myelitis: Inflammation of the spinal cord. Relatively common etiologies include infections; autoimmune diseases; spinal cord; and ischemia (see also spinal cord vascular diseases). Clinical features generally include weakness, sensory loss, localized pain, incontinence, and other signs of autonomic dysfunction. [NIH]

Myelodysplasia: Abnormal bone marrow cells that may lead to myelogenous leukemia. [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]

Myocardium: The muscle tissue of the heart composed of striated, involuntary muscle known as cardiac muscle. [NIH]

NCI: National Cancer Institute. NCI, part of the National Institutes of Health of the United States Department of Health and Human Services, is the federal government's principal agency for cancer research. NCI conducts, coordinates, and funds cancer research, training, health information dissemination, and other programs with respect to the cause, diagnosis, prevention, and treatment of cancer. Access the NCI Web site at http://cancer.gov. [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]

Needle biopsy: The removal of tissue or fluid with a needle for examination under a microscope. Also called fine-needle aspiration. [NIH]

Neoadjuvant Therapy: Preliminary cancer therapy (chemotherapy, radiation therapy, hormone/endocrine therapy, immunotherapy, hyperthermia, etc.) that precedes a necessary second modality of treatment. [NIH]

Neoplasia: Abnormal and uncontrolled cell growth. [NIH]

Neoplasm: A new growth of benign or malignant tissue. [NIH]

Neoplastic: Pertaining to or like a neoplasm (= any new and abnormal growth); pertaining to neoplasia (= the formation of a neoplasm). [EU]

Neoplastic Processes: The pathological mechanisms and forms taken by tissue during degeneration into a neoplasm and its subsequent activity. [NIH]

Nerve: A cordlike structure of nervous tissue that connects parts of the nervous system with other tissues of the body and conveys nervous impulses to, or away from, these tissues. [NIH]

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]

Neural: 1. Pertaining to a nerve or to the nerves. 2. Situated in the region of the spinal axis, as the neutral arch. [EU]

Neural Crest: A strip of specialized ectoderm flanking each side of the embryonal neural

plate, which after the closure of the neural tube, forms a column of isolated cells along the dorsal aspect of the neural tube. Most of the cranial and all of the spinal sensory ganglion cells arise by differentiation of neural crest cells. [NIH]

Neuroblastoma: Cancer that arises in immature nerve cells and affects mostly infants and children. [NIH]

Neuroectodermal tumor: A tumor of the central or peripheral nervous system. [NIH]

Neurologic: Having to do with nerves or the nervous system. [NIH]

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]

Neuropeptide: A member of a class of protein-like molecules made in the brain. Neuropeptides consist of short chains of amino acids, with some functioning as neurotransmitters and some functioning as hormones. [NIH]

Neurotransmitter: Any of a group of substances that are released on excitation from the axon terminal of a presynaptic neuron of the central or peripheral nervous system and travel across the synaptic cleft to either excite or inhibit the target cell. Among the many substances that have the properties of a neurotransmitter are acetylcholine, norepinephrine, epinephrine, dopamine, glycine, y-aminobutyrate, glutamic acid, substance P, enkephalins, endorphins, and serotonin. [EU]

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]

Neutrophils: Granular leukocytes having a nucleus with three to five lobes connected by slender threads of chromatin, and cytoplasm containing fine inconspicuous granules and stainable by neutral dyes. [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]

Nonmetastatic: Cancer that has not spread from the primary (original) site to other sites in the body. [NIH]

Norepinephrine: Precursor of epinephrine that is secreted by the adrenal medulla and is a widespread central and autonomic neurotransmitter. Norepinephrine is the principal transmitter of most postganglionic sympathetic fibers and of the diffuse projection system in the brain arising from the locus ceruleus. It is also found in plants and is used pharmacologically as a sympathomimetic. [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]

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]

Nucleus: A body of specialized protoplasm found in nearly all cells and containing the

chromosomes. [NIH]

Octreotide: A potent, long-acting somatostatin octapeptide analog which has a wide range of physiological actions. It inhibits growth hormone secretion, is effective in the treatment of hormone-secreting tumors from various organs, and has beneficial effects in the management of many pathological states including diabetes mellitus, orthostatic hypertension, hyperinsulinism, hypergastrinemia, and small bowel fistula. [NIH]

Ointments: Semisolid preparations used topically for protective emollient effects or as a vehicle for local administration of medications. Ointment bases are various mixtures of fats, waxes, animal and plant oils and solid and liquid hydrocarbons. [NIH]

Oncogene: A gene that normally directs cell growth. If altered, an oncogene can promote or allow the uncontrolled growth of cancer. Alterations can be inherited or caused by an environmental exposure to carcinogens. [NIH]

Oncogenic: Chemical, viral, radioactive or other agent that causes cancer; carcinogenic. [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]

Operon: The genetic unit consisting of a feedback system under the control of an operator gene, in which a structural gene transcribes its message in the form of mRNA upon blockade of a repressor produced by a regulator gene. Included here is the attenuator site of bacterial operons where transcription termination is regulated. [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]

Orthostatic: Pertaining to or caused by standing erect. [EU]

Osteoclasts: A large multinuclear cell associated with the absorption and removal of bone. An odontoclast, also called cementoclast, is cytomorphologically the same as an osteoclast and is involved in cementum resorption. [NIH]

Osteogenic sarcoma: A malignant tumor of the bone. Also called osteosarcoma. [NIH]

Osteolytic: Causing the breakdown of bone. [NIH]

Osteosarcoma: A cancer of the bone that affects primarily children and adolescents. Also called osteogenic sarcoma. [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]

Overexpress: An excess of a particular protein on the surface of a cell. [NIH]

Paediatric: Of or relating to the care and medical treatment of children; belonging to or concerned with paediatrics. [EU]

Palliative: 1. Affording relief, but not cure. 2. An alleviating medicine. [EU]

Pamidronate: A drug that belongs to the family of drugs called bisphosphonates. Pamidronate is used as treatment for abnormally high levels of calcium in the blood. [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]

Paraffin: A mixture of solid hydrocarbons obtained from petroleum. It has a wide range of

uses including as a stiffening agent in ointments, as a lubricant, and as a topical anti-inflammatory. It is also commonly used as an embedding material in histology. [NIH]

Partial remission: The shrinking, but not complete disappearance, of a tumor in response to therapy. Also called partial response. [NIH]

Partial response: A decrease in the size of a tumor, or in the extent of cancer in the body, in response to treatment. [NIH]

Particle: A tiny mass of material. [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 fracture: A broken bone caused by disease, often by the spread of cancer to the bone. [NIH]

Pathologic Processes: The abnormal mechanisms and forms involved in the dysfunctions of tissues and organs. [NIH]

Pathologist: A doctor who identifies diseases by studying cells and tissues under a microscope. [NIH]

PDQ: Physician Data Query. PDQ is an online database developed and maintained by the National Cancer Institute. Designed to make the most current, credible, and accurate cancer information available to health professionals and the public, PDQ contains peer-reviewed summaries on cancer treatment, screening, prevention, genetics, and supportive care; a registry of cancer clinical trials from around the world; and directories of physicians, professionals who provide genetics services, and organizations that provide cancer care. Most of this information is available on the CancerNet Web site, and more specific information about PDQ can be found at http://cancernet.nci.nih.gov/pdq.html. [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]

Peripheral blood: Blood circulating throughout the body. [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 stem cell transplantation: A method of replacing blood-forming cells destroyed by cancer treatment. Immature blood cells (stem cells) in the circulating blood that are similar to those in the bone marrow are given after treatment to help the bone marrow recover and continue producing healthy blood cells. Transplantation may be autologous (an individual's own blood cells saved earlier), allogeneic (blood cells donated by someone else), or syngeneic (blood cells donated by an identical twin). Also called peripheral stem cell support. [NIH]

Perivascular: Situated around a vessel. [EU]

Petroleum: Naturally occurring complex liquid hydrocarbons which, after distillation, yield combustible fuels, petrochemicals, and lubricants. [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]

Phenotype: The outward appearance of the individual. It is the product of interactions between genes and between the genotype and the environment. This includes the killer phenotype, characteristic of yeasts. [NIH]

Phenylalanine: An aromatic amino acid that is essential in the animal diet. It is a precursor of melanin, dopamine, noradrenalin, and thyroxine. [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]

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]

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]

Pituitary Gland: A small, unpaired gland situated in the sella turcica tissue. It is connected to the hypothalamus by a short stalk. [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]

Plasmid: An autonomously replicating, extra-chromosomal DNA molecule found in many bacteria. Plasmids are widely used as carriers of cloned genes. [NIH]

Platelet-Derived Growth Factor: Mitogenic peptide growth hormone carried in the alpha-granules of platelets. It is released when platelets adhere to traumatized tissues. Connective tissue cells near the traumatized region respond by initiating the process of replication. [NIH]

Platelets: A type of blood cell that helps prevent bleeding by causing blood clots to form. Also called thrombocytes. [NIH]

Platinum: Platinum. A heavy, soft, whitish metal, resembling tin, atomic number 78, atomic weight 195.09, symbol Pt. (From Dorland, 28th ed) It is used in manufacturing equipment for laboratory and industrial use. It occurs as a black powder (platinum black) and as a spongy substance (spongy platinum) and may have been known in Pliny's time as "alutiae". [NIH]

Pneumonia: Inflammation of the lungs. [NIH]

Podophyllotoxin: The main active constituent of the resin from the roots of may apple or mandrake (Podophyllum peltatum and P. emodi). It is a potent spindle poison, toxic if taken internally, and has been used as a cathartic. It is very irritating to skin and mucous membranes, has keratolytic actions, has been used to treat warts and keratoses, and may have antineoplastic properties, as do some of its congeners and derivatives. [NIH]

Polymerase: An enzyme which catalyses the synthesis of DNA using a single DNA strand as a template. The polymerase copies the template in the 5'-3'direction provided that sufficient quantities of free nucleotides, dATP and dTTP are present. [NIH]

Polymerase Chain Reaction: In vitro method for producing large amounts of specific DNA or RNA fragments of defined length and sequence from small amounts of short oligonucleotide flanking sequences (primers). The essential steps include thermal denaturation of the double-stranded target molecules, annealing of the primers to their complementary sequences, and extension of the annealed primers by enzymatic synthesis

with DNA polymerase. The reaction is efficient, specific, and extremely sensitive. Uses for the reaction include disease diagnosis, detection of difficult-to-isolate pathogens, mutation analysis, genetic testing, DNA sequencing, and analyzing evolutionary relationships. [NIH]

Polymorphism: The occurrence together of two or more distinct forms in the same population. [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]

Polysaccharide: A type of carbohydrate. It contains sugar molecules that are linked together chemically. [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]

Postnatal: Occurring after birth, with reference to the newborn. [EU]

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]

Practice Management: Business management of medical and dental practices that may include capital financing, utilization management, and arrangement of capitation agreements with other parties. [NIH]

Precancerous: A term used to describe a condition that may (or is likely to) become cancer. Also called premalignant. [NIH]

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]

Predictive factor: A situation or condition that may increase a person's risk of developing a certain disease or disorder. [NIH]

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 tumor: The original tumor. [NIH]

Primitive neuroectodermal tumors: PNET. A type of bone cancer that forms in the middle (shaft) of large bones. Also called Ewing's sarcoma/primitive neuroectodermal tumor. [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]

Prognostic factor: A situation or condition, or a characteristic of a patient, that can be used to estimate the chance of recovery from a disease, or the chance of the disease recurring (coming back). [NIH]

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]

Progressive disease: Cancer that is increasing in scope or severity. [NIH]

Projection: A defense mechanism, operating unconsciously, whereby that which is emotionally unacceptable in the self is rejected and attributed (projected) to others. [NIH]

Promoter: A chemical substance that increases the activity of a carcinogenic process. [NIH]

Prophylaxis: An attempt to prevent disease. [NIH]

Proptosis: Forward projection or displacement especially of the eyeball : exophthalmos. [EU]

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]

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 Kinase C: An enzyme that phosphorylates proteins on serine or threonine residues in the presence of physiological concentrations of calcium and membrane phospholipids. The additional presence of diacylglycerols markedly increases its sensitivity to both calcium and phospholipids. The sensitivity of the enzyme can also be increased by phorbol esters and it is believed that protein kinase C is the receptor protein of tumor-promoting phorbol esters. EC 2.7.1.-. [NIH]

Protein Kinases: A family of enzymes that catalyze the conversion of ATP and a protein to ADP and a phosphoprotein. EC 2.7.1.37. [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]

Protein-Serine-Threonine Kinases: A group of enzymes that catalyzes the phosphorylation of serine or threonine residues in proteins, with ATP or other nucleotides as phosphate donors. EC 2.7.10. [NIH]

Proteinuria: The presence of protein in the urine, indicating that the kidneys are not working properly. [NIH]

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]

Psoriasis: A common genetically determined, chronic, inflammatory skin disease characterized by rounded erythematous, dry, scaling patches. The lesions have a predilection for nails, scalp, genitalia, extensor surfaces, and the lumbosacral region. Accelerated epidermopoiesis is considered to be the fundamental pathologic feature in psoriasis. [NIH]

Psychiatric: Pertaining to or within the purview of psychiatry. [EU]

Psychology: The science dealing with the study of mental processes and behavior in man and animals. [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]

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]

Purines: A series of heterocyclic compounds that are variously substituted in nature and are known also as purine bases. They include adenine and guanine, constituents of nucleic acids, as well as many alkaloids such as caffeine and theophylline. Uric acid is the metabolic end product of purine metabolism. [NIH]

Pyrimidines: A family of 6-membered heterocyclic compounds occurring in nature in a wide variety of forms. They include several nucleic acid constituents (cytosine, thymine, and uracil) and form the basic structure of the barbiturates. [NIH]

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]

Racemic: Optically inactive but resolvable in the way of all racemic compounds. [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]

Radioactive: Giving off radiation. [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]

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]

Radiology: A specialty concerned with the use of x-ray and other forms of radiant energy in the diagnosis and treatment of disease. [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]

Ramus: Most commonly used for branches of nerves, but applied also to other structures. [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]

Ras gene: A gene that has been found to cause cancer when it is altered (mutated). Agents that block its activity may stop the growth of cancer. A ras peptide is a protein fragment produced by the ras gene. [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]

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]

Reconstitution: 1. A type of regeneration in which a new organ forms by the rearrangement of tissues rather than from new formation at an injured surface. 2. The restoration to original form of a substance previously altered for preservation and storage, as the restoration to a liquid state of blood serum or plasma that has been dried and stored. [EU]

Rectum: The last 8 to 10 inches of the large intestine. [NIH]

Recurrence: The return of a sign, symptom, or disease after a remission. [NIH]

Red blood cells: RBCs. Cells that carry oxygen to all parts of the body. Also called erythrocytes. [NIH]

Refer: To send or direct for treatment, aid, information, de decision. [NIH]

Refraction: A test to determine the best eyeglasses or contact lenses to correct a refractive error (myopia, hyperopia, or astigmatism). [NIH]

Refractory: Not readily yielding to treatment. [EU]

Regeneration: The natural renewal of a structure, as of a lost tissue or part. [EU]

Regimen: A treatment plan that specifies the dosage, the schedule, and the duration of treatment. [NIH]

Relapse: The return of signs and symptoms of cancer after a period of improvement. [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]

Repressor: Any of the specific allosteric protein molecules, products of regulator genes, which bind to the operator of operons and prevent RNA polymerase from proceeding into

the operon to transcribe messenger RNA. [NIH]

Resection: Removal of tissue or part or all of an organ by surgery. [NIH]

Resorption: The loss of substance through physiologic or pathologic means, such as loss of dentin and cementum of a tooth, or of the alveolar process of the mandible or maxilla. [EU]

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]

Respiratory System: The tubular and cavernous organs and structures, by means of which pulmonary ventilation and gas exchange between ambient air and the blood are brought about. [NIH]

Response rate: The percentage of patients whose cancer shrinks or disappears after treatment. [NIH]

Retinoblastoma: An eye cancer that most often occurs in children younger than 5 years. It occurs in hereditary and nonhereditary (sporadic) forms. [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]

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]

Retroviral vector: RNA from a virus that is used to insert genetic material into cells. [NIH]

Reverse Transcriptase Polymerase Chain Reaction: A variation of the PCR technique in which cDNA is made from RNA via reverse transcription. The resultant cDNA is then amplified using standard PCR protocols. [NIH]

Rhabdomyosarcoma: A malignant tumor of muscle tissue. [NIH]

Ribose: A pentose active in biological systems usually in its D-form. [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]

Sacroiliac Joint: The immovable joint formed by the lateral surfaces of the sacrum and ilium. [NIH]

Salvage Therapy: A therapeutic approach, involving chemotherapy, radiation therapy, or surgery, after initial regimens have failed to lead to improvement in a patient's condition. Salvage therapy is most often used for neoplastic diseases. [NIH]

Sarcoma: A connective tissue neoplasm formed by proliferation of mesodermal cells; it is usually highly malignant. [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]

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]

Secretion: 1. The process of elaborating a specific product as a result of the activity of a gland; this activity may range from separating a specific substance of the blood to the elaboration of a new chemical substance. 2. Any substance produced by secretion. [EU]

Segregation: The separation in meiotic cell division of homologous chromosome pairs and their contained allelomorphic gene pairs. [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]

Semisynthetic: Produced by chemical manipulation of naturally occurring substances. [EU]

Sensitization: 1. Administration of antigen to induce a primary immune response; priming; immunization. 2. Exposure to allergen that results in the development of hypersensitivity. 3. The coating of erythrocytes with antibody so that they are subject to lysis by complement in the presence of homologous antigen, the first stage of a complement fixation test. [EU]

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]

Septal: An abscess occurring at the root of the tooth on the proximal surface. [NIH]

Septum: A dividing wall or partition; a general term for such a structure. The term is often used alone to refer to the septal area or to the septum pellucidum. [EU]

Septum Pellucidum: A triangular double membrane separating the anterior horns of the lateral ventricles of the brain. It is situated in the median plane and bounded by the corpus callosum and the body and columns of the fornix. [NIH]

Sequencing: The determination of the order of nucleotides in a DNA or RNA chain. [NIH]

Serine: A non-essential amino acid occurring in natural form as the L-isomer. It is synthesized from glycine or threonine. It is involved in the biosynthesis of purines, pyrimidines, and other amino acids. [NIH]

Serum: The clear liquid part of the blood that remains after blood cells and clotting proteins have been removed. [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]

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 intestine: The part of the digestive tract that is located between the stomach and the large intestine. [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]

Solid tumor: Cancer of body tissues other than blood, bone marrow, or the lymphatic system. [NIH]

Somatostatin: A polypeptide hormone produced in the hypothalamus, and other tissues and organs. It inhibits the release of human growth hormone, and also modulates important physiological functions of the kidney, pancreas, and gastrointestinal tract. Somatostatin receptors are widely expressed throughout the body. Somatostatin also acts as a neurotransmitter in the central and peripheral nervous systems. [NIH]

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]

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]

Sphenoid: An unpaired cranial bone with a body containing the sphenoid sinus and forming the posterior part of the medial walls of the orbits. [NIH]

Sphenoid Sinus: One of the paired paranasal sinuses, located in the body of the sphenoid bone and communicating with the highest meatus of the nasal cavity on the same side. [NIH]

Sphincter: A ringlike band of muscle fibres that constricts a passage or closes a natural orifice; called also musculus sphincter. [EU]

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 Vascular Diseases: Hypoxic-ischemic and hemorrhagic disorders of the spinal cord. Arteriosclerosis, emboli, and vascular malformations are potential causes of these conditions. [NIH]

Sporadic: Neither endemic nor epidemic; occurring occasionally in a random or isolated manner. [EU]

Stable disease: Cancer that is neither decreasing nor increasing in extent or severity. [NIH]

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]

Stem cell transplantation: A method of replacing immature blood-forming cells that were destroyed by cancer treatment. The stem cells are given to the person after treatment to help

the bone marrow recover and continue producing healthy blood cells. [NIH]

Stem Cells: Relatively undifferentiated cells of the same lineage (family type) that retain the ability to divide and cycle throughout postnatal life to provide cells that can become specialized and take the place of those that die or are lost. [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]

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]

Stromal: Large, veil-like cell in the bone marrow. [NIH]

Stromal Cells: Connective tissue cells of an organ found in the loose connective tissue. These are most often associated with the uterine mucosa and the ovary as well as the hematopoietic system and elsewhere. [NIH]

Subacute: Somewhat acute; between acute and chronic. [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]

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]

Supportive care: Treatment given to prevent, control, or relieve complications and side effects and to improve the comfort and quality of life of people who have cancer. [NIH]

Sympathomimetic: 1. Mimicking the effects of impulses conveyed by adrenergic postganglionic fibres of the sympathetic nervous system. 2. An agent that produces effects similar to those of impulses conveyed by adrenergic postganglionic fibres of the sympathetic nervous system. Called also adrenergic. [EU]

Symphysis: A secondary cartilaginous joint. [NIH]

Synapse: The region where the processes of two neurons come into close contiguity, and the nervous impulse passes from one to the other; the fibers of the two are intermeshed, but, according to the general view, there is no direct contiguity. [NIH]

Systemic: Affecting the entire body. [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]

Thalassemia: A group of hereditary hemolytic anemias in which there is decreased synthesis of one or more hemoglobin polypeptide chains. There are several genetic types

with clinical pictures ranging from barely detectable hematologic abnormality to severe and fatal anemia. [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]

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]

Thorax: A part of the trunk between the neck and the abdomen; the chest. [NIH]

Threonine: An essential amino acid occurring naturally in the L-form, which is the active form. It is found in eggs, milk, gelatin, and other proteins. [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]

Tissue: A group or layer of cells that are alike in type and work together to perform a specific function. [NIH]

Topical: On the surface of the body. [NIH]

Total-body irradiation: Radiation therapy to the entire body. Usually followed by bone marrow or peripheral stem cell transplantation. [NIH]

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]

Trachea: The cartilaginous and membranous tube descending from the larynx and branching into the right and left main bronchi. [NIH]

Transcriptase: An enzyme which catalyses the synthesis of a complementary mRNA molecule from a DNA template in the presence of a mixture of the four ribonucleotides (ATP, UTP, GTP and CTP). [NIH]

Transcription Factors: Endogenous substances, usually proteins, which are effective in the initiation, stimulation, or termination of the genetic transcription process. [NIH]

Transfection: The uptake of naked or purified DNA into cells, usually eukaryotic. It is analogous to bacterial transformation. [NIH]

Transferases: Transferases are enzymes transferring a group, for example, the methyl group or a glycosyl group, from one compound (generally regarded as donor) to another compound (generally regarded as acceptor). The classification is based on the scheme "donor:acceptor group transferase". (Enzyme Nomenclature, 1992) EC 2. [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]

Translational: The cleavage of signal sequence that directs the passage of the protein through a cell or organelle membrane. [NIH]

Translocation: The movement of material in solution inside the body of the plant. [NIH]

Transmitter: A chemical substance which effects the passage of nerve impulses from one cell to the other at the synapse. [NIH]

Trauma: Any injury, wound, or shock, must frequently physical or structural shock, producing a disturbance. [NIH]

Tumor suppressor gene: Genes in the body that can suppress or block the development of cancer. [NIH]

Tumorigenic: Chemical, viral, radioactive or other agent that causes cancer; carcinogenic. [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]

Tyrosine: A non-essential amino acid. In animals it is synthesized from phenylalanine. It is also the precursor of epinephrine, thyroid hormones, and melanin. [NIH]

Ulna: The long and medial bone of the forearm. [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]

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]

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]

Vagina: The muscular canal extending from the uterus to the exterior of the body. Also called the birth canal. [NIH]

Vascular: Pertaining to blood vessels or indicative of a copious blood supply. [EU]

Vasoactive: Exerting an effect upon the calibre of blood vessels. [EU]

Vasoactive Intestinal Peptide: A highly basic, single-chain polypeptide isolated from the intestinal mucosa. It has a wide range of biological actions affecting the cardiovascular, gastrointestinal, and respiratory systems. It is also found in several parts of the central and peripheral nervous systems and is a neurotransmitter. [NIH]

Vasodilation: Physiological dilation of the blood vessels without anatomic change. For dilation with anatomic change, dilatation, pathologic or aneurysm (or specific aneurysm) is used. [NIH]

Vasodilator: An agent that widens blood vessels. [NIH]

Ventricles: Fluid-filled cavities in the heart or brain. [NIH]

Ventricular: Pertaining to a ventricle. [EU]

Vertebral: Of or pertaining to a vertebra. [EU]

Veterinary Medicine: The medical science concerned with the prevention, diagnosis, and treatment of diseases in animals. [NIH]

Vibrio: A genus of Vibrionaceae, made up of short, slightly curved, motile, gram-negative

rods. Various species produce cholera and other gastrointestinal disorders as well as abortion in sheep and cattle. [NIH]

Villi: The tiny, fingerlike projections on the surface of the small intestine. Villi help absorb nutrients. [NIH]

Vinca Alkaloids: A class of alkaloids from the genus of apocyanaceous woody herbs including periwinkles. They are some of the most useful antineoplastic agents. [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]

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]

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]

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]

Wound Healing: Restoration of integrity to traumatized tissue. [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]

Yeasts: A general term for single-celled rounded fungi that reproduce by budding. Brewers' and bakers' yeasts are Saccharomyces cerevisiae; therapeutic dried yeast is dried yeast. [NIH]

INDEX


9 780497 004262