MYELOPROLIFERATIVE DISORDER

A MEDICAL DICTIONARY, BIBLIOGRAPHY,
AND ANNOTATED RESEARCH GUIDE TO
INTERNET REFERENCES

JAMES N. PARKER, M.D.
AND PHILIP M. PARKER, PH.D., EDITORS

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FORWARD

In March 2001, the National Institutes of Health issued the following warning: "The number of Web sites offering health-related resources grows every day. Many sites provide valuable information, while others may have information that is unreliable or misleading."[1] Furthermore, because of the rapid increase in Internet-based information, many hours can be wasted searching, selecting, and printing. Since only the smallest fraction of information dealing with myeloproliferative disorder 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 myeloproliferative disorder, 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 myeloproliferative disorder, 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 myeloproliferative disorder. 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 myeloproliferative disorder, 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 myeloproliferative disorder.

The Editors

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

CHAPTER 1. STUDIES ON MYELOPROLIFERATIVE DISORDER

Overview

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

The Combined Health Information Database

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

- **Granulocytic Sarcoma: Case Report with an Unusual Presentation and Review of the Literature**

  Source: Journal of Oral and Maxillofacial Surgery. 60(10): 1206-1211. October 2002.

  Contact: Available from W.B. Saunders Company. Periodicals Department, P.O. Box 629239, Orlando, FL 32862-8239. (800) 654-2452. Website: www.harcourthealth.com.

  Summary: Granulocytic sarcoma is a localized infiltrate of immature granulocytes in an extramedullary site, which superficially resembles sarcoma clinically. This article describes a case report of an unusual presentation of granulocytic sarcoma, followed by a review of the relevant literature. Granulocytic sarcoma is most frequently identified in

patients known to suffer from acute or chronic leukemia or another **myeloproliferative disorder.** This report details the presentation of a granulocytic sarcoma at the apex of an endodontically treated tooth. The sarcoma clinically and histologically resembled a radicular cyst in a patient with a history of chemotherapy treatment. 4 figures. 1 table. 35 references.

Federally Funded Research on Myeloproliferative Disorder

The U.S. Government supports a variety of research studies relating to myeloproliferative disorder. 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 myeloproliferative disorder.

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 myeloproliferative disorder. The following is typical of the type of information found when searching the CRISP database for myeloproliferative disorder:

- **Project Title: ACTIVATION OF SIGNAL TRANSDUCTION PATHWAYS IN STABLE PHASE CHRONIC MYELOID**

  Principal Investigator & Institution: Griffin, James D.; Professor; Dana-Farber Cancer Institute 44 Binney St Boston, Ma 02115

  Timing: Fiscal Year 2002; Project Start 01-AUG-2002; Project End 31-JUL-2007

  Summary: (provided by applicant): Chronic myeloid leukemias are caused by activated tyrosine kinase oncogenes, most often by BCR/ABL, or the related oncogenes TEL/ABL, TEL/JAK2, or TEL/PDGFR. The goal of this project is to understand in detail the signal transduction pathways activated by BCR/ABL and related oncogenes that are relevant for transformation of hematopoietic cells. Using BCR/ABL as the best-studied example, this kinase is believed to function by phosphorylating itself and adjacent cell proteins, and by phosphorylating other proteins that are brought in by adapter molecules. This results in activation of a variety of signaling pathways that ultimately block apoptosis, deregulate cell cycle control, alter adhesion and homing, and cause genetic instability. A particular focus of this project period will be phosphotidylinositol signaling, which we and others have shown is required for transformation, probably because of prominent effects on apoptosis and cell cycle deregulation. We would like to understand how PI3K is activated and determine the downstream targets particularly those related to viability signaling. Also, in preliminary studies we have shown that SHIP, an inositol 5-phophatase, is downregulated by BCR/ABL. SHIP activity would be expected to modulate the lipids that accumulated downstream of PI3K. This is of

[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).

interest since a SHIP knock out mouse develops a myeloproliferative syndrome, suggesting that there may be certain PI3K products that are more important for hematopoiesis than others. Finally, efforts will be focused on understanding the differences in signaling by the 3 known forms of BCR/ABL, encoding p190, p210, or p230; and understanding the differences between BCR/ABL and v-ABL. In particular, pathways initiated because of phosphorylation of Y177 of BCR seem to be of particular interest, as this single tyrosine residue is needed to generate a **myeloproliferative disorder** in mice. Overall, identification of critical signaling intermediates will be useful for many reasons, but particularly to identify potential targets for drug development, especially for drugs that would be synergistic with STI571.

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

- **Project Title: APOPTOSIS IN MYELOFIBROSIS WITH MYELOID METAPLASIA**

  Principal Investigator & Institution: Mesa, Ruben A.; Mayo Clinic Coll of Medicine, Rochester 200 1St St Sw Rochester, Mn 55905

  Timing: Fiscal Year 2002; Project Start 01-SEP-2002; Project End 31-AUG-2007

  Summary: (provided by applicant): Myelofibrosis with myeloid metaplasia is a clonal hematopoietic stem cell disorder that results in progressive cytopenias, splenomegaly, blastic transformation, and death. No broadly applicable therapy is available. The pathogenetic mechanism of MMM is currently unknown. A defect in the normal process of apoptosis has been demonstrated in the related **myeloproliferative disorders** of chronic myeloid leukemia and polycythemia vera. We have shown that apoptosis (spontaneous, serum deprivation, and TNF-alpha induced) is quantitively diminished in the granulocytes of patients with MMM. We have also observed that erythroid precursors from MMM patients can be grown in vitro in the absence of the prerequisite cytokine erythropoietin. Cytokine independent growth has been characterized in polycythemia Vera to arise from over-expression of Bcl-XL (an anti-apoptotic member of the Bcl-2 family). We believe the diminished apoptosis we have observed in MMM may be linked to cytokine hypersensitivity and, potentially, to the anti-apoptotic pathways of Bcl-2 or the Akt pathway. We hypothesize that apoptosis is dysregulated in granulocytes in MMM, and this is a reflection of the corresponding defect in the aberrant clone. In this grant application we propose to: 1.Compare baseline levels of apoptotic proteins and regulators across the spectrum of MMM patients and controls. Baseline levels of apoptotic proteins (caspases), and regulators (lAP's, Bcl-2 family members) will be assessed across a spectrum of MMM patients and normal controls. 2. Evaluate the regulation of caspase activation in MMM neutrophils subjected to apoptotic stimuli through both cellular and cell free systems. Isolated neutrophils from MMM patients and controls will be subjected to various apoptotic stimuli to delineate which pathway of apoptosis is aberrantly regulated. Subsequent experiments will use both immunoblotting and a cytosol caspase activation assay to determine which caspases and regulators are responsible for the apoptotic defect seen in MMM neutrophils. 3. Evaluate the role of the phosphatidylinositol 3- kinase pathway on cytokine independent growth in myeloid progenitors in MMM. Cytokine independent growth of myeloid colonies will be confirmed across a spectrum of MMM patients. Subsequent experiments will delineate the role of the phosphatidylinositol-3 kinase pathway in both apoptosis resistance and cytokine independent colony growth. Successful accomplishments of these goals will provide the scientific basis for targeted anti-myeloproliferative therapy for the treatment of patients suffering from MMM and potentially related chronic myeloid disorders.

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

- **Project Title: BCR/ABL SIGNALING IN HUMAN LEUKEMIAS**

  Principal Investigator & Institution: Pendergast, Ann M.; Associate Professor; Pharmacology and Cancer Biology; Duke University Durham, Nc 27710

  Timing: Fiscal Year 2002; Project Start 15-JUN-1994; Project End 31-JAN-2004

  Summary: The long-term objective of this research is to identify the intracellular signaling pathways that are critical for oncogenic transformation by altered forms of the ABL tyrosine kinase. Oncogenic forms of ABL are linked to the development of human, murine and feline leukemias. Activation of ABL may occur as a consequence of chromosomal translocations. The chimeric BCR-ABL oncogene is produced by a reciprocal chromosomal translocation that fuses varying amounts of the BCR gene on chromosome 22 with sequences upstream of the second exon of the c-ABL gene on chromosome 9. Three different BCR-ABL proteins may be produced: P210 which is the causative agent of greater than 95 percent of chronic myelogenous leukemia (CML). P185 which is associated with a subset of acute lymphocytic leukemias (ALL), and P230 which is associated with chronic neutrophilic leukemia (CNL), a rare **myeloproliferative disorder** characterized by a mild hematologic phenotype. The P185 and P210 forms of BCR-ABL have been proposed to transform cells through their ability to enhance cell proliferation, block apoptosis, alter cell adhesion and increase cell motility. Multiple proteins have been identified as downstream targets of BCR-ABL. However, only a small subset of these proteins have been shown to play critical roles in the biological activities associated with BCR-ABL expression. The specific aims of this proposal are: 1) to test the hypothesis that the ubiquitin-dependent degradation of specific cellular proteins by the oncogenic BCR-ABL tyrosine kinases constitutes a novel mechanism for the functional inactivation of growth inhibitors/tumor suppressors, and 2) to identify intracellular signaling pathways that are differentially regulated by the oncogenic forms of BCR-ABL (such as P210) and by the weakly leukemogenic P230 protein that is associated with an indolent or benign clinical disease. Comparative analysis of the BCR-ABL proteins may allow the identification of critical molecular components required for malignant transformation by BCR-ABL. Furthermore, our finding that oncogenic tyrosine kinases trigger the destruction of specific target proteins via the ubiquitin proteasome machinery provides a potentially important pathway for the elimination of growth inhibitors/tumor suppressors during tumor progression. Definition of this pathway may allow for the development of therapeutic reagents for the treatment of leukemias and other cancers that are caused by the activation of nonreceptor tyrosine kinases.

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

- **Project Title: BCR-ABL DEPENDENT & INDEPENDENT MECHANISMS OF IMATINIB MESYLATE RESISTANCE**

  Principal Investigator & Institution: Talpaz, Moshe; University of Texas Md Anderson Can Ctr Cancer Center Houston, Tx 77030

  Timing: Fiscal Year 2003; Project Start 19-SEP-2003; Project End 28-FEB-2008

  Summary: Chronic myelogenous leukemia (CML) is a clonal **myeloproliferative disorder** that results from neoplastic transformation of primitive hematopoietic stem cells. The disease accounts for approximately 7 - 15 % of all leukemias in adults and until recently had limited therapeutic responsiveness to a wide variety of agents. Through cytogenetic, molecular and biochemical studies the mechanisms associated with initiation CML cell transformation are becoming more clearly understood. In > 95 % of CML patients a reciprocal translocation of chromosomes 9 and 22 result in

expression of a chimeric gene encoding an unregulated tyrosine kinase activity, termed BCR-ABL. Numerous animal studies demonstrated that BCR-ABL expression alone was sufficient to induce leukemic-like disorders, suggesting that targeted inhibition of this kinase would provide therapeutic activity in CML. The Novartis drug, Imatinib mesylate (IM) binds to the ATP binding pocket of BCR-ABL inhibiting its activity. Clinical studies with IM have shown remarkable activity in CML with frequent reports of both hematological and cytogenetic remission. However, patients frequently progress or fail to respond to IM, suggesting resistance mechanisms exist that suppress the efficacy or durability of this drug. Clinical studies suggest that point mutations and amplification of the BCR-ABL gene exist and correlate with IM resistance in about 30 to 40 % of CML patients. Analysis of CML cell models and clinical samples suggest that escape from BCR-ABL dependence may account for resistance in other patients. The goal of this project is to fully characterize BCR-ABL dependent and independent mechanisms of IM resistance in CML patients using several techniques including studies of gene mutations, alternate signaling pathways and establishment of cells in short and long term culture to study intrinsic resistance profiles from CML patients. These studies have already identified unique mechanisms of IM resistance and have tested activities of novel agents that overcome various mechanisms of IM resistance. These agents are to be tested in vitro and in clinical studies to determine whether IM resistance and disease progression can be eliminated in CML patients.

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

- **Project Title: CHARACTERIZATION OF A MOUSE MODEL FOR POLYCYTHEMIA VERA**

  Principal Investigator & Institution: Mok, Henry; Molecular and Human Genetics; Baylor College of Medicine 1 Baylor Plaza Houston, Tx 77030

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

  Summary: (provided by applicant): Polycythemia vera is one of four recognized **myeloproliferative disorders** in humans and is thought to be a clonal abnormality of stem cells, manifesting primarily as erythrocytosis (increased red cell mass). Although the molecular mechanisms of aberrant hematopoiesis remain enigmatic, there is distinct evidence for both genetic and environmental influences in disease pathogenesis. The paucity of familial cases and clinical heterogeneity in humans suggest that gene-environment interactions play a significant role in the pathogenesis of the disorder. Environmental factors associated with erythrocytosis range the gamut from dietary and occupational exposure (cobalt), to tobacco smoking, to geographical circumstances (high altitude). The mouse Polycythemia mutation, Pcm, was generated by radiation mutagenesis, and results in a transient erythrocytosis in the heterozygous state. Our preliminary genetic mapping studies are consistent with a single locus causing the Pcm phenotype. We hypothesize that this phenotype associated with Pcm is due to haploinsufficiency for a hematopoietic regulator, and that Pcm mice will provide us with a valuable animal model system for polycythemia vera. The principle goals of this project are to fully characterize Pcm at a genetic and cellular level, and thereby gain insight into the contributions of genetic and environmental factors in the pathogenesis of hematopoietic disorders. The ability to study this mutation on a well-defined, uniform genetic background will allow us to systematically elucidate potential gene-environment interactions. We will specifically test the hypothesis that the discrete and transient erythrocytosis observed in Pcm can be exacerbated by environmental factors, such as cobalt exposure. This would be consistent with the interpretation that the single-locus Pcm mutation predisposes the organism to environmental insult that would

subsequently unmask a more severe manifestation of disease. Therefore, the aims of my research include phenotypic characterization of Pcm, genetic mapping of the locus, and subsequent positional cloning of Pcm.

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

- **Project Title: FTI BIOLOGY & TREATMENT OF MYELOPROLIFERATIVE DISORDERS**

  Principal Investigator & Institution: Gotlib, Jason R.; Mechanical Engineering; Stanford University Stanford, Ca 94305

  Timing: Fiscal Year 2002; Project Start 01-JUL-2001; Project End 30-JUN-2006

  Summary: (provided by applicant) The long-term objective of the proposed research is to investigate clonal myeloid hemopathies, particularly Myelodysplastic Syndrome (MDS), and chronic **myeloproliferative disorders** (MPDs). With the resources of the Stanford-UCSF MDS Center, the goal is to improve the understanding of MDS and MPDs by coordinated clinical and laboratory research, and to evaluate novel therapies which are based on the biology of these disorders. One example of rational drug development is represented by the class of compounds termed farnesyltransferase inhibitors (FTIs). The proposed research will examine whether FTIs have activity in proliferative-type hematologic disorders in which de-regulation of the signaling protein Ras is implicated in their pathogenesis. FTIs target the post-translational modification of Ras, a critical step for its functional localization at the cytoplasmic plasma membrane surface. The FT1 R115777 (Janssen) is a potent inhibitor of Ras. Herein is proposed a phase 1/11 open-label, intrapatient clinical study for the use of R115777 in the treatment of adult patients with MPDs. The study will evaluate two MPD patient populations. One group will include patients who have received substantive prior treatment (e.g. interferon-resistant or intolerant CML). The second group will include patients with CMML, atypical CML, and undifferentiated MPDs (UMPDs), who have not received substantive prior treatment (e.g. generally only hydroxyurea). 25 patients, 12-13 in each group, will be recruited. Patients will be treated with R115777 for 21 days every 28 days for a total of 4 cycles. If no response is observed with 300 mg po bid after 2 cycles, the dose will be increased to 400 mg po bid for 2 more cycles. If greater than or equal to grade 3 non-hematological dose-limiting toxicity is observed at 300 mg po bid after 2 cycles, the dose will be decreased to 200 mg po bid. Primary endpoints will include evaluation of drug safety/toxicity and hematologic response. Secondary endpoints will include cytogenetic response, and biologic correlates such as N/K-ras mutation analysis and processing, MAP kinase activation, and in vitro CFU-GM cytotoxicity assays performed on patient bone marrows prior to study entry and at study completion. If clinically efficacious, further studies of R115777 in MPDs will be warranted.

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

- **Project Title: GVL AGAINST MURINE CHRONIC PHASE AND BLAST CRISIS CML**

  Principal Investigator & Institution: Shlomchik, Warren D.; Assistant Professor; Comprehensive Cancer Center; Yale University 47 College Street, Suite 203 New Haven, Ct 065208047

  Timing: Fiscal Year 2003; Project Start 05-APR-2003; Project End 31-MAR-2008

  Summary: (provided by applicant): The Graft-vs-Leukemia effect (GVL) mediated by T cells that accompany allogeneic stem cell grafts and delayed leukocyte infusions (DLI), has revolutionized the treatment of leukemia and lymphoma. Chronic phase CML (CP-

CML) is the prototypical GVL-sensitive neoplasm in which complete remissions are achieved in 80% of recipients of DLI. In spite of this success, alloimmune therapy has two principle weaknesses. First, many neoplasms including CML in blast crisis (BC-CML), are GVL-resistant. The basis for this differential susceptibility is unknown. Second, GVL has proven difficult to separate from Graft-vs.-Host Disease (GVHD), the attack by donor T cells on recipient tissues. We hypothesize that manipulation of alloimmune responses can render GVL-resistant tumors more sensitive and lessen GVHD while retaining GVL. We believe this is possible because some patients with GVL-resistant disease do benefit from alloSCT and some patients have GVL without GVHD. A first step in developing such strategies is to understand alloimmunity against GVL-sensitive neoplasms and how this response differs from GVHD and from GVL against less sensitive neoplasms. These are the objectives of this proposal. A major obstacle in achieving these goals has been the absence of murine models for GVL-sensitive and resistant leukemias that share a common pathology and genetic etiology with their human counterparts and are inducible on different strains, including KO mice that will yield leukemias lacking critical molecules. Leukemia cell lines, the mainstay of murine GVL research, lack these features. We have adopted novel murine models of CP-CML (mCP-CML) and BC-CML (mBC-CML) that address these problems, mCP-CML is a **myeloproliferative disorder** induced via retroviral transduction of murine progenitors with the bcr-abl fusion cDNA, the defining genetic abnormality in human CP-CML. mBC-CML is induced via the retroviral introduction of both bcr-abl and the NUP98/HOXA9 fusion, a translocation found in BC-CML. The use of retrovirus allows the induction of both leukemias in any mouse, most notably gene-deficient mice. Using gene deficient recipients, donors, and leukemias, we will examine antigen presentation, T cell polarization, and T cell effector mechanisms in GVL and GVHD.

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

- **Project Title: IDENTIFICATION OF TARGETS OF BCR ABL IN THE LEUKEMOGENIC**

  Principal Investigator & Institution: Ren, Ruibao; Associate Professor; None; Brandeis University 415 South Street Waltham, Ma 024549110

  Timing: Fiscal Year 2002; Project Start 07-MAY-1996; Project End 28-FEB-2006

  Summary: (Adapted from the investigator's abstract) Our long-term goal is to understand the molecular mechanism by which the bcr-abl oncogene acts in the pathogenesis of chronic myelogenous leukemia (CML). During the previous project period, we have successfully established a mouse CML model where Bcr-Abl efficiently induces a myeloproliferative disease resembling the chronic phase of human CML. We have used this murine CML model to define the roles of domains of Bcr-Abl and of specific signaling events in leukemogenesis. The mouse CML model has also provided a way to study the role played in leukemogenesis by extracellular factors produced by Bcr-Abl target cells, and by the altered interaction of these target cells with the in vivo microenvironment. Since Bcr-Abl alone induces only a **myeloproliferative disorder,** we recently sought to study the blast transformation of CML by testing if Bcr-Abl and the AML1/MDS1/EVI1 (AME) fusion protein cooperate to efficiently induce acute myelogenous leukemia. AME is a product of the human t(3;21)(q26;q22) translocation found as a secondary mutation in some cases of CML during the blast phase, and in therapy-related myelodysplasia and acute myelogenous leukemia. We found that while AME alone induces an acute myelogenous leukemia with a long latency (5 to 13 mounts), coexpression of Bcr-Able and AME induces a **myeloproliferative disorder** with accumulation of a large number of immature myeloid cells, resembling the

accelerated or myeloid blast phase of CML, with a latency of 1 to 3 months. Building on our progress in several areas and our expertise with in vivo models of leukemia, this proposal aims to understand in greater depth and detail the roles of domains of Bcr-Abl of intracellular signaling events and of extracellular factors affected by Bcr-Abl in the pathogenesis of CML. In addition, this project will begin a detailed examination of the specific role of secondary mutations in the blast transformation of CML. Our specific aims for the project are as follows: 1) To test hypotheses regarding the roles of domains of Bcr-Abl and signaling pathways in Bcr-Abl leukemogenesis. 2) To test the hypotheses that altered expression of cytokine and adhesion molecules plays a role in Bcr-Abl leukemogenesis. 3) To test hypotheses regarding the role of secondary mutations in the molecular mechanism of blastic transformation of CML. These studies will help to further design rational therapeutic interventions for CML and to understand the mechanisms involved in leukemogenesis in general.

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

- **Project Title: INDUCTION AND MANIPULATION OF HUMAN CML IN NOD/SCID**

  Principal Investigator & Institution: Conrad, Patricia D.; Children's Research Institute 700 Children's Dr Columbus, Oh 432052664

  Timing: Fiscal Year 2002; Project Start 20-SEP-1999; Project End 31-AUG-2003

  Summary: This proposal describes an intensive, five-year training program designed to allow the principal investigator to successfully bridge the gap between clinical and basic science training. The ultimate goal of the performance of this training will be to achieve scientific independence in the fields of normal and malignant hematopoiesis. Dr. Conrad is board certified in pediatrics and is currently a third year pediatric hematology/oncology fellow at the Children's Hospital of Philadelphia. She has been working for the last 18 months in the laboratory of Stephen G. Emerson, M.D., Ph.D. During this time, Dr. Conrad has intensively pursued laboratory investigation and is ready for the next phase of training, progressively independent work. The candidate's research has focused on 1) investigating functional and biological properties of umbilical cord blood (UCB) hematopoietic stem cells (HSCs) and 2) establishing the NOD/SCID assay using cord blood as the source for stem cells. UCB stem cells are not identical to their bone marrow or peripheral blood counterparts, and seem to act as a more primitive population. Immunodeficient mice, including NOD/SCID, have become the preferred in vivo assay for HSCs. Chronic myelogenous leukemia (CML) is believed to be a **myeloproliferative disorder** of stem-cell origin. Therefore, experiments designed to investigate fundamental questions relating to pathogenesis of CML will be optimized utilizing a system of UCB HSCs and NOD/SCID mice. Dr. Conrad's sponsor, Dr. Emerson, is division chief of the hematology/oncology section at the University of Pennsylvania. He holds a Ph.D. in cell biology and immunology and was scientific director of the alloBMT program at the University of Michigan. He has significantly contributed to and remains committed to Dr. Conrad's growth into a physician scientist.

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

- **Project Title: LEUKEMIA THERAPY BASED ON ABNORMAL SIGNAL TRANSDUCTION**

  Principal Investigator & Institution: Emanuel, Peter D.; Associate Professor; Medicine; University of Alabama at Birmingham Uab Station Birmingham, Al 35294

  Timing: Fiscal Year 2002; Project Start 13-MAY-1999; Project End 30-APR-2004

Summary: Juvenile myelomonocytic leukemia (JMML) is a rare, clonal **myeloproliferative disorder** afflicting young children. Since 1986 a team of investigators at the University of Alabama at Birmingham (UAB) have been conducting translational research studies in JMML. Over the last ten years the UAB JMML project has risen to the forefront of research in this rare but fascinating disorder. The blend of investigators in basic science and clinical investigation has positioned the UAB team in a unique role to have unprecedented access to JMML patients and thus take a leadership role in investigating mechanism-based treatment modalities. The pathogenesis of JMML has been linked to deregulated GM-CSF growth factor signal transduction through the Ras pathway. This deregulation results in JMML cells demonstrating selective hypersensitivity to GM-CSF in vitro. This feature of growth factor hypersensitivity is emerging as a potential common mechanism amongst many other **myeloproliferative disorders** and thus, JMML serves as an important model disease. Potential causative mutations resulting in GM-CSF hypersensitivity include neurofibromatosis gene abnormalities in 30 percent of JMML patients and RAS mutations in an additional 20 percent of patients. Causative mutations are undefined in the remaining majority of patients. In addition to providing insights into the pathogenesis of this disease, the UAB JMML project has also identified a promising new treatment modality using 13-cis retinoic acid (CRA). The retinoic acid appears to modulate the hypersensitive GM-CSF response in JMML. But CRA does not appear to be effective enough to induce complete, lasting remissions. Thus there is a need for more effective therapeutics and such strategies can be aimed at the GM-CSF pathway as a result of the pathogenetic studies. The major goals for the recipient of this K24 award will be: (1) to establish the first North American JMML Registry at the P.I.'s institution and the first Pediatric Intergroup Multimodality Clinical Trials Program for JMML, (2) to complete the development of a diagnostic test for JMML, field test it and implement it, (3) to continue to investigate for other genetic mutations in the Ras signaling pathway responsible for GM-CSF hypersensitivity within JMML cells, and (4) to develop other novel therapeutic strategies for JMML that are mechanism-based.

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

- **Project Title: MECHANISM OF ACTION OF A NOVEL TYROSINE KINASE INHIBITOR**

  Principal Investigator & Institution: Chandra, Joya; Pediatrics; University of Texas Md Anderson Can Ctr Cancer Center Houston, Tx 77030

  Timing: Fiscal Year 2002; Project Start 17-JUL-2002

  Summary: Chronic myelogenous leukemia (CML) is the most common **myeloproliferative disorder** and accounts for 20% of all leukemias. Notably, it is a disease in which identification of a molecular defect has facilitated novel therapeutic strategies.In over 95% of CML cases, the c-ABL gene from chromosome 9 translocates and fuses with the BCR gene on chromosome 22, giving rise to the p210bcr/abl protein tyrosine kinase. Inhibition of p210bcr/abl kinase activity represents a pharmacological goal. STI571 is the first of these tyrosine kinase inhibitors to be introduced into the clinic. However, ongoing clinical evaluation of STI571 reveals that continuous dosing is required for the optimal efficacy of this drug. Also, preliminary reports indicate that patients with more advanced blast phase CML have fewer responses of shorter duration in comparison to patients with chronic phase disease. Given these limitations associated with STI571, other inhibitors of p210bcr/abl may be useful in a clinical setting. Tyrphostins are a class of inhibitors that mimic the polypeptide substrates of BCR-ABL and are noncompetitive with respect to ATP (unlike STI571). In vitro studies with the

tyrphostin, NSC680410, show that it causes down-regulation of p210bcr/abl protein levels and induces apoptosis via a mitochondrial pathway. Preliminary results indicate that NSC680410 and STI571 activate distinct signaling pathways. Elucidation of these pathways will reveal opportunities to improve the efficacy of the tyrosine kinase inhibitors.

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

- **Project Title: MECHANISMS OF LEUKEMOGENESIS IN DOWN SYNDROME**

  Principal Investigator & Institution: Crispino, John D.; Ben May Institute; University of Chicago 5801 S Ellis Ave Chicago, Il 60637

  Timing: Fiscal Year 2003; Project Start 01-JUL-2003; Project End 30-JUN-2007

  Summary: (provided by applicant): Children with Down syndrome (DS) have a 10-20 fold increased risk of developing leukemia, in particular acute megakaryoblastic leukemia (AMKL). While the genetic lesions that promote leukemia in Down syndrome have been largely undefined, we recently demonstrated that leukemic cells from every DS-AMKL patient examined harbor mutations in the essential hematopoietic transcription factor gene GATA1. In every instance, the mutation involved a small insertion or deletion in GATA1 that resulted in a frame-shift and the introduction of a premature stop codon within the sequences encoding the N-terminal activation domain of GATA-1. These mutations prevent the synthesis of the 50-kD full length GATA-1, but not of a 40-kD isoform initiated further downstream, termed GATA-1s. In this application, we propose to study the mechanism of leukemogenesis in patients with GATA1 mutations. Furthermore, we will seek to identify the cooperating factors that are likely contributed by trisomy 21 in Down syndrome AMKL. Specifically, we plan: 1) To determine the incidence and distribution of GATA1 mutations in a greater number of DS-AMKL samples as well as in DNA from patients with DS pre-leukemia, named Transient **Myeloproliferative Disorder;** 2) To assess whether loss of GATA-1 in conjunction with the mouse equivalent of trisomy 21 can promote leukemogenesis in mice, and further, whether overexpression of GATA-1s can promote immortalization of GATA-1-deficient megakaryocyte progenitors; and 3) To develop a mouse model of DS-AMKL by creating mice that will conditionally express only the 40-kD isoform of GATA-1 and breeding them to mice with the murine equivalent of DS. Separately, we will also cross these novel GATA1 mutant mice into the BXH-2 strain of mice to identify genes that cooperate with the GATA1 mutations in leukemia. These studies will likely increase our understanding of how GATA1 mutations contribute to the initiation or progression of leukemia in Down syndrome and may also lead to the identification of novel leukemia disease genes on chromosome 21.

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

- **Project Title: MOLECULAR PATHWAYS IN MYELOPROLIFERATIVE DISEASE**

  Principal Investigator & Institution: Daley, George Q.; Associate Professor; Whitehead Institute for Biomedical Res Biomedical Research Cambridge, Ma 02142

  Timing: Fiscal Year 2002; Project Start 01-DEC-2000; Project End 30-NOV-2002

  Summary: (adapted from the investigator's abstract) The broad objectives of this proposal are to understand how the Bcr/Abl protein induces chronic myeloid leukemia (CML), to create improved murine model systems that will facilitate the study of CML, and to develop an experimental framework for identifying and studying genes responsible for related **myeloproliferative disorders.** The specific aims outlined below will address how Bcr/Abl induces bone marrow proliferation by activating cytokine-

signaling pathways. Normal hematopoiesis is regulated by cytokines, but the hallmark of myeloproliferative disease is autonomous hematopoiesis, a pathology most clearly documented for erythroid progenitors, which form colonies in culture in the absence of erythropoietin (EPO). A prevailing hypothesis to explain the origin of this autonomous hematopoiesis is that somatic mutations arise in post-receptor signaling proteins, deregulating mitogenic pathways normally controlled by cytokine receptor signal transduction. Of the four adult **myeloproliferative disorders,** CML is the only one for which the activated signaling molecule is known. The CML-specific Bcr/Abl oncoprotein can abrogate growth factor requirements for established cell lines in culture and induce a CML-like myeloproliferative syndrome in mouse models, but which pathways are crucial to disease in vivo is unknown. The observation the EPO-independent erythropoiesis in CML patients requires stem cell factor (SCF), and recent insights into the cooperation of the EPO and SCF receptor pathways, suggest that Bcr/Abl functionally substitutes for the EPOR requirement in the SCF signaling pathway. Preliminary data confirm this by demonstrating that Bcr/Abl expression can rescue erythropoiesis in fetal liver progenitors of mice lacking the EPOR. This system affords a very direct assessment of the role of Bcr/Abl in a defined cytokine pathway. He proposes to determine which disease-related forms of Abl (P210 and P185 Bcr/Abl, Tel/Abl, and v-Abl) will rescue erythropoiesis from fetal liver progenitors and embryonic stem cells from EPOR(-/-) mice, using in vitro hematopoietic colony assays and in vivo reconstitution experiments. Through mutational analysis of Bcr/Abl and strategies for inhibiting the function of downstream signaling molecules, the p.i. will determine which domains of Bcr/Abl mediate signaling and what pathways are critical for rescue of erythropoiesis. He will then extend these studies to determine whether Bcr/Abl will induce myeloid colony formation in mice deficient in the IL-3, GM-CSF, and thrombopoietin receptors. Longer term objectives include expressing Bcr/Abl in ES cells under conditional promoters to develop a breedable strain of mice with regulated Bcr/Abl expression, and identifying genes relevant to other **myeloproliferative disorders** through expression cDNA cloning.

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

- **Project Title: SUICIDAL LYMPHOCYTES FOR INDUCTION OF GVL & CONTROL OF GVHD**

  Principal Investigator & Institution: Kornblau, Steven M.; University of Texas Md Anderson Can Ctr Cancer Center Houston, Tx 77030

  Timing: Fiscal Year 2003; Project Start 19-SEP-2003; Project End 28-FEB-2008

  Summary: The goal of this project is to optimize the use of "suicidal lymphocytes" as a means of controlling graft-versus-host disease (GVHD) thereby expanding the population of patients able to benefit from the graft-vs.-leukemia effect (GVL) associated with allogeneic transplantation. The ability to fully harness the immunologically mediated graft-versus-leukemia (GVL) effect noted after allogeneic marrow or stem cell transplantation is limited by the development of GVHD. Current therapies, designed to prevent or treat GVHD are sub optimal and the risk of GVHD remains a major barrier preventing many leukemia patients from undergoing allogeneic transplantation and benefiting from a GVL effect. A novel strategy to control GVHD is to selectively eliminate the GVHD initiating T-cell after infusion, instead of suppressing the function of all T-cells. This selectivity is generated by transducing T-cells ex-vivo with a retrovirus containing the herpes simplex virus-thymidine kinase (HSV-TK) gene. These "suicidal" lymphocytes are then infused into patient. Should GVHD develop the "suicidal lymphocytes" are eliminated by the administration of ganciclovir (GCV) to

which they are now sensitive. Several small clinical trials have demonstrated proof of principle but have also highlighted technical problems. During the prior funding cycle of NIH P01 grant CA 49639 ("the Therapy of CML") we developed a murine model using retrovirally transduced murine T-cells to help optimize the use of "suicidal" lymphocytes. The proposed studies will continue to determine the efficacy of these transduced lymphocytes in established murine models and investigate means of optimizing and expanding their use to enable more patients to benefit from the GVL effect. Specific Aim 1. Demonstrate that LNGFR-TK-infected lymphocytes are capable of generating a GVL effect in the MHC matched allogeneic transplant setting against the AKR/J derived M1 T-cell leukemia, or against a retrovirally transduced Bcr-abl based "CML like" **myeloproliferative disorder.** Specific Aim 2. Adapt the model to test if GVHD can still be controlled when suicidal lymphocyte are used in the non-myeloablative and haploidentical allogeneic transplant settings. Specific Aim 3. Attempt to increased the anti-leukemic specificity and the GVL effect by using leukemia derived dendritic cells to stimulate and prime the T-cells during the generation of TK+ lymphocytes. Specific Aim 4: Test whether DLI using suicidal lymphocytes can be utilized as therapy against minimal residual disease during remission without marrow or stem cell support.

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

- **Project Title: THE ROLE OF ABC TRANSPORTERS IN STEM CELLS**

  Principal Investigator & Institution: Sorrentino, Brian P.; Associate Member; St. Jude Children's Research Hospital Memphis, Tn 381052794

  Timing: Fiscal Year 2002; Project Start 15-MAY-2001; Project End 30-APR-2005

  Summary: (Applicant's Description Verbatim): Hematopoietic stem cells (HSCs) can be identified on the basis of their ability to extrude fluorescent dyes, a property attributed to expression of transmembrane proteins belonging to the ABC transporter superfamily. It is not known which transporters are expressed on HSCs, or whether ABC transporters have a functional role in stem cell development. We have recently shown that enforced expression of one ABC transporter, the MDR 1 gene product P-glycoprotein (P-gp), resulted in HSC amplification and development of a **myeloproliferative disorder** in transplanted mice. While these data clearly show that the P-gp transporter can have functional effects in stem cells, expression of P-gp was not necessary for normal stem cell development. In mice with targeted disruptions of MDR 1-like genes, normal HSCs were present and expressed another recently identified ABC transporter named Bcrpl. This conservation of transporter expression in HSCs suggests that transporter function may be required for normal stem cell development. To test this hypothesis, the Bcrp1 gene will be knocked out in murine ES cells, and crosses with mdrl a/b knockout mice will be analyzed for developmental defects in hematopoiesis. The tightly restricted expression pattern of Bcrpl in stem cell populations suggests that it may be a novel marker for stem cell purification. Sorting experiments will be performed to determine whether Bcrpl (BCRP) expression identifies stem cells from hematopoietic and muscle tissue. The last aim of this proposal will define the relationship between deregulated expression of ABC transporters and leukemia by using controllable transgenic expression systems in mice, and through direct study of pediatric leukemia samples. Altogether, it is expected that these experiments will provide novel information regarding the role of ABC transporters in normal and leukemic hematopoiesis.

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

- **Project Title: TRANSLATIONAL INVESTIGATION OF NF1 IN MYELOID LUEKEMIA**

  Principal Investigator & Institution: Shannon, Kevin M.; Professor and Director, Hematopoietic Ma; Pediatrics; University of California San Francisco 3333 California Street, Suite 315 San Francisco, Ca 941430962

  Timing: Fiscal Year 2002; Project Start 15-FEB-1997; Project End 31-JAN-2007

  Summary: (provided by applicant) Children with the common inherited disorder neurofibromatosis, type 1 (NF1) are predisposed to myeloid leukemia, particularly juvenile chronic myelomonocytic leukemia (JMML). The NF1 gene (NF1) encodes a GTPase activating protein (GAP) called neurofibromin that stimulates GTP hydrolysis on the p21ras (Ras) family of signaling proteins. We have shown that NF1 functions as a tumor suppressor gene in myeloid cells by negatively regulating Ras. In the current period of support, we have exploited a murine model to investigate mechanistic questions related to the role of NF1 in myeloid growth control and to perform preclinical studies of rational therapeutics. These studies strongly implicate the growth factor GM-CSF as playing a central role in the aberrant growth of murine NF1 mutant cells and in human JMML. In the competing renewal of this translational research project, we will extend these studies using expertise and reagents developed during the past 4 years. This application has 4 specific aims. The experiments proposed under aim 1 involve detailed mechanistic studies of the effects of NF1 inactivation on signal transduction, apoptosis, and cell cycle control in myeloid lineage cells. We will also take a genetic approach to test the role of GM-C SF signaling in a **myeloproliferative disorder** (MPD) that arises in JunB mutant mice. In aim 2, we propose studies to elucidate the role of GM-CSF in fetal liver cell engraftment that might be relevant to the pathogenesis of JMML. Our third aim proposes a combination of in vivo and in vitro approaches to contrast the effects of expressing oncogenic Ras and inactivating NF1 in myeloid cells. These studies will exploit a novel mouse model developed by our collaborator Tyler Jacks. In aim 4, we examine how the adapter molecule p62DOK regulates myeloid growth by interacting with the Ras GTPase activating protein p12OGAP. Together, these studies will provide new insights into how Ras signaling is normally regulated in myeloid cells, and how hyperactive Ras contributes to leukemogenesis.

  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 "myeloproliferative disorder" (or synonyms) into the search box. This search gives

[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.

you access to full-text articles. The following is a sample of items found for myeloproliferative disorder in the PubMed Central database:

- **Fibroblast growth factor receptor 1 is fused to FIM in stem-cell myeloproliferative disorder with t(8;13)(p12;q12).** by Popovici C, Adelaide J, Ollendorff V, Chaffanet M, Guasch G, Jacrot M, Leroux D, Birnbaum D, Pebusque MJ.; 1998 May 12; http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&artid=20444

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 myeloproliferative disorder, simply go to the PubMed Web site at **http://www.ncbi.nlm.nih.gov/pubmed**. Type "myeloproliferative disorder" (or synonyms) into the search box, and click "Go." The following is the type of output you can expect from PubMed for myeloproliferative disorder (hyperlinks lead to article summaries):

- **A chronic myelogenous leukemia-like myeloproliferative disorder accompanied by T-cell lymphoblastic lymphoma with chromosome translocation t(8;13)(p11;q12): a Japanese case.**
  Author(s): Matsumoto K, Morita K, Takada S, Sakura T, Shiozaki H, Murakami H, Miyawaki S.
  Source: International Journal of Hematology. 1999 December; 70(4): 278-82.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10643154

- **A chronic myeloproliferative disorder associated with monosomy 7 in the bone marrow cells; normal karyotype in acute transformation.**
  Author(s): Linch DC, Walker H, Roberts P, McKinnon J, Goldstone AH, Huehns ER.
  Source: British Journal of Haematology. 1982 July; 51(3): 439-44.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7104227

[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.

- **A fourth case of 8p11 myeloproliferative disorder transforming to B-lineage acute lymphoblastic leukaemia. A case report.**
  Author(s): JabbarAl-Obaidi M, Rymes N, White P, Pomfret M, Smith H, Starczynski J, Johnson R.
  Source: Acta Haematologica. 2002; 107(2): 98-100. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11919390

- **A myeloproliferative disorder associated with isochromosome 14q.**
  Author(s): Saghir F, Abboud E, Veres C, Feldman L.
  Source: The American Journal of the Medical Sciences. 2002 September; 324(3): 166-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12240716

- **A myeloproliferative disorder with eosinophilia associated with a unique translocation (3;5).**
  Author(s): Shanske AL, Kalman A, Grunwald H.
  Source: British Journal of Haematology. 1996 December; 95(3): 524-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8943895

- **A patient with basophilic-eosinophilic myeloproliferative disorder showing monosomy 7 and hyperhistaminemia.**
  Author(s): Takimoto Y, Imanaka F, Hayashi Y, Shindo H.
  Source: Acta Haematologica. 1997; 98(1): 37-41.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9210912

- **Abnormalities of platelet aggregation in chronic myeloproliferative disorders.**
  Author(s): Avram S, Lupu A, Angelescu S, Olteanu N, Mut-Popescu D.
  Source: Journal of Cellular and Molecular Medicine. 2001 January-March; 5(1): 79-87.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12067453

- **Acute megakaryoblastic leukemia after transient myeloproliferative disorder with clonal karyotype evolution in a phenotypically normal neonate.**
  Author(s): Polski JM, Galambos C, Gale GB, Dunphy CH, Evans HL, Batanian JR.
  Source: Journal of Pediatric Hematology/Oncology : Official Journal of the American Society of Pediatric Hematology/Oncology. 2002 January; 24(1): 50-4. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11902741

- **Acute megakaryoblastic leukemia following transient myeloproliferative disorder in a patient without Down syndrome.**
  Author(s): Brissette MD, Duval-Arnould BJ, Gordon BG, Cotelingam JD.
  Source: American Journal of Hematology. 1994 December; 47(4): 316-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7977305

- **Acute nonlymphocytic leukemia after transient myeloproliferative disorder in a patient with Down syndrome.**
  Author(s): Barnett PL, Clark AC, Garson OM.
  Source: Medical and Pediatric Oncology. 1990; 18(5): 347-53. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2142749

- **Acute paraplegia due to thoracic extramedullary hematopoiesis in chronic myeloproliferative disorder--an unusual presentation.**
  Author(s): Chang YH, Niu CC, Chen LH, Chen WJ.
  Source: Acta Orthop Belg. 2002 April; 68(2): 187-91.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12051009

- **Allogeneic stem cell transplantation for chronic myeloproliferative disorders and myelodysplastic syndromes: the question is "when?".**
  Author(s): Maziarz RT, Mesa RA, Tefferi A.
  Source: Mayo Clinic Proceedings. 2003 August; 78(8): 941-3.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12911040

- **An acute myeloproliferative disorder characterized by myelofibrosis and blast cells that express phenotypic properties associated with multiple hematopoietic lineages.**
  Author(s): Schreeder MT, Prchal JT, Parmley RT, Carroll AJ, Gewirtz AM, Hoffman R.
  Source: American Journal of Clinical Pathology. 1985 January; 83(1): 114-21.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=4038430

- **An atypical myeloproliferative disorder with high thrombotic risk and slow disease progression.**
  Author(s): de Revel T, Nedellec G, Auzanneau G, Mayaudon H, Nedelec G, Monconduit M.
  Source: Cancer. 1992 September 15; 70(6): 1648; Author Reply 1648-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1516019

- **An atypical myeloproliferative disorder with high thrombotic risk and slow disease progression.**
  Author(s): Teofili L, De Stefano V, Iovino MS, Bizzi B, Leone G.
  Source: Cancer. 1992 September 15; 70(6): 1647-8; Author Reply 1648-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1516018

- **An atypical myeloproliferative disorder with high thrombotic risk and slow disease progression.**
  Author(s): Barosi G, Buratti A, Costa A, Liberato LN, Balduini C, Cazzola M, Rosti V, Magrini U, Ascari E.
  Source: Cancer. 1991 November 15; 68(10): 2310-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1913467

- **An atypical myeloproliferative disorder with t(8;13) (p11;q12): a third case.**
  Author(s): Macdonald D, Sheerin SM, Cross NC, Spencer A, Goldman JM.
  Source: British Journal of Haematology. 1994 April; 86(4): 879-80.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7918089

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  Author(s): Lertprasertsuke N, Tsutsumi Y.
  Source: Acta Pathol Jpn. 1991 January; 41(1): 73-81.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2031458

- **Anagrelide and imatinib mesylate combination therapy in patients with chronic myeloproliferative disorders.**
  Author(s): Tsimberidou AM, Colburn DE, Welch MA, Cortes JE, Verstovsek S, O'Brien SM, Albitar M, Kantarjian HM, Giles FJ.
  Source: Cancer Chemotherapy and Pharmacology. 2003 September; 52(3): 229-34. Epub 2003 May 29.
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- **Analysis of serum Sialyl-Lewis(x) antigen levels in acute leukemias, myelodysplastic syndromes, myeloproliferative disorders and malignant lymphomas.**
  Author(s): Takubo T, Shibata H, Terada Y, Aoyama Y, Nakamae H, Yamamura R, Shima E, Makita K, Tanaka K, Ohta K, Yamane T, Hino M, Hashimoto S, Kamitani T, Tatsumi N.
  Source: Leukemia & Lymphoma. 2002 September; 43(9): 1889-91.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12685851

- **Basophil production in myeloproliferative disorders: increases during acute blastic transformation of chronic myeloid leukemia.**
  Author(s): Denburg JA, Wilson WE, Bienenstock J.
  Source: Blood. 1982 July; 60(1): 113-20.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6952947

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  Author(s): Jaffe JP, Loprinzi CL.
  Source: Jama : the Journal of the American Medical Association. 1983 January 7; 249(1): 73-4.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6848784

- **Basophils, histamine and gastric acid secretin in chronic myeloproliferative disorders.**
  Author(s): Gray AG, Boughton BJ, Burt DS, Struthers GR.
  Source: British Journal of Haematology. 1982 May; 51(1): 117-23.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6951602

- **bcr gene rearrangement analysis in myeloproliferative disorders other than chronic myelogenous leukemia.**
  Author(s): Crisan D, Mattson JC, O'Malley BA, Schulz RW, Wilner F.
  Source: Cancer Detection and Prevention. 1996; 20(4): 263-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8818385

- **Bcr-abl mRNA expression in patients with chronic myeloproliferative disorders--absence of bcr-abl fused clone except chronic myelocytic leukemia.**
  Author(s): Nakata Y.
  Source: Hiroshima J Med Sci. 1993 June; 42(2): 67-71.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8253600

- **Beyond chronic myelogenous leukemia: potential role for imatinib in Philadelphia-negative myeloproliferative disorders.**
  Author(s): Cortes J, Kantarjian H.
  Source: Cancer. 2004 May 15; 100(10): 2064-78. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15139047

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  Source: Molecular and Cellular Biochemistry. 2002 October; 239(1-2): 203-11.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12479587

- **Systemic sclerosis after interferon-alfa therapy for myeloproliferative disorders.**
  Author(s): Beretta L, Caronni M, Vanoli M, Scorza R.
  Source: The British Journal of Dermatology. 2002 August; 147(2): 385-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12174121

- **The 8p12 myeloproliferative disorder. t(8;19)(p12;q13.3): a novel translocation involving the FGFR1 gene.**
  Author(s): Mugneret F, Chaffanet M, Maynadie M, Guasch G, Favre B, Casasnovas O, Birnbaum D, Pebusque MJ.
  Source: British Journal of Haematology. 2000 November; 111(2): 647-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11122115

- **Transient myeloproliferative disorder (transient leukemia) and hematologic manifestations of Down syndrome.**
  Author(s): Zipursky A, Brown EJ, Christensen H, Doyle J.
  Source: Clin Lab Med. 1999 March; 19(1): 157-67, Vii. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10403079

- **Transient myeloproliferative disorder and acute myeloid leukemia in Down syndrome. An immunophenotypic analysis.**
  Author(s): Karandikar NJ, Aquino DB, McKenna RW, Kroft SH.
  Source: American Journal of Clinical Pathology. 2001 August; 116(2): 204-10.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11488066

- **Transient myeloproliferative disorder associated with trisomy 21: is a short course of chemotherapy indicated in patients with liver impairment and severe clinical problems?**
  Author(s): Rizzari C, Malberti R, Dell'Orto M, Milani M, Jankovic M, Ferrari E, Conter V.
  Source: Medical and Pediatric Oncology. 1999 June; 32(6): 453-4.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10358708

- **Transient myeloproliferative disorder in a phenotypically normal infant with i(21q) mosaicism.**
  Author(s): Wu SQ, Loh KT, Chen XR, Joo WJ, Mascarenhas L.
  Source: Cancer Genetics and Cytogenetics. 2002 July 15; 136(2): 138-40.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12237238

- **Transient myeloproliferative disorder in Down syndrome presenting with ascites: a case report.**
  Author(s): Shiffer J, Natarajan S.
  Source: Acta Cytol. 2001 July-August; 45(4): 610-2.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11480727

- **Transient myeloproliferative disorder with a CD7+ and CD56+ myeloid/natural killer cell precursor phenotype in a newborn.**
  Author(s): Svaldi M, Moroder W, Messner H, Battisti L, Venturi R, Coser P, Mitterer M.
  Source: Journal of Pediatric Hematology/Oncology : Official Journal of the American Society of Pediatric Hematology/Oncology. 2002 June-July; 24(5): 394-6.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12142790

- **Transient myeloproliferative disorder with erythroid differentiation in Down syndrome.**
  Author(s): Bozner P.
  Source: Archives of Pathology & Laboratory Medicine. 2002 April; 126(4): 474-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11900577

- **Transient myeloproliferative disorder, a disorder with too few data and many unanswered questions: does it contain an important piece of the puzzle to understanding hematopoiesis and acute myelogenous leukemia?**
  Author(s): Gamis AS, Hilden JM.
  Source: Journal of Pediatric Hematology/Oncology : Official Journal of the American Society of Pediatric Hematology/Oncology. 2002 January; 24(1): 2-5. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11902733

- **Trisomy 13 in a Philadelphia negative chromosome and BCR-ABL negative myeloproliferative disorder.**
  Author(s): Cabrol C, Samii K, Scherrer A, Darbellay R, Beris P.
  Source: Cancer Genetics and Cytogenetics. 1999 June; 111(2): 184-5.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10347563

- **Ultrastructural and ultracytochemical differences between transient myeloproliferative disorder and megakaryoblastic leukaemia in Down's syndrome.**
  Author(s): Eguchi M, Sakaibara H, Suda J, Ozawa T, Hayashi Y, Sato T, Kojima S, Furukawa T.
  Source: British Journal of Haematology. 1989 November; 73(3): 315-22.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2532535

- **Ultrastructure of unusual cytoplasmic inclusions in a case of myeloproliferative disorder.**
  Author(s): Coppola A, O'Connor J.
  Source: Cancer. 1977 November; 40(5): 2111-5.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=922660

- **Uncontrolled thrombocytosis in chronic myeloproliferative disorders.**
  Author(s): Kessler CM, Klein HG, Havlik RJ.
  Source: British Journal of Haematology. 1982 January; 50(1): 157-67.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6976793

- **Undifferentiated lymphoma with coexisting myeloproliferative disorder.**
  Author(s): Anido V, Gilbert EF, Harley JB, Salisbury R.
  Source: W V Med J. 1971 August; 67(8): 205-9. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=5284432

- **Unexplained pulmonary hypertension in chronic myeloproliferative disorders.**
  Author(s): Dingli D, Utz JP, Krowka MJ, Oberg AL, Tefferi A.
  Source: Chest. 2001 September; 120(3): 801-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11555513

- **Unusual diffuse liver fibrosis accompanying transient myeloproliferative disorder in Down's syndrome: a report of four autopsy cases and proposal of a hypothesis.**
  Author(s): Miyauchi J, Ito Y, Kawano T, Tsunematsu Y, Shimizu K.
  Source: Blood. 1992 September 15; 80(6): 1521-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1387814

- **Variations in megakaryocyte ploidy in myeloproliferative disorders.**
  Author(s): Lagerlof B.
  Source: Acta Pathol Microbiol Scand [a]. 1971; 79(3): 311. No Abstract Available.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=4102472

- **Vesiculopustular eruptions in Down syndrome neonates with myeloproliferative disorders.**
  Author(s): Nijhawan A, Baselga E, Gonzalez-Ensenat MA, Vicente A, Southern JF, Camitta BM, Esterly NB, Drolet BA.
  Source: Archives of Dermatology. 2001 June; 137(6): 760-3.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=11405767

- **Von Recklinghausen neurofibromatosis and myeloproliferative disorders in adults.**
  Author(s): Lightman SM.
  Source: Lancet. 1988 November 19; 2(8621): 1197-8.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=2903408

- **von Willebrand factor is the most reliable immunohistochemical marker for megakaryocytes of myelodysplastic syndrome and chronic myeloproliferative disorders.**
  Author(s): Chuang SS, Jung YC, Li CY, Yung YC.
  Source: American Journal of Clinical Pathology. 2000 April; 113(4): 506-11. Erratum In: Am J Clin Pathol 2000 July; 114(1): 154. Yung Yc[corrected to Jung Yc].
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10761451

- **What is the role of cytogenetic and molecular genetic analysis in the diagnosis of chronic myeloproliferative disorders?**
  Author(s): Owen RG, Dickinson H, Evans PA, O'Connor SJ, Swirsky DM, Jack AS.
  Source: British Journal of Haematology. 2003 February; 120(4): 717-8 Author Reply.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12588364

- **Working classification of chronic myeloproliferative disorders based on histological, haematological, and clinical findings.**
  Author(s): Burkhardt R, Bartl R, Jager K, Frisch B, Kettner G, Mahl G, Sund M.
  Source: Journal of Clinical Pathology. 1986 March; 39(3): 237-52.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=3457024

CHAPTER 2. ALTERNATIVE MEDICINE AND MYELOPROLIFERATIVE DISORDER

Overview

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

- **De novo appearance of the ph-1 chromosome in a previously monosomic bone marrow (45,XX,-6): conversion of a myeloproliferative disorder to acute myelogenous leukemia.**
  Author(s): Kohn G, Manny N, Eldor A, Cohen MM.
  Source: Blood. 1975 May; 45(5): 653-7.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=1054612

- **Myelodysplasia and myeloproliferative disorders.**
  Author(s): Anderson JE, Appelbaum FR.
  Source: Current Opinion in Hematology. 1997 July; 4(4): 261-7. Review.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9260054

- **Myeloproliferative disorder with profound hypereosinophilia associated with chemotherapy for breast cancer.**
  Author(s): Soffer T, Chan WC, Brynes RK, Vogler WR, O'Neal S.
  Source: Cancer. 1984 December 1; 54(11): 2356-9.
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=6548657

Additional Web Resources

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

- Alternative Medicine Foundation, Inc.: **http://www.herbmed.org/**
- AOL: **http://search.aol.com/cat.adp?id=169&layer=&from=subcats**
- Chinese Medicine: **http://www.newcenturynutrition.com/**
- drkoop.com®: **http://www.drkoop.com/InteractiveMedicine/IndexC.html**
- Family Village: **http://www.familyvillage.wisc.edu/med_altn.htm**
- Google: **http://directory.google.com/Top/Health/Alternative/**
- Healthnotes: **http://www.healthnotes.com/**
- MedWebPlus: **http://medwebplus.com/subject/Alternative_and_Complementary_Medicine**
- Open Directory Project: **http://dmoz.org/Health/Alternative/**
- HealthGate: **http://www.tnp.com/**
- WebMD®Health: **http://my.webmd.com/drugs_and_herbs**
- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,00.html**
- Yahoo.com: **http://dir.yahoo.com/Health/Alternative_Medicine/**

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

- **General Overview**

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

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

  Bone Marrow Disorders
  Source: Integrative Medicine Communications; www.drkoop.com

Breathing Difficulty
Source: Integrative Medicine Communications; www.drkoop.com

Bruises Easily
Source: Integrative Medicine Communications; www.drkoop.com

Chronic Myelogenous Leukemia
Source: Integrative Medicine Communications; www.drkoop.com

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

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

Gastrointestinal Complications
Source: Integrative Medicine Communications; www.drkoop.com

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

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

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

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

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

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

Myeloproliferative Disorders
Source: Integrative Medicine Communications; www.drkoop.com

Myocardial Infarction
Source: Integrative Medicine Communications; www.drkoop.com

Night Sweats
Source: Integrative Medicine Communications; www.drkoop.com

Polycythemia Vera
Source: Integrative Medicine Communications; www.drkoop.com

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

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

Vision Disturbances
Source: Integrative Medicine Communications; www.drkoop.com

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

General References

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

CHAPTER 3. PATENTS ON MYELOPROLIFERATIVE DISORDER

Overview

Patents can be physical innovations (e.g. chemicals, pharmaceuticals, medical equipment) or processes (e.g. treatments or diagnostic procedures). The United States Patent and Trademark Office defines a patent as a grant of a property right to the inventor, issued by the Patent and Trademark Office.[7] Patents, therefore, are intellectual property. For the United States, the term of a new patent is 20 years from the date when the patent application was filed. If the inventor wishes to receive economic benefits, it is likely that the invention will become commercially available within 20 years of the initial filing. It is important to understand, therefore, that an inventor's patent does not indicate that a product or service is or will be commercially available. The patent implies only that the inventor has "the right to exclude others from making, using, offering for sale, or selling" the invention in the United States. While this relates to U.S. patents, similar rules govern foreign patents.

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

Patent Applications on Myeloproliferative Disorder

As of December 2000, U.S. patent applications are open to public viewing.[8] Applications are patent requests which have yet to be granted. (The process to achieve a patent can take several years.) The following patent applications have been filed since December 2000 relating to myeloproliferative disorder:

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

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

- **Treatment of chronic myelogenous leukemia, resistant or intolerant to ST1571, involving homoharringtonine alone or combined with other agents**

  Inventor(s): Blanchard, Julie; (Rouillon, FR), Mahon, Francois-Xavier; (Bordeaux, FR), Maisonneuve, Herve; (La Roche Sur Yon, FR), Maloisel, Frederick; (Illkirch Graffenstaden, FR), Robin, Jean-Pierre; (Charlottesville, VA)

  Correspondence: R. Danny Huntington; Burns, Doane, Swecker & Mathis, Llp; P.O. Box 1404; Alexandria; VA; 22313-1404; US

  Patent Application Number: 20040019036

  Date filed: March 27, 2003

  Abstract: The present invention concerns a method of treating chronic myelogenous leukemia, a related **myeloproliferative disorder** or a Ph-positive acute lymphocytic leukemia in a subject animal, comprising:(a) selecting or identifying an animal suffering from chronic myelogenous leukemia or a related **myeloproliferative disorder** and showing resistance or intolerance to treatment with STI571; and(b) administering to the animal homoharringtonine.In a preferred embodiment, the animal is a human being.

  Excerpt(s): The invention relates to methods for treating subjects suffering from chronic myelogenous leukemia which is resistant or intolerant to treatment with STI571, involving treating the subjects with homoharringtonine alone or combined with STI571 and/or other antileukemic agents. Chronic myelogenous leukemia (CML) is a mycloproliferative disease which strikes about 4,500 new cases per year in the U.S. or in Europe. The median survival of this disease is around 3 years without treatment. Since the introduction of standard therapy by interferon alpha (INF) the median survival of this leukemia reaches about 7 years. However when patients become resistant to interferon, progression to acute phases occurs. Until these recent years there were only a few drugs able to induce a new remission. [Ref 1-5] Homoharringtonine, an alkaloid isolated from the genus Cephalotaxus [Ref 1, 2, 6, 7] and more recently STI571, a synthetic product, are recent drugs able to give a new remission to patients resistant to INF. Moreover STI571 was recently approved in the U.S. as major therapy of CML. There is therefore a need for improved methods of treating CML which provide longer term remission. In view of the limitations of STI571, there is a need for therapies providing improved results in the treatment of accelerated phase CML and blastic phase.

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

Keeping Current

In order to stay informed about patents and patent applications dealing with myeloproliferative disorder, you can access the U.S. Patent Office archive via the Internet at the following Web address: **http://www.uspto.gov/patft/index.html**. You will see two broad options: (1) Issued Patent, and (2) Published Applications. To see a list of issued patents, perform the following steps: Under "Issued Patents," click "Quick Search." Then, type "myeloproliferative disorder" (or synonyms) into the "Term 1" box. After clicking on the search button, scroll down to see the various patents which have been granted to date on myeloproliferative disorder.

You can also use this procedure to view pending patent applications concerning myeloproliferative disorder. Simply go back to **http://www.uspto.gov/patft/index.html**. Select "Quick Search" under "Published Applications." Then proceed with the steps listed above.

CHAPTER 4. BOOKS ON MYELOPROLIFERATIVE DISORDER

Overview

This chapter provides bibliographic book references relating to myeloproliferative disorder. In addition to online booksellers such as **www.amazon.com** and **www.bn.com**, excellent sources for book titles on myeloproliferative disorder include the Combined Health Information Database and the National Library of Medicine. Your local medical library also may have these titles available for loan.

Chapters on Myeloproliferative Disorder

In order to find chapters that specifically relate to myeloproliferative disorder, an excellent source of abstracts is the Combined Health Information Database. You will need to limit your search to book chapters and myeloproliferative disorder using the "Detailed Search" option. Go to the following hyperlink: **http://chid.nih.gov/detail/detail.html**. To find book chapters, use the drop boxes at the bottom of the search page where "You may refine your search by." Select the dates and language you prefer, and the format option "Book Chapter." Type "myeloproliferative disorder" (or synonyms) into the "For these words:" box. The following is a typical result when searching for book chapters on myeloproliferative disorder:

- **Consultations**

  Source: in Lockhart, P.B. Oral Medicine and Hospital Practice. Chicago, IL: Special Care Dentistry. 1997. p. 4.3-4.40.

  Contact: Available from Special Care Dentistry. 211 East Chicago Avenue, Chicago, IL 60611. (312) 440-2660. Fax (312) 440-2824. PRICE: $27.00 (member) or $30.00 (nonmember), plus shipping and handling; institutional prices and bulk orders available. ISBN: 0965719103.

  Summary: This chapter is from a manual designed to help dental residents, students and practitioners engaged in the care of patients in the hospital setting. This chapter discusses consultations in the hospital setting. The first section describes how to request consults from other services, how to answer consult requests from other services, and a recommended consult format. The remainder of the chapter provides examples of

fourteen specific types of consults: poorly fitting denture on an atrophic ridge; acute myelogenous leukemia, stomatitis, and fungal infection; oral ulcerations of unknown etiology; endocarditis of possible dental origin; **myeloproliferative disorder** and facial swelling; aortic valve replacement and poor dentition; juvenile onset diabetes and poor dentition; dental trauma following motor vehicle accident (MVA), risk of aspiration; newborn infant with masses on alveolar ridge; acute lymphocytic leukemia and oral ulcers; AIDS with multiple oral problems; cerebral palsy and excessive drooling; malocclusion following old mandibular fracture; and ruling out a dental source of endocarditis. Most information is presented in outline format, for ease of access.

- **Budd-Chiari Syndrome and Other Vascular Disorders**

  Source: in Friedman, L.S. and Keeffe, E.B., eds. Handbook of Liver Disease. Philadelphia, PA: Churchill-Livingstone. 1998. p. 267-275.

  Contact: Available from W.B. Saunders Company. Book Order Fulfillment Department, 6277 Sea Harbor Drive, Orlando, FL 32887-4430. (800) 545-2522. Fax (800) 874-6418. E-mail: wbsbcs@harcourtbrace.com. PRICE: $73.00 plus shipping and handling. ISBN: 0443055203.

  Summary: This chapter on Budd Chiari syndrome and other vascular disorders is from a comprehensive handbook in outline format that offers easy access to information on the full range of liver disorders and covers symptoms, signs, differential diagnoses, and treatments. Hepatic vein occlusion, or Budd Chiari syndrome, is an uncommon disorder characterized by hepatomegaly, ascites, and abdominal pain. The disorder most often occurs in patients with underlying thrombotic diathesis, including **myeloproliferative disorders** such as polycythemia vera and paroxysmal nocturnal hemoglobinuria, tumors, chronic inflammatory diseases, clotting disorders, and infections. Diagnosis is confirmed by visualization of thrombus or absent flow in hepatic veins on Doppler ultrasound or magnetic resonance imaging (MRI). Hepatic venography and liver biopsy provide definitive confirmation. Budd Chiari syndrome is often fatal. Medical therapy with diuretics and conventional anticoagulation provides only short term symptomatic relief. Most patients require portosystemic decompression or liver transplantation for long term relief of symptoms and correction of the underlying pathophysiology. Transjugular intrahepatic portal shunts and hepatic venous stents are promising options to replace or delay the need for surgery. Veno-occlusive disease of the liver is a disease of the small hepatic venules that mimics Budd Chiari syndrome and develops primarily in patients after allogeneic or autologous bone marrow transplantation. It is probably the result of toxic injury to the endothelial cells from cytoreductive therapy. Treatment is largely supportive.

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[9]:

- 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/**

[9] 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.[10] 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:[11]

- **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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[10] 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**).

[11] 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[12]

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.[13] To use the NLM Gateway, simply go to the search site at **http://gateway.nlm.nih.gov/gw/Cmd**. Type "myeloproliferative disorder" (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	16147
Books / Periodicals / Audio Visual	35
Consumer Health	1124
Meeting Abstracts	3
Other Collections	41
Total	17350

HSTAT[14]

HSTAT is a free, Web-based resource that provides access to full-text documents used in healthcare decision-making.[15] 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.[16] Simply search by "myeloproliferative disorder" (or synonyms) at the following Web site: **http://text.nlm.nih.gov**.

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

[13] 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).

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

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

[16] 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[17]

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.[18] 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.[19] 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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[17] Adapted from **http://www.ncbi.nlm.nih.gov/Coffeebreak/Archive/FAQ.html**.

[18] 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.

[19] 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 myeloproliferative disorder 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 myeloproliferative disorder. 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 myeloproliferative disorder. 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 "myeloproliferative disorder":

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

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

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

Stem Cells and Stem Cell Transplantation
http://www.nlm.nih.gov/medlineplus/stemcellsandstemcelltransplantation.html

Within the health topic page dedicated to myeloproliferative disorder, the following was listed:

- Diagnosis/Symptoms

  Platelet Count
  Source: American Association for Clinical Chemistry
  http://www.labtestsonline.org/understanding/analytes/platelet/test.html

  Understanding Your Complete Blood Count
  Source: National Institutes of Health, Clinical Center
  http://www.cc.nih.gov/ccc/patient_education/pepubs/cbc97.pdf

- Treatment

  Epoetin Treatment
  Source: American Society of Clinical Oncology
  http://www.asco.org/ac/1%2C1003%2C_12-002214-00_18-0024517-00_19-0024518-00_20-001%2C00.asp

  Long Term and Late Effects of Treatment for Blood Cancers
  Source: Leukemia & Lymphoma Society
  http://www.leukemia-lymphoma.org/all_mat_toc.adp?item_id=9965

  MedlinePlus: Bone Marrow Transplantation
  Source: National Library of Medicine
  http://www.nlm.nih.gov/medlineplus/bonemarrowtransplantation.html

- From the National Institutes of Health

  Chronic Myeloproliferative Disorders (PDQ): Treatment
  Source: National Cancer Institute
  http://www.cancer.gov/cancerinfo/pdq/treatment/myeloproliferative/patient/

  Myelodysplastic Syndromes (PDQ): Treatment
  Source: National Cancer Institute
  http://www.cancer.gov/cancerinfo/pdq/treatment/myelodysplastic/patient/

- Organizations

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

Leukemia & Lymphoma Society
http://www.leukemia-lymphoma.org/hm_lls

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

National Heart, Lung, and Blood Institute
http://www.nhlbi.nih.gov/

- Research

Azacytidine May Improve Survival, Quality of Life for Patients with Pre-Leukemia
Source: National Cancer Institute
http://cancer.gov/ClinicalTrials/results/azacytidine0702

FDA Approves New Drug for Bone Marrow Disease
Source: Food and Drug Administration
http://www.fda.gov/bbs/topics/news/2004/NEW01069.html

Polycythemia Vera and Essential Thrombocythemia in a General Population
Source: American College of Physicians
http://www.annals.org/cgi/content/full/139/6/I-32

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 myeloproliferative disorder. 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 myeloproliferative disorder. By consulting all of associations listed in this chapter, you will have nearly exhausted all sources for patient associations concerned with myeloproliferative disorder.

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 myeloproliferative disorder. 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 "myeloproliferative disorder" (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 "myeloproliferative disorder". 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 "myeloproliferative disorder" (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 "myeloproliferative disorder" (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.[20]

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

[20] 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)[21]:

- **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/**

[21] 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**).

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**

MYELOPROLIFERATIVE DISORDER DICTIONARY

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

Abdominal: Having to do with the abdomen, which is the part of the body between the chest and the hips that contains the pancreas, stomach, intestines, liver, gallbladder, and other organs. [NIH]

Abdominal Pain: Sensation of discomfort, distress, or agony in the abdominal region. [NIH]

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

Accelerated phase: Refers to chronic myelogenous leukemia that is progressing. The number of immature, abnormal white blood cells in the bone marrow and blood is higher than in the chronic phase, but not as high as in the blast phase. [NIH]

Acceptor: A substance which, while normally not oxidized by oxygen or reduced by hydrogen, can be oxidized or reduced in presence of a substance which is itself undergoing oxidation or reduction. [NIH]

Acidity: The quality of being acid or sour; containing acid (hydrogen ions). [EU]

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]

Acute renal: A condition in which the kidneys suddenly stop working. In most cases, kidneys can recover from almost complete loss of function. [NIH]

Adolescence: The period of life beginning with the appearance of secondary sex characteristics and terminating with the cessation of somatic growth. The years usually referred to as adolescence lie between 13 and 18 years of age. [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]

Agonists: Drugs that trigger an action from a cell or another drug. [NIH]

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

Alkaline: Having the reactions of an alkali. [EU]

Alkaloid: A member of a large group of chemicals that are made by plants and have nitrogen in them. Some alkaloids have been shown to work against cancer. [NIH]

Allogeneic: Taken from different individuals of the same species. [NIH]

Allogeneic bone marrow transplantation: A procedure in which a person receives stem cells, the cells from which all blood cells develop, from a compatible, though not genetically identical, donor. [NIH]

Alloys: A mixture of metallic elements or compounds with other metallic or metalloid elements in varying proportions. [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]

Alveoli: Tiny air sacs at the end of the bronchioles in the lungs. [NIH]

Amine: An organic compound containing nitrogen; any member of a group of chemical compounds formed from ammonia by replacement of one or more of the hydrogen atoms by organic (hydrocarbon) radicals. The amines are distinguished as primary, secondary, and tertiary, according to whether one, two, or three hydrogen atoms are replaced. The amines include allylamine, amylamine, ethylamine, methylamine, phenylamine, propylamine, and many other compounds. [EU]

Amino acid: 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]

Amino Acid Motifs: Commonly observed structural components of proteins formed by simple combinations of adjacent secondary structures. A commonly observed structure may be composed of a conserved sequence which can be represented by a consensus sequence. [NIH]

Amino Acid Sequence: The order of amino acids as they occur in a polypeptide chain. This

is referred to as the primary structure of proteins. It is of fundamental importance in determining protein conformation. [NIH]

Amplification: The production of additional copies of a chromosomal DNA sequence, found as either intrachromosomal or extrachromosomal DNA. [NIH]

Anaemia: A reduction below normal in the number of erythrocytes per cu. mm., in the quantity of haemoglobin, or in the volume of packed red cells per 100 ml. of blood which occurs when the equilibrium between blood loss (through bleeding or destruction) and blood production is disturbed. [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]

Analog: In chemistry, a substance that is similar, but not identical, to another. [NIH]

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]

Anatomical: Pertaining to anatomy, or to the structure of the organism. [EU]

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

Animal model: An animal with a disease either the same as or like a disease in humans. Animal models are used to study the development and progression of diseases and to test new treatments before they are given to humans. Animals with transplanted human cancers or other tissues are called xenograft models. [NIH]

Ankle: That part of the lower limb directly above the foot. [NIH]

Anomalies: Birth defects; abnormalities. [NIH]

Antibacterial: A substance that destroys bacteria or suppresses their growth or reproduction. [EU]

Antibiotic: A drug used to treat infections caused by bacteria and other microorganisms. [NIH]

Antibodies: Immunoglobulin molecules having a specific amino acid sequence by virtue of which they interact only with the antigen that induced their synthesis in cells of the lymphoid series (especially plasma cells), or with an antigen closely related to it. [NIH]

Antibody: A type of protein made by certain white blood cells in response to a foreign substance (antigen). Each antibody can bind to only a specific antigen. The purpose of this binding is to help destroy the antigen. Antibodies can work in several ways, depending on the nature of the antigen. Some antibodies destroy antigens directly. Others make it easier for white blood cells to destroy the antigen. [NIH]

Anticoagulant: A drug that helps prevent blood clots from forming. Also called a blood thinner. [NIH]

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]

Antigen-presenting cell: APC. A cell that shows antigen on its surface to other cells of the immune system. This is an important part of an immune response. [NIH]

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

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

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

Aorta: The main trunk of the systemic arteries. [NIH]

Aortic Valve: The valve between the left ventricle and the ascending aorta which prevents backflow into the left ventricle. [NIH]

Aplastic anaemia: A form of anaemia generally unresponsive to specific antianaemia therapy, often accompanied by granulocytopenia and thrombocytopenia, in which the bone marrow may not necessarily be acellular or hypoplastic but fails to produce adequate numbers of peripheral blood elements. The term actually is all-inclusive and most probably encompasses several clinical syndromes. [EU]

Aplastic anemia: A condition in which the bone marrow is unable to produce blood cells. [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]

Arachidonic Acid: An unsaturated, essential fatty acid. It is found in animal and human fat as well as in the liver, brain, and glandular organs, and is a constituent of animal phosphatides. It is formed by the synthesis from dietary linoleic acid and is a precursor in the biosynthesis of prostaglandins, thromboxanes, and leukotrienes. [NIH]

Arterial: Pertaining to an artery or to the arteries. [EU]

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

Ascites: Accumulation or retention of free fluid within the peritoneal cavity. [NIH]

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]

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]

Autopsy: Postmortem examination of the body. [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]

Bacterial Infections: Infections by bacteria, general or unspecified. [NIH]

Bacteriophage: A virus whose host is a bacterial cell; A virus that exclusively infects

bacteria. It generally has a protein coat surrounding the genome (DNA or RNA). One of the coliphages most extensively studied is the lambda phage, which is also one of the most important. [NIH]

Bacterium: Microscopic organism which may have a spherical, rod-like, or spiral unicellular or non-cellular body. Bacteria usually reproduce through asexual processes. [NIH]

Barbiturate: A drug with sedative and hypnotic effects. Barbiturates have been used as sedatives and anesthetics, and they have been used to treat the convulsions associated with epilepsy. [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]

Bilateral: Affecting both the right and left side of body. [NIH]

Bile: An emulsifying agent produced in the liver and secreted into the duodenum. Its composition includes bile acids and salts, cholesterol, and electrolytes. It aids digestion of fats in the duodenum. [NIH]

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

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]

Bivalent: Pertaining to a group of 2 homologous or partly homologous chromosomes during the zygotene stage of prophase to the first metaphase in meiosis. [NIH]

Blast Crisis: Rapid increase in the proportion of blast cells in the blood and bone marrow. [NIH]

Blast phase: The phase of chronic myelogenous leukemia in which the number of immature, abnormal white blood cells in the bone marrow and blood is extremely high. Also called blast crisis. [NIH]

Blood Coagulation: The process of the interaction of blood coagulation factors that results in an insoluble fibrin clot. [NIH]

Blood Platelets: Non-nucleated disk-shaped cells formed in the megakaryocyte and found in the blood of all mammals. They are mainly involved in blood coagulation. [NIH]

Blood pressure: The pressure of blood against the walls of a blood vessel or heart chamber. Unless there is reference to another location, such as the pulmonary artery or one of the heart chambers, it refers to the pressure in the systemic arteries, as measured, for example, in the forearm. [NIH]

Blood vessel: A tube in the body through which blood circulates. Blood vessels include a network of arteries, arterioles, capillaries, venules, and veins. [NIH]

Blood Volume: Volume of circulating blood. It is the sum of the plasma volume and erythrocyte volume. [NIH]

Blot: To transfer DNA, RNA, or proteins to an immobilizing matrix such as nitrocellulose. [NIH]

Blotting, Western: Identification of proteins or peptides that have been electrophoretically separated by blotting and transferred to strips of nitrocellulose paper. The blots are then detected by radiolabeled antibody probes. [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 Remodeling: The continuous turnover of bone matrix and mineral that involves first, an increase in resorption (osteoclastic activity) and later, reactive bone formation (osteoblastic activity). The process of bone remodeling takes place in the adult skeleton at discrete foci. The process ensures the mechanical integrity of the skeleton throughout life and plays an important role in calcium homeostasis. An imbalance in the regulation of bone remodeling's two contrasting events, bone resorption and bone formation, results in many of the metabolic bone diseases, such as osteoporosis. [NIH]

Bone Resorption: Bone loss due to osteoclastic activity. [NIH]

Brain Diseases: Pathologic conditions affecting the brain, which is composed of the intracranial components of the central nervous system. This includes (but is not limited to) the cerebral cortex; intracranial white matter; basal ganglia; thalamus; hypothalamus; brain stem; and cerebellum. [NIH]

Breeding: The science or art of changing the constitution of a population of plants or animals through sexual reproduction. [NIH]

Bronchial: Pertaining to one or more bronchi. [EU]

Buccal: Pertaining to or directed toward the cheek. In dental anatomy, used to refer to the buccal surface of a tooth. [EU]

Bullous: Pertaining to or characterized by bullae. [EU]

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]

Capillary: Any one of the minute vessels that connect the arterioles and venules, forming a network in nearly all parts of the body. Their walls act as semipermeable membranes for the interchange of various substances, including fluids, between the blood and tissue fluid; called also vas capillare. [EU]

Carbon Dioxide: A colorless, odorless gas that can be formed by the body and is necessary for the respiration cycle of plants and animals. [NIH]

Carcinogenic: Producing carcinoma. [EU]

Carcinogens: Substances that increase the risk of neoplasms in humans or animals. Both genotoxic chemicals, which affect DNA directly, and nongenotoxic chemicals, which induce neoplasms by other mechanism, are included. [NIH]

Carcinoma: Cancer that begins in the skin or in tissues that line or cover internal organs. [NIH]

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

Case report: A detailed report of the diagnosis, treatment, and follow-up of an individual patient. Case reports also contain some demographic information about the patient (for example, age, gender, ethnic origin). [NIH]

Case series: A group or series of case reports involving patients who were given similar treatment. Reports of case series usually contain detailed information about the individual patients. This includes demographic information (for example, age, gender, ethnic origin) and information on diagnosis, treatment, response to treatment, and follow-up after treatment. [NIH]

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

Cell: The individual unit that makes up all of the tissues of the body. All living things are made up of one or more cells. [NIH]

Cell Adhesion: Adherence of cells to surfaces or to other 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 Differentiation: Progressive restriction of the developmental potential and increasing specialization of function which takes place during the development of the embryo and leads to the formation of specialized cells, tissues, and organs. [NIH]

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

Cell motility: The ability of a cell to move. [NIH]

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

Cell Size: The physical dimensions of a cell. It refers mainly to changes in dimensions correlated with physiological or pathological changes in cells. [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]

Centrioles: Self-replicating, short, fibrous, rod-shaped organelles. Each centriole is a short cylinder containing nine pairs of peripheral microtubules, arranged so as to form the wall of the cylinder. [NIH]

Centrosome: The cell center, consisting of a pair of centrioles surrounded by a cloud of amorphous material called the pericentriolar region. During interphase, the centrosome nucleates microtubule outgrowth. The centrosome duplicates and, during mitosis, separates to form the two poles of the mitotic spindle (mitotic spindle apparatus). [NIH]

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

Cerebral Palsy: Refers to a motor disability caused by a brain dysfunction. [NIH]

Cerebrum: The largest part of the brain. It is divided into two hemispheres, or halves, called the cerebral hemispheres. The cerebrum controls muscle functions of the body and also controls speech, emotions, reading, writing, and learning. [NIH]

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]

Chemotherapy: Treatment with anticancer drugs. [NIH]

Chondrocytes: Polymorphic cells that form 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]

Chronic Disease: Disease or ailment of long duration. [NIH]

Chronic granulocytic leukemia: A slowly progressing disease in which too many white blood cells are made in the bone marrow. Also called chronic myelogenous leukemia or chronic myeloid leukemia. [NIH]

Chronic leukemia: A slowly progressing cancer of the blood-forming tissues. [NIH]

Chronic lymphocytic leukemia: A slowly progressing disease in which too many white blood cells (called lymphocytes) are found in the body. [NIH]

Chronic myelogenous leukemia: CML. A slowly progressing disease in which too many white blood cells are made in the bone marrow. Also called chronic myeloid leukemia or chronic granulocytic leukemia. [NIH]

Chronic phase: Refers to the early stages of chronic myelogenous leukemia or chronic lymphocytic leukemia. The number of mature and immature abnormal white blood cells in the bone marrow and blood is higher than normal, but lower than in the accelerated or blast phase. [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]

C-kit receptor: A protein on the surface of some cells that binds to stem cell factor (a substance that causes certain types of cells to grow). Altered forms of this receptor may be associated with some types of cancer. [NIH]

Clinical Medicine: The study and practice of medicine by direct examination of the patient. [NIH]

Clinical study: A research study in which patients receive treatment in a clinic or other medical facility. Reports of clinical studies can contain results for single patients (case reports) or many patients (case series or clinical trials). [NIH]

Clinical trial: A research study that tests how well new medical treatments or other interventions work in people. Each study is designed to test new methods of screening, prevention, diagnosis, or treatment of a disease. [NIH]

Clone: The term "clone" has acquired a new meaning. It is applied specifically to the bits of

inserted foreign DNA in the hybrid molecules of the population. Each inserted segment originally resided in the DNA of a complex genome amid millions of other DNA segment. [NIH]

Cloning: The production of a number of genetically identical individuals; in genetic engineering, a process for the efficient replication of a great number of identical DNA molecules. [NIH]

Cobalt: A trace element that is a component of vitamin B12. It has the atomic symbol Co, atomic number 27, and atomic weight 58.93. It is used in nuclear weapons, alloys, and pigments. Deficiency in animals leads to anemia; its excess in humans can lead to erythrocytosis. [NIH]

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]

Cofactor: A substance, microorganism or environmental factor that activates or enhances the action of another entity such as a disease-causing agent. [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]

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]

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]

Conception: The onset of pregnancy, marked by implantation of the blastocyst; the formation of a viable zygote. [EU]

Connective Tissue: Tissue that supports and binds other tissues. It consists of connective tissue cells embedded in a large amount of extracellular matrix. [NIH]

Connective Tissue: Tissue that supports and binds other tissues. It consists of connective tissue cells embedded in a large amount of extracellular matrix. [NIH]

Consensus Sequence: A theoretical representative nucleotide or amino acid sequence in which each nucleotide or amino acid is the one which occurs most frequently at that site in the different sequences which occur in nature. The phrase also refers to an actual sequence which approximates the theoretical consensus. A known conserved sequence set is represented by a consensus sequence. Commonly observed supersecondary protein structures (amino acid motifs) are often formed by conserved sequences. [NIH]

Conserved Sequence: A sequence of amino acids in a polypeptide or of nucleotides in DNA or RNA that is similar across multiple species. A known set of conserved sequences is represented by a consensus sequence. Amino acid motifs are often composed of conserved sequences. [NIH]

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]

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]

Corpuscle: A small mass or body; a sensory nerve end bulb; a cell, especially that of the blood or the lymph. [NIH]

Curative: Tending to overcome disease and promote recovery. [EU]

Cystathionine beta-Synthase: A multifunctional pyridoxal phosphate enzyme. In the second stage of cysteine biosynthesis it catalyzes the reaction of homocysteine with serine to form cystathionine with the elimination of water. Deficiency of this enzyme leads to hyperhomocysteinemia and homocystinuria. EC 4.2.1.22. [NIH]

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

Cytochrome: Any electron transfer hemoprotein having a mode of action in which the transfer of a single electron is effected by a reversible valence change of the central iron atom of the heme prosthetic group between the +2 and +3 oxidation states; classified as cytochromes a in which the heme contains a formyl side chain, cytochromes b, which contain protoheme or a closely similar heme that is not covalently bound to the protein,

cytochromes c in which protoheme or other heme is covalently bound to the protein, and cytochromes d in which the iron-tetrapyrrole has fewer conjugated double bonds than the hemes have. Well-known cytochromes have been numbered consecutively within groups and are designated by subscripts (beginning with no subscript), e.g. cytochromes c, c1, C2, . New cytochromes are named according to the wavelength in nanometres of the absorption maximum of the a-band of the iron (II) form in pyridine, e.g., c-555. [EU]

Cytochrome b: Cytochromes (electron-transporting proteins) with protoheme or a related heme as the prosthetic group. The prosthetic group is not covalently bound to the protein moiety. [NIH]

Cytokine: Small but highly potent protein that modulates the activity of many cell types, including T and B cells. [NIH]

Cytomegalovirus: A genus of the family Herpesviridae, subfamily Betaherpesvirinae, infecting the salivary glands, liver, spleen, lungs, eyes, and other organs, in which they produce characteristically enlarged cells with intranuclear inclusions. Infection with Cytomegalovirus is also seen as an opportunistic infection in AIDS. [NIH]

Cytomegalovirus Infections: Infection with Cytomegalovirus, characterized by enlarged cells bearing intranuclear inclusions. Infection may be in almost any organ, but the salivary glands are the most common site in children, as are the lungs in adults. [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]

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

Decarboxylation: The removal of a carboxyl group, usually in the form of carbon dioxide, from a chemical compound. [NIH]

Decompression: Decompression external to the body, most often the slow lessening of external pressure on the whole body (especially in caisson workers, deep sea divers, and persons who ascend to great heights) to prevent decompression sickness. It includes also sudden accidental decompression, but not surgical (local) decompression or decompression applied through body openings. [NIH]

Decompression Sickness: A condition occurring as a result of exposure to a rapid fall in ambient pressure. Gases, nitrogen in particular, come out of solution and form bubbles in body fluid and blood. These gas bubbles accumulate in joint spaces and the peripheral circulation impairing tissue oxygenation causing disorientation, severe pain, and potentially death. [NIH]

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

Dendrites: Extensions of the nerve cell body. They are short and branched and receive stimuli from other neurons. [NIH]

Dendritic: 1. Branched like a tree. 2. Pertaining to or possessing dendrites. [EU]

Dendritic cell: A special type of antigen-presenting cell (APC) that activates T lymphocytes. [NIH]

Density: The logarithm to the base 10 of the opacity of an exposed and processed film. [NIH]

Dentition: The teeth in the dental arch; ordinarily used to designate the natural teeth in position in their alveoli. [EU]

Deprivation: Loss or absence of parts, organs, powers, or things that are needed. [EU]

Dermatosis: Any skin disease, especially one not characterized by inflammation. [EU]

Diabetes Mellitus: A heterogeneous group of disorders that share glucose intolerance in common. [NIH]

Diagnostic procedure: A method used to identify a disease. [NIH]

Diastolic: Of or pertaining to the diastole. [EU]

Diathesis: A constitution or condition of the body which makes the tissues react in special ways to certain extrinsic stimuli and thus tends to make the person more than usually susceptible to certain diseases. [EU]

Digestion: The process of breakdown of food for metabolism and use by the body. [NIH]

Diploid: Having two sets of chromosomes. [NIH]

Direct: 1. Straight; in a straight line. 2. Performed immediately and without the intervention of subsidiary means. [EU]

Discrete: Made up of separate parts or characterized by lesions which do not become blended; not running together; separate. [NIH]

Dose-limiting: Describes side effects of a drug or other treatment that are serious enough to prevent an increase in dose or level of that treatment. [NIH]

Duodenum: The first part of the small intestine. [NIH]

Dura mater: The outermost, toughest, and most fibrous of the three membranes (meninges) covering the brain and spinal cord; called also pachymeninx. [EU]

Dyes: Chemical substances that are used to stain and color other materials. The coloring may or may not be permanent. Dyes can also be used as therapeutic agents and test reagents in medicine and scientific research. [NIH]

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

Efficacy: The extent to which a specific intervention, procedure, regimen, or service produces a beneficial result under ideal conditions. Ideally, the determination of efficacy is based on the results of a randomized control trial. [NIH]

Elastin: The protein that gives flexibility to tissues. [NIH]

Elective: Subject to the choice or decision of the patient or physician; applied to procedures that are advantageous to the patient but not urgent. [EU]

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]

Embryogenesis: The process of embryo or embryoid formation, whether by sexual (zygotic) or asexual means. In asexual embryogenesis embryoids arise directly from the explant or on intermediary callus tissue. In some cases they arise from individual cells (somatic cell embryoge). [NIH]

Encephalopathy: A disorder of the brain that can be caused by disease, injury, drugs, or chemicals. [NIH]

Endocarditis: Exudative and proliferative inflammatory alterations of the endocardium, characterized by the presence of vegetations on the surface of the endocardium or in the

endocardium itself, and most commonly involving a heart valve, but sometimes affecting the inner lining of the cardiac chambers or the endocardium elsewhere. It may occur as a primary disorder or as a complication of or in association with another disease. [EU]

Endocardium: The innermost layer of the heart, comprised of endothelial cells. [NIH]

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

Eosinophil: A polymorphonuclear leucocyte with large eosinophilic granules in its cytoplasm, which plays a role in hypersensitivity reactions. [NIH]

Eosinophilia: Abnormal increase in eosinophils in the blood, tissues or organs. [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]

Epigastric: Having to do with the upper middle area of the abdomen. [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]

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]

Erythropoiesis: The production of erythrocytes. [EU]

Erythropoietin: Glycoprotein hormone, secreted chiefly by the kidney in the adult and the liver in the fetus, that acts on erythroid stem cells of the bone marrow to stimulate proliferation and differentiation. [NIH]

Esophageal: Having to do with the esophagus, the muscular tube through which food passes from the throat to the stomach. [NIH]

Esophageal Varices: Stretched veins in the esophagus that occur when the liver is not working properly. If the veins burst, the bleeding can cause death. [NIH]

Esophagus: The muscular tube through which food passes from the throat to the stomach. [NIH]

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

Excitation: An act of irritation or stimulation or of responding to a stimulus; the addition of energy, as the excitation of a molecule by absorption of photons. [EU]

Exocrine: Secreting outwardly, via a duct. [EU]

Exogenous: Developed or originating outside the organism, as exogenous disease. [EU]

Exon: The part of the DNA that encodes the information for the actual amino acid sequence of the protein. In many eucaryotic genes, the coding sequences consist of a series of exons alternating with intron sequences. [NIH]

Extracellular: Outside a cell or cells. [EU]

Facial: Of or pertaining to the face. [EU]

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]

Fetus: The developing offspring from 7 to 8 weeks after conception until birth. [NIH]

Fibrinogen: Plasma glycoprotein clotted by thrombin, composed of a dimer of three non-identical pairs of polypeptide chains (alpha, beta, gamma) held together by disulfide bonds. Fibrinogen clotting is a sol-gel change involving complex molecular arrangements: whereas fibrinogen is cleaved by thrombin to form polypeptides A and B, the proteolytic action of other enzymes yields different fibrinogen degradation products. [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]

Fibronectin: An adhesive glycoprotein. One form circulates in plasma, acting as an opsonin; another is a cell-surface protein which mediates cellular adhesive interactions. [NIH]

Fibrosis: Any pathological condition where fibrous connective tissue invades any organ, usually as a consequence of inflammation or other injury. [NIH]

Flow Cytometry: Technique using an instrument system for making, processing, and displaying one or more measurements on individual cells obtained from a cell suspension. Cells are usually stained with one or more fluorescent dyes specific to cell components of interest, e.g., DNA, and fluorescence of each cell is measured as it rapidly transverses the excitation beam (laser or mercury arc lamp). Fluorescence provides a quantitative measure of various biochemical and biophysical properties of the cell, as well as a basis for cell sorting. Other measurable optical parameters include light absorption and light scattering, the latter being applicable to the measurement of cell size, shape, density, granularity, and stain uptake. [NIH]

Fluorescence: The property of emitting radiation while being irradiated. The radiation emitted is usually of longer wavelength than that incident or absorbed, e.g., a substance can be irradiated with invisible radiation and emit visible light. X-ray fluorescence is used in diagnosis. [NIH]

Fluorescent Dyes: Dyes that emit light when exposed to light. The wave length of the emitted light is usually longer than that of the incident light. Fluorochromes are substances that cause fluorescence in other substances, i.e., dyes used to mark or label other compounds with fluorescent tags. They are used as markers in biochemistry and immunology. [NIH]

Folate: A B-complex vitamin that is being studied as a cancer prevention agent. Also called folic acid. [NIH]

Fold: A plication or doubling of various parts of the body. [NIH]

Folic Acid: N-(4-(((2-Amino-1,4-dihydro-4-oxo-6-pteridinyl)methyl)amino)benzoyl)-L-glutamic acid. A member of the vitamin B family that stimulates the hematopoietic system. It is present in the liver and kidney and is found in mushrooms, spinach, yeast, green leaves,

and grasses. Folic acid is used in the treatment and prevention of folate deficiencies and megaloblastic anemia. [NIH]

Gallbladder: The pear-shaped organ that sits below the liver. Bile is concentrated and stored in the gallbladder. [NIH]

Ganciclovir: Acyclovir analog that is a potent inhibitor of the Herpesvirus family including cytomegalovirus. Ganciclovir is used to treat complications from AIDS-associated cytomegalovirus infections. [NIH]

Gas: Air that comes from normal breakdown of food. The gases are passed out of the body through the rectum (flatus) or the mouth (burp). [NIH]

Gastric: Having to do with the stomach. [NIH]

Gastric Acid: Hydrochloric acid present in gastric juice. [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 Rearrangement: The ordered rearrangement of gene regions by DNA recombination such as that which occurs normally during development. [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]

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]

Glomeruli: Plural of glomerulus. [NIH]

Glomerulosclerosis: Scarring of the glomeruli. It may result from diabetes mellitus (diabetic glomerulosclerosis) or from deposits in parts of the glomerulus (focal segmental glomerulosclerosis). The most common signs of glomerulosclerosis are proteinuria and kidney failure. [NIH]

Glomerulus: A tiny set of looping blood vessels in the nephron where blood is filtered in the kidney. [NIH]

Glucose: D-Glucose. A primary source of energy for living organisms. It is naturally occurring and is found in fruits and other parts of plants in its free state. It is used therapeutically in fluid and nutrient replacement. [NIH]

Glucose Intolerance: A pathological state in which the fasting plasma glucose level is less than 140 mg per deciliter and the 30-, 60-, or 90-minute plasma glucose concentration following a glucose tolerance test exceeds 200 mg per deciliter. This condition is seen frequently in diabetes mellitus but also occurs with other diseases. [NIH]

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

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

Grade: The grade of a tumor depends on how abnormal the cancer cells look under a

microscope and how quickly the tumor is likely to grow and spread. Grading systems are different for each type of cancer. [NIH]

Graft: Healthy skin, bone, or other tissue taken from one part of the body and used to replace diseased or injured tissue removed from another part of the body. [NIH]

Graft-versus-host disease: GVHD. A reaction of donated bone marrow or peripheral stem cells against a person's tissue. [NIH]

Granulocyte: A type of white blood cell that fights bacterial infection. Neutrophils, eosinophils, and basophils are granulocytes. [NIH]

Granulocytopenia: A deficiency in the number of granulocytes, a type of white blood cell. [NIH]

Growth Inhibitors: Endogenous or exogenous substances which inhibit the normal growth of human and animal cells or micro-organisms, as distinguished from those affecting plant growth (plant growth regulators). [NIH]

Haematological: Relating to haematology, that is that branch of medical science which treats of the morphology of the blood and blood-forming tissues. [EU]

Haematology: The science of the blood, its nature, functions, and diseases. [NIH]

Haploid: An organism with one basic chromosome set, symbolized by n; the normal condition of gametes in diploids. [NIH]

Hematology: A subspecialty of internal medicine concerned with morphology, physiology, and pathology of the blood and blood-forming tissues. [NIH]

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

Hematopoietic Stem Cells: Progenitor cells from which all blood cells derive. [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]

Hemoglobinuria: The presence of free hemoglobin in the urine. [NIH]

Hemolysis: The destruction of erythrocytes by many different causal agents such as antibodies, bacteria, chemicals, temperature, and changes in tonicity. [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]

Hemorrhage: Bleeding or escape of blood from a vessel. [NIH]

Hemorrhoids: Varicosities of the hemorrhoidal venous plexuses. [NIH]

Hepatic: Refers to the liver. [NIH]

Hepatic Vein Thrombosis: Occlusion of the hepatic veins caused by thrombi or fibrous obliteration of the veins. [NIH]

Hepatic Veins: Veins which drain the liver. [NIH]

Hepatomegaly: Enlargement of the liver. [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]

Herpes: Any inflammatory skin disease caused by a herpesvirus and characterized by the formation of clusters of small vesicles. When used alone, the term may refer to herpes simplex or to herpes zoster. [EU]

Herpes Zoster: Acute vesicular inflammation. [NIH]

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]

Histamine: 1H-Imidazole-4-ethanamine. A depressor amine derived by enzymatic decarboxylation of histidine. It is a powerful stimulant of gastric secretion, a constrictor of bronchial smooth muscle, a vasodilator, and also a centrally acting neurotransmitter. [NIH]

Histidine: An essential amino acid important in a number of metabolic processes. It is required for the production of histamine. [NIH]

Histidine Decarboxylase: An enzyme that catalyzes the decarboxylation of histidine to histamine and carbon dioxide. It requires pyridoxal phosphate in animal tissues, but not in microorganisms. EC 4.1.1.22. [NIH]

Histology: The study of tissues and cells under a microscope. [NIH]

Homeostasis: The processes whereby the internal environment of an organism tends to remain balanced and stable. [NIH]

Homoharringtonine: An anticancer drug that belongs to the plant alkaloid family of drugs. [NIH]

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]

Humoral: Of, relating to, proceeding from, or involving a bodily humour - now often used of endocrine factors as opposed to neural or somatic. [EU]

Hybrid: Cross fertilization between two varieties or, more usually, two species of vines, see also crossing. [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]

Hydroxylysine: A hydroxylated derivative of the amino acid lysine that is present in certain collagens. [NIH]

Hydroxyproline: A hydroxylated form of the imino acid proline. A deficiency in ascorbic acid can result in impaired hydroxyproline formation. [NIH]

Hydroxyurea: An antineoplastic agent that inhibits DNA synthesis through the inhibition of ribonucleoside diphosphate reductase. [NIH]

Hypereosinophilic Syndrome: A heterogeneous group of disorders with the common feature of prolonged eosinophilia of unknown cause and associated organ system

dysfunction, including the heart, central nervous system, kidneys, lungs, gastrointestinal tract, and skin. There is a massive increase in the number of eosinophils in the blood, mimicking leukemia, and extensive eosinophilic infiltration of the various organs. It is often referred to as idiopathic. [NIH]

Hyperhomocysteinemia: An inborn error of methionone metabolism which produces an excess of homocysteine in the blood. It is often caused by a deficiency of cystathionine beta-synthase and is a risk factor for coronary vascular disease. [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]

Hypnotic: A drug that acts to induce sleep. [EU]

Idiopathic: Describes a disease of unknown cause. [NIH]

Idiopathic myelofibrosis: A progressive disease in which the bone marrow is replaced by fibrous tissue and is unable to produce red blood cells; the cause is unknown. [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]

Immunoblotting: Immunologic methods for isolating and quantitatively measuring immunoreactive substances. When used with immune reagents such as monoclonal antibodies, the process is known generically as western blot analysis (blotting, western). [NIH]

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

Immunology: The study of the body's immune system. [NIH]

Immunophenotyping: Process of classifying cells of the immune system based on structural and functional differences. The process is commonly used to analyze and sort T-lymphocytes into subsets based on CD antigens by the technique of flow cytometry. [NIH]

Impairment: In the context of health experience, an impairment is any loss or abnormality of psychological, physiological, or anatomical structure or function. [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]

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]

Infancy: The period of complete dependency prior to the acquisition of competence in walking, talking, and self-feeding. [NIH]

Infantile: Pertaining to an infant or to infancy. [EU]

Infarction: A pathological process consisting of a sudden insufficient blood supply to an area, which results in necrosis of that area. It is usually caused by a thrombus, an embolus, or a vascular torsion. [NIH]

Infection: 1. Invasion and multiplication of microorganisms in body tissues, which may be clinically unapparent or result in local cellular injury due to competitive metabolism, toxins, intracellular replication, or antigen-antibody response. The infection may remain localized, subclinical, and temporary if the body's defensive mechanisms are effective. A local infection may persist and spread by extension to become an acute, subacute, or chronic clinical infection or disease state. A local infection may also become systemic when the microorganisms gain access to the lymphatic or vascular system. 2. An infectious disease. [EU]

Inferior vena cava: A large vein that empties into the heart. It carries blood from the legs and feet, and from organs in the abdomen and pelvis. [NIH]

Infiltration: The diffusion or accumulation in a tissue or cells of substances not normal to it or in amounts of the normal. Also, the material so accumulated. [EU]

Inflammation: A pathological process characterized by injury or destruction of tissues caused by a variety of cytologic and chemical reactions. It is usually manifested by typical signs of pain, heat, redness, swelling, and loss of function. [NIH]

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]

Inositol: An isomer of glucose that has traditionally been considered to be a B vitamin although it has an uncertain status as a vitamin and a deficiency syndrome has not been identified in man. (From Martindale, The Extra Pharmacopoeia, 30th ed, p1379) Inositol phospholipids are important in signal transduction. [NIH]

Insight: The capacity to understand one's own motives, to be aware of one's own psychodynamics, to appreciate the meaning of symbolic behavior. [NIH]

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]

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]

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

Intestines: The section of the alimentary canal from the stomach to the anus. It includes the

large intestine and small intestine. [NIH]

Intracellular: Inside a cell. [NIH]

Intrahepatic: Within the liver. [NIH]

Intravenous: IV. Into a vein. [NIH]

Intrinsic: Situated entirely within or pertaining exclusively to a part. [EU]

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]

Karyotype: The characteristic chromosome complement of an individual, race, or species as defined by their number, size, shape, etc. [NIH]

Kb: A measure of the length of DNA fragments, 1 Kb = 1000 base pairs. The largest DNA fragments are up to 50 kilobases long. [NIH]

Kidney Cortex: The outer zone of the kidney, beneath the capsule, consisting of kidney glomerulus; kidney tubules, distal; and kidney tubules, proximal. [NIH]

Latency: The period of apparent inactivity between the time when a stimulus is presented and the moment a response occurs. [NIH]

Latent: Phoria which occurs at one distance or another and which usually has no troublesome effect. [NIH]

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

Leucocyte: All the white cells of the blood and their precursors (myeloid cell series, lymphoid cell series) but commonly used to indicate granulocytes exclusive of lymphocytes. [NIH]

Leukaemia: An acute or chronic disease of unknown cause in man and other warm-blooded animals that involves the blood-forming organs, is characterized by an abnormal increase in the number of leucocytes in the tissues of the body with or without a corresponding increase of those in the circulating blood, and is classified according of the type leucocyte most prominently involved. [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]

Leukocytosis: A transient increase in the number of leukocytes in a body fluid. [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 Transplantation: The transference of a part of or an entire liver from one human or animal to another. [NIH]

Localization: The process of determining or marking the location or site of a lesion or disease. May also refer to the process of keeping a lesion or disease in a specific location or site. [NIH]

Localized: Cancer which has not metastasized yet. [NIH]

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]

Lymphocytic: Referring to lymphocytes, a type of white blood cell. [NIH]

Lymphoid: Referring to lymphocytes, a type of white blood cell. Also refers to tissue in which lymphocytes develop. [NIH]

Lymphoma: A general term for various neoplastic diseases of the lymphoid tissue. [NIH]

Lymphoproliferative: Disorders characterized by proliferation of lymphoid tissue, general or unspecified. [NIH]

Macrophage: A type of white blood cell that surrounds and kills microorganisms, removes dead cells, and stimulates the action of other immune system cells. [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]

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]

Mastocytosis: A group of diseases resulting from proliferation of mast cells. [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]

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

Megaloblastic: A large abnormal red blood cell appearing in the blood in pernicious anaemia. [EU]

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

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

Meninges: The three membranes that cover and protect the brain and spinal cord. [NIH]

Meningitis: Inflammation of the meninges. When it affects the dura mater, the disease is termed pachymeningitis; when the arachnoid and pia mater are involved, it is called leptomeningitis, or meningitis proper. [EU]

Mercury: A silver metallic element that exists as a liquid at room temperature. It has the atomic symbol Hg (from hydrargyrum, liquid silver), atomic number 80, and atomic weight 200.59. Mercury is used in many industrial applications and its salts have been employed therapeutically as purgatives, antisyphilitics, disinfectants, and astringents. It can be absorbed through the skin and mucous membranes which leads to mercury poisoning. Because of its toxicity, the clinical use of mercury and mercurials is diminishing. [NIH]

Mesenchymal: Refers to cells that develop into connective tissue, blood vessels, and

lymphatic tissue. [NIH]

Mesenteric: Pertaining to the mesentery : a membranous fold attaching various organs to the body wall. [EU]

Mesentery: A layer of the peritoneum which attaches the abdominal viscera to the abdominal wall and conveys their blood vessels and nerves. [NIH]

Metallothionein: A low-molecular-weight (approx. 10 kD) protein occurring in the cytoplasm of kidney cortex and liver. It is rich in cysteinyl residues and contains no aromatic amino acids. Metallothionein shows high affinity for bivalent heavy metals. [NIH]

Metaplasia: A condition in which there is a change of one adult cell type to another similar adult cell type. [NIH]

Metastasis: The spread of cancer from one part of the body to another. Tumors formed from cells that have spread are called "secondary tumors" and contain cells that are like those in the original (primary) tumor. The plural is metastases. [NIH]

Metastatic: Having to do with metastasis, which is the spread of cancer from one part of the body to another. [NIH]

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]

Microorganism: An organism that can be seen only through a microscope. Microorganisms include bacteria, protozoa, algae, and fungi. Although viruses are not considered living organisms, they are sometimes classified as microorganisms. [NIH]

Micro-organism: An organism which cannot be observed with the naked eye; e. g. unicellular animals, lower algae, lower fungi, bacteria. [NIH]

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]

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]

Mitotic Spindle Apparatus: An organelle consisting of three components: (1) the astral microtubules, which form around each centrosome and extend to the periphery; (2) the polar microtubules which extend from one spindle pole to the equator; and (3) the kinetochore microtubules, which connect the centromeres of the various chromosomes to either centrosome. [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]

Monoclonal antibodies: Laboratory-produced substances that can locate and bind to cancer cells wherever they are in the body. Many monoclonal antibodies are used in cancer detection or therapy; each one recognizes a different protein on certain cancer cells. Monoclonal antibodies can be used alone, or they can be used to deliver drugs, toxins, or radioactive material directly to a tumor. [NIH]

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]

Monosomy: The condition in which one chromosome of a pair is missing. In a normally diploid cell it is represented symbolically as 2N-1. [NIH]

Morphology: The science of the form and structure of organisms (plants, animals, and other forms of life). [NIH]

Mosaicism: The occurrence in an individual of two or more cell populations of different chromosomal constitutions, derived from a single zygote, as opposed to chimerism in which the different cell populations are derived from more than one zygote. [NIH]

Motility: The ability to move spontaneously. [EU]

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

Mucositis: A complication of some cancer therapies in which the lining of the digestive system becomes inflamed. Often seen as sores in the mouth. [NIH]

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]

Muscular Diseases: Acquired, familial, and congenital disorders of skeletal muscle and smooth muscle. [NIH]

Mutagenesis: Process of generating genetic mutations. It may occur spontaneously or be induced by mutagens. [NIH]

Mutagens: Chemical agents that increase the rate of genetic mutation by interfering with the function of nucleic acids. A clastogen is a specific mutagen that causes breaks in chromosomes. [NIH]

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

Myelodysplastic syndrome: Disease in which the bone marrow does not function normally. Also called preleukemia or smoldering leukemia. [NIH]

Myelogenous: Produced by, or originating in, the bone marrow. [NIH]

Myeloid Cells: Cells which include the monocytes and the granulocytes. [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]

Neonatal: Pertaining to the first four weeks after birth. [EU]

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]

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]

Neuromuscular: Pertaining to muscles and nerves. [EU]

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]

Neutrophil: A type of white blood cell. [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]

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]

Nucleates: Bacteria-inducing ice nucleation at warm temperatures (between zero and minus ten degrees C.). [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]

Occupational Exposure: The exposure to potentially harmful chemical, physical, or biological agents that occurs as a result of one's occupation. [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]

Oncology: The study of cancer. [NIH]

Osteoporosis: Reduction of bone mass without alteration in the composition of bone, leading to fractures. Primary osteoporosis can be of two major types: postmenopausal osteoporosis and age-related (or senile) osteoporosis. [NIH]

Ovary: Either of the paired glands in the female that produce the female germ cells and secrete some of the female sex hormones. [NIH]

P53 gene: A tumor suppressor gene that normally inhibits the growth of tumors. This gene is altered in many types of cancer. [NIH]

Pachymeningitis: Inflammation of the dura mater of the brain, the spinal cord or the optic nerve. [NIH]

Palate: The structure that forms the roof of the mouth. It consists of the anterior hard palate and the posterior soft palate. [NIH]

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

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]

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]

Paraplegia: Severe or complete loss of motor function in the lower extremities and lower portions of the trunk. This condition is most often associated with spinal cord diseases, although brain diseases; peripheral nervous system diseases; neuromuscular diseases; and muscular diseases may also cause bilateral leg weakness. [NIH]

Paroxysmal: Recurring in paroxysms (= spasms or seizures). [EU]

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

Particle: A tiny mass of material. [EU]

Pathogenesis: The cellular events and reactions that occur in the development of disease. [NIH]

Pathologic: 1. Indicative of or caused by a morbid condition. 2. Pertaining to pathology (= branch of medicine that treats the essential nature of the disease, especially the structural and functional changes in tissues and organs of the body caused by the disease). [EU]

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

Pathophysiology: Altered functions in an individual or an organ due to disease. [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]

Pediatrics: A medical specialty concerned with maintaining health and providing medical care to children from birth to adolescence. [NIH]

Pelvis: The lower part of the abdomen, located between the hip bones. [NIH]

Pepsin: An enzyme made in the stomach that breaks down proteins. [NIH]

Peptic: Pertaining to pepsin or to digestion; related to the action of gastric juices. [EU]

Peptic Ulcer: An ulceration of the mucous membrane of the esophagus, stomach or duodenum, caused by the action of the acid gastric juice. [NIH]

Peptic Ulcer Hemorrhage: Bleeding from a peptic ulcer. [NIH]

Peptide: Any compound consisting of two or more amino acids, the building blocks of proteins. Peptides are combined to make proteins. [NIH]

Percutaneous: Performed through the skin, as injection of radiopacque material in radiological examination, or the removal of tissue for biopsy accomplished by a needle. [EU]

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 Nervous System Diseases: Diseases of the peripheral nerves external to the brain and spinal cord, which includes diseases of the nerve roots, ganglia, plexi, autonomic nerves, sensory nerves, and motor nerves. [NIH]

Peripheral stem cells: Immature cells found circulating in the bloodstream. New blood cells develop from peripheral stem cells. [NIH]

Peritoneal: Having to do with the peritoneum (the tissue that lines the abdominal wall and covers most of the organs in the abdomen). [NIH]

Peritoneal Cavity: The space enclosed by the peritoneum. It is divided into two portions, the greater sac and the lesser sac or omental bursa, which lies behind the stomach. The two sacs are connected by the foramen of Winslow, or epiploic foramen. [NIH]

Peroxidase: A hemeprotein from leukocytes. Deficiency of this enzyme leads to a hereditary disorder coupled with disseminated moniliasis. It catalyzes the conversion of a donor and peroxide to an oxidized donor and water. EC 1.11.1.7. [NIH]

Peroxide: Chemical compound which contains an atom group with two oxygen atoms tied to each other. [NIH]

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

PH: The symbol relating the hydrogen ion (H+) concentration or activity of a solution to that of a given standard solution. Numerically the pH is approximately equal to the negative logarithm of H+ concentration expressed in molarity. pH 7 is neutral; above it alkalinity increases and below it acidity increases. [EU]

Phagocytosis: The engulfing of microorganisms, other cells, and foreign particles by phagocytic cells. [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]

Phospholipids: Lipids containing one or more phosphate groups, particularly those derived from either glycerol (phosphoglycerides; glycerophospholipids) or sphingosine (sphingolipids). They are polar lipids that are of great importance for the structure and function of cell membranes and are the most abundant of membrane lipids, although not stored in large amounts in the system. [NIH]

Phosphorus: A non-metallic element that is found in the blood, muscles, nevers, bones, and teeth, and is a component of adenosine triphosphate (ATP; the primary energy source for the body's cells.) [NIH]

Phosphorylating: Attached to a phosphate group. [NIH]

Phosphorylation: The introduction of a phosphoryl group into a compound through the formation of an ester bond between the compound and a phosphorus moiety. [NIH]

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]

Pigments: Any normal or abnormal coloring matter in plants, animals, or micro-organisms. [NIH]

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

Placenta: A highly vascular fetal organ through which the fetus absorbs oxygen and other nutrients and excretes carbon dioxide and other wastes. It begins to form about the eighth day of gestation when the blastocyst adheres to the decidua. [NIH]

Plant Growth Regulators: Any of the hormones produced naturally in plants and active in controlling growth and other functions. There are three primary classes: auxins, cytokinins, and gibberellins. [NIH]

Plants: Multicellular, eukaryotic life forms of the kingdom Plantae. They are characterized by a mainly photosynthetic mode of nutrition; essentially unlimited growth at localized regions of cell divisions (meristems); cellulose within cells providing rigidity; the absence of organs of locomotion; absense of nervous and sensory systems; and an alteration of haploid and diploid generations. [NIH]

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]

Plasmin: A product of the lysis of plasminogen (profibrinolysin) by plasminogen activators. It is composed of two polypeptide chains, light (B) and heavy (A), with a molecular weight of 75,000. It is the major proteolytic enzyme involved in blood clot retraction or the lysis of fibrin and quickly inactivated by antiplasmins. EC 3.4.21.7. [NIH]

Plasminogen: Precursor of fibrinolysin (plasmin). It is a single-chain beta-globulin of molecular weight 80-90,000 found mostly in association with fibrinogen in plasma; plasminogen activators change it to fibrinolysin. It is used in wound debriding and has been investigated as a thrombolytic agent. [NIH]

Plasminogen Activators: A heterogeneous group of proteolytic enzymes that convert plasminogen to plasmin. They are concentrated in the lysosomes of most cells and in the

vascular endothelium, particularly in the vessels of the microcirculation. EC 3.4.21.-. [NIH]

Platelet Activation: A series of progressive, overlapping events triggered by exposure of the platelets to subendothelial tissue. These events include shape change, adhesiveness, aggregation, and release reactions. When carried through to completion, these events lead to the formation of a stable hemostatic plug. [NIH]

Platelet Aggregation: The attachment of platelets to one another. This clumping together can be induced by a number of agents (e.g., thrombin, collagen) and is part of the mechanism leading to the formation of a thrombus. [NIH]

Platelet Count: A count of the number of platelets per unit volume in a sample of venous blood. [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]

Ploidy: The number of sets of chromosomes in a cell or an organism. For example, haploid means one set and diploid means two sets. [NIH]

Pneumonia: Inflammation of the lungs. [NIH]

Point Mutation: A mutation caused by the substitution of one nucleotide for another. This results in the DNA molecule having a change in a single base pair. [NIH]

Polycythemia Vera: A myeloproliferative disorder of unknown etiology, characterized by abnormal proliferation of all hematopoietic bone marrow elements and an absolute increase in red cell mass and total blood volume, associated frequently with splenomegaly, leukocytosis, and thrombocythemia. Hematopoiesis is also reactive in extramedullary sites (liver and spleen). In time myelofibrosis occurs. [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]

Polyp: A growth that protrudes from a mucous membrane. [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]

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

Practice Guidelines: Directions or principles presenting current or future rules of policy for the health care practitioner to assist him in patient care decisions regarding diagnosis, therapy, or related clinical circumstances. The guidelines may be developed by government agencies at any level, institutions, professional societies, governing boards, or by the convening of expert panels. The guidelines form a basis for the evaluation of all aspects of health care and delivery. [NIH]

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]

Preleukemia: Conditions in which the abnormalities in the peripheral blood or bone marrow represent the early manifestations of acute leukemia, but in which the changes are not of sufficient magnitude or specificity to permit a diagnosis of acute leukemia by the usual clinical criteria. [NIH]

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]

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]

Proline: A non-essential amino acid that is synthesized from glutamic acid. It is an essential component of collagen and is important for proper functioning of joints and tendons. [NIH]

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

Prospective study: An epidemiologic study in which a group of individuals (a cohort), all free of a particular disease and varying in their exposure to a possible risk factor, is followed over a specific amount of time to determine the incidence rates of the disease in the exposed and unexposed groups. [NIH]

Prostaglandins: A group of compounds derived from unsaturated 20-carbon fatty acids, primarily arachidonic acid, via the cyclooxygenase pathway. They are extremely potent mediators of a diverse group of physiological processes. [NIH]

Protein C: A vitamin-K dependent zymogen present in the blood, which, upon activation by thrombin and thrombomodulin exerts anticoagulant properties by inactivating factors Va and VIIIa at the rate-limiting steps of thrombin formation. [NIH]

Protein S: The vitamin K-dependent cofactor of activated protein C. Together with protein C, it inhibits the action of factors VIIIa and Va. A deficiency in protein S can lead to recurrent venous and arterial thrombosis. [NIH]

Proteins: Polymers of amino acids linked by peptide bonds. The specific sequence of amino acids determines the shape and function of the protein. [NIH]

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

Prothrombin: A plasma protein that is the inactive precursor of thrombin. It is converted to thrombin by a prothrombin activator complex consisting of factor Xa, factor V, phospholipid, and calcium ions. Deficiency of prothrombin leads to hypoprothrombinemia. [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]

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 hypertension: Abnormally high blood pressure in the arteries of the lungs. [NIH]

Purulent: Consisting of or containing pus; associated with the formation of or caused by pus. [EU]

Pyoderma: Any purulent skin disease (Dorland, 27th ed). [NIH]

Pyoderma Gangrenosum: An idiopathic, rapidly evolving, and severely debilitating disease occurring most commonly in association with chronic ulcerative colitis. It is characterized by the presence of boggy, purplish ulcers with undermined borders, appearing mostly on the legs. The majority of cases are in people between 40 and 60 years old. Its etiology is unknown. [NIH]

Pyridoxal: 3-Hydroxy-5-(hydroxymethyl)-2-methyl-4- pyridinecarboxaldehyde. [NIH]

Pyridoxal Phosphate: 3-Hydroxy-2-methyl-5-((phosphonooxy)methyl)-4-pyridinecarboxaldehyde. An enzyme co-factor vitamin. [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]

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]

Radicular: Having the character of or relating to a radicle or root. [NIH]

Radicular Cyst: Slow-growing fluid-filled epithelial sac at the apex of a tooth with a nonvital pulp or defective root canal filling. [NIH]

Radioactive: Giving off radiation. [NIH]

Radiological: Pertaining to radiodiagnostic and radiotherapeutic procedures, and interventional radiology or other planning and guiding medical radiology. [NIH]

Randomized: Describes an experiment or clinical trial in which animal or human subjects are assigned by chance to separate groups that compare different treatments. [NIH]

Receptor: A molecule inside or on the surface of a cell that binds to a specific substance and causes a specific physiologic effect in the cell. [NIH]

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]

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]

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]

Residual disease: Cancer cells that remain after attempts have been made to remove the cancer. [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]

Respiratory Burst: A large increase in oxygen uptake by neutrophils and most types of tissue macrophages through activation of an NADPH-cytochrome b-dependent oxidase that reduces oxygen to a superoxide. Individuals with an inherited defect in which the oxidase that reduces oxygen to superoxide is decreased or absent (granulomatous disease, chronic) often die as a result of recurrent bacterial infections. [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]

Retrovirus: A member of a group of RNA viruses, the RNA of which is copied during viral replication into DNA by reverse transcriptase. The viral DNA is then able to be integrated into the host chromosomal DNA. [NIH]

Ribonucleoside Diphosphate Reductase: An enzyme of the oxidoreductase class that catalyzes the formation of 2'-deoxyribonucleotides from the corresponding ribonucleotides using NADPH as the ultimate electron donor. The deoxyribonucleoside diphosphates are used in DNA synthesis. (From Dorland, 27th ed) EC 1.17.4.1. [NIH]

Risk factor: A habit, trait, condition, or genetic alteration that increases a person's chance of developing a disease. [NIH]

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

Sclerosis: A pathological process consisting of hardening or fibrosis of an anatomical structure, often a vessel or a nerve. [NIH]

Sclerotherapy: Treatment of varicose veins, hemorrhoids, gastric and esophageal varices, and peptic ulcer hemorrhage by injection or infusion of chemical agents which cause localized thrombosis and eventual fibrosis and obliteration of the vessels. [NIH]

Screening: Checking for disease when there are no symptoms. [NIH]

Secretin: A hormone made in the duodenum. Causes the stomach to make pepsin, the liver to make bile, and the pancreas to make a digestive juice. [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]

Segmental: Describing or pertaining to a structure which is repeated in similar form in successive segments of an organism, or which is undergoing segmentation. [NIH]

Segmentation: The process by which muscles in the intestines move food and wastes through the body. [NIH]

Seizures: Clinical or subclinical disturbances of cortical function due to a sudden, abnormal, excessive, and disorganized discharge of brain cells. Clinical manifestations include abnormal motor, sensory and psychic phenomena. Recurrent seizures are usually referred to as epilepsy or "seizure disorder." [NIH]

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]

Skin graft: Skin that is moved from one part of the body to another. [NIH]

Skull: The skeleton of the head including the bones of the face and the bones enclosing the brain. [NIH]

Smoldering leukemia: Disease in which the bone marrow does not function normally. Also called preleukemia or myelodysplastic syndrome. [NIH]

Smooth muscle: Muscle that performs automatic tasks, such as constricting blood vessels. [NIH]

Soft tissue: Refers to muscle, fat, fibrous tissue, blood vessels, or other supporting tissue of the body. [NIH]

Soma: The body as distinct from the mind; all the body tissue except the germ cells; all the axial body. [NIH]

Somatic: 1. Pertaining to or characteristic of the soma or body. 2. Pertaining to the body wall in contrast to the viscera. [EU]

Somatic mutations: Alterations in DNA that occur after conception. Somatic mutations can occur in any of the cells of the body except the germ cells (sperm and egg) and therefore are not passed on to children. These alterations can (but do not always) cause cancer or other diseases. [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]

Specificity: Degree of selectivity shown by an antibody with respect to the number and types of antigens with which the antibody combines, as well as with respect to the rates and the extents of these reactions. [NIH]

Spectrum: A charted band of wavelengths of electromagnetic vibrations obtained by refraction and diffraction. By extension, a measurable range of activity, such as the range of bacteria affected by an antibiotic (antibacterial s.) or the complete range of manifestations of a disease. [EU]

Sperm: The fecundating fluid of the male. [NIH]

Spinal cord: The main trunk or bundle of nerves running down the spine through holes in the spinal bone (the vertebrae) from the brain to the level of the lower back. [NIH]

Spinal Cord Diseases: Pathologic conditions which feature spinal cord damage or dysfunction, including disorders involving the meninges and perimeningeal spaces surrounding the spinal cord. Traumatic injuries, vascular diseases, infections, and inflammatory/autoimmune processes may affect the spinal cord. [NIH]

Spleen: An organ that is part of the lymphatic system. The spleen produces lymphocytes, filters the blood, stores blood cells, and destroys old blood cells. It is located on the left side of the abdomen near the stomach. [NIH]

Splenectomy: An operation to remove the spleen. [NIH]

Splenomegaly: Enlargement of the spleen. [NIH]

Standard therapy: A currently accepted and widely used treatment for a certain type of cancer, based on the results of past research. [NIH]

Stem Cell Factor: Hematopoietic growth factor and the ligand of the c-kit receptor CD117 (proto-oncogene protein C-kit). It is expressed during embryogenesis and provides a key signal in multiple aspects of mast-cell differentiation and function. [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]

Stents: Devices that provide support for tubular structures that are being anastomosed or for body cavities during skin grafting. [NIH]

Sternum: Breast bone. [NIH]

Stimulant: 1. Producing stimulation; especially producing stimulation by causing tension on muscle fibre through the nervous tissue. 2. An agent or remedy that produces stimulation. [EU]

Stimulus: That which can elicit or evoke action (response) in a muscle, nerve, gland or other excitable issue, or cause an augmenting action upon any function or metabolic process. [NIH]

Stomach: An organ of digestion situated in the left upper quadrant of the abdomen between the termination of the esophagus and the beginning of the duodenum. [NIH]

Stomatitis: Inflammation of the oral mucosa, due to local or systemic factors which may involve the buccal and labial mucosa, palate, tongue, floor of the mouth, and the gingivae. [EU]

Strand: DNA normally exists in the bacterial nucleus in a helix, in which two strands are coiled together. [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]

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]

Superoxide: Derivative of molecular oxygen that can damage cells. [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]

Symptomatic: Having to do with symptoms, which are signs of a condition or disease. [NIH]

Synergistic: Acting together; enhancing the effect of another force or agent. [EU]

Systemic: Affecting the entire body. [NIH]

Systolic: Indicating the maximum arterial pressure during contraction of the left ventricle of the heart. [EU]

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]

Thalidomide: A pharmaceutical agent originally introduced as a non-barbiturate hypnotic, but withdrawn from the market because of its known tetratogenic effects. It has been reintroduced and used for a number of immunological and inflammatory disorders. Thalidomide displays immunosuppresive and anti-angiogenic activity. It inhibits release of tumor necrosis factor alpha from monocytes, and modulates other cytokine action. [NIH]

Therapeutics: The branch of medicine which is concerned with the treatment of diseases, palliative or curative. [NIH]

Thoracic: Having to do with the chest. [NIH]

Threshold: For a specified sensory modality (e. g. light, sound, vibration), the lowest level (absolute threshold) or smallest difference (difference threshold, difference limen) or intensity of the stimulus discernible in prescribed conditions of stimulation. [NIH]

Thrombin: An enzyme formed from prothrombin that converts fibrinogen to fibrin. (Dorland, 27th ed) EC 3.4.21.5. [NIH]

Thrombocytes: Blood cells that help prevent bleeding by causing blood clots to form. Also called platelets. [NIH]

Thrombocytopenia: A decrease in the number of blood platelets. [NIH]

Thrombocytosis: Increased numbers of platelets in the peripheral blood. [EU]

Thrombolytic: 1. Dissolving or splitting up a thrombus. 2. A thrombolytic agent. [EU]

Thrombomodulin: A cell surface glycoprotein of endothelial cells that binds thrombin and serves as a cofactor in the activation of protein C and its regulation of blood coagulation. [NIH]

Thrombopoietin: A humoral factor that controls blood platelet production through stimulation of megakaryocyte populations. Bone marrow megakaryocytes increase in both size and number in response to exposure to thrombopoietin. [NIH]

Thrombosis: The formation or presence of a blood clot inside a blood vessel. [NIH]

Thromboxanes: Physiologically active compounds found in many organs of the body. They are formed in vivo from the prostaglandin endoperoxides and cause platelet aggregation, contraction of arteries, and other biological effects. Thromboxanes are important mediators of the actions of polyunsaturated fatty acids transformed by cyclooxygenase. [NIH]

Thrombus: An aggregation of blood factors, primarily platelets and fibrin with entrapment of cellular elements, frequently causing vascular obstruction at the point of its formation.

Some authorities thus differentiate thrombus formation from simple coagulation or clot formation. [EU]

Thymidine: A chemical compound found in DNA. Also used as treatment for mucositis. [NIH]

Thymidine Kinase: An enzyme that catalyzes the conversion of ATP and thymidine to ADP and thymidine 5'-phosphate. Deoxyuridine can also act as an acceptor and dGTP as a donor. (From Enzyme Nomenclature, 1992) EC 2.7.1.21. [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]

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]

Trace element: Substance or element essential to plant or animal life, but present in extremely small amounts. [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]

Transduction: The transfer of genes from one cell to another by means of a viral (in the case of bacteria, a bacteriophage) vector or a vector which is similar to a virus particle (pseudovirion). [NIH]

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

Transplantation: Transference of a tissue or organ, alive or dead, within an individual, between individuals of the same species, or between individuals of different species. [NIH]

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

Trisomy: The possession of a third chromosome of any one type in an otherwise diploid cell. [NIH]

Tryptophan: An essential amino acid that is necessary for normal growth in infants and for nitrogen balance in adults. It is a precursor serotonin and niacin. [NIH]

Tumor Necrosis Factor: Serum glycoprotein produced by activated macrophages and other mammalian mononuclear leukocytes which has necrotizing activity against tumor cell lines and increases ability to reject tumor transplants. It mimics the action of endotoxin but differs

from it. It has a molecular weight of less than 70,000 kDa. [NIH]

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

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]

Ubiquitin: A highly conserved 76 amino acid-protein found in all eukaryotic cells. [NIH]

Ulcer: A localized necrotic lesion of the skin or a mucous surface. [NIH]

Ulceration: 1. The formation or development of an ulcer. 2. An ulcer. [EU]

Ulcerative colitis: Chronic inflammation of the colon that produces ulcers in its lining. This condition is marked by abdominal pain, cramps, and loose discharges of pus, blood, and mucus from the bowel. [NIH]

Umbilical Arteries: Either of a pair of arteries originating from the internal iliac artery and passing through the umbilical cord to carry blood from the fetus to the placenta. [NIH]

Umbilical Cord: The flexible structure, giving passage to the umbilical arteries and vein, which connects the embryo or fetus to the placenta. [NIH]

Umbilical cord blood: Blood from the placenta (afterbirth) that contains high concentrations of stem cells needed to produce new blood cells. [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]

Urokinase: A drug that dissolves blood clots or prevents them from forming. [NIH]

Vaccines: Suspensions of killed or attenuated microorganisms (bacteria, viruses, fungi, protozoa, or rickettsiae), antigenic proteins derived from them, or synthetic constructs, administered for the prevention, amelioration, or treatment of infectious and other diseases. [NIH]

Varicose: The common ulcer in the lower third of the leg or near the ankle. [NIH]

Varicose vein: An abnormal swelling and tortuosity especially of the superficial veins of the legs. [EU]

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

Vascular endothelial growth factor: VEGF. A substance made by cells that stimulates new blood vessel formation. [NIH]

Vasculitis: Inflammation of a blood vessel. [NIH]

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

VE: The total volume of gas either inspired or expired in one minute. [NIH]

Vector: Plasmid or other self-replicating DNA molecule that transfers DNA between cells in nature or in recombinant DNA technology. [NIH]

Vein: Vessel-carrying blood from various parts of the body to the heart. [NIH]

Vena: A vessel conducting blood from the capillary bed to the heart. [NIH]

Venous: Of or pertaining to the veins. [EU]

Venous blood: Blood that has given up its oxygen to the tissues and carries carbon dioxide back for gas exchange. [NIH]

Venous Thrombosis: The formation or presence of a thrombus within a vein. [NIH]

Ventricle: One of the two pumping chambers of the heart. The right ventricle receives oxygen-poor blood from the right atrium and pumps it to the lungs through the pulmonary

artery. The left ventricle receives oxygen-rich blood from the left atrium and pumps it to the body through the aorta. [NIH]

Ventricular: Pertaining to a ventricle. [EU]

Venules: The minute vessels that collect blood from the capillary plexuses and join together to form veins. [NIH]

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]

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]

Viscera: Any of the large interior organs in any one of the three great cavities of the body, especially in the abdomen. [NIH]

Vitamin A: A substance used in cancer prevention; it belongs to the family of drugs called retinoids. [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]

Xenograft: The cells of one species transplanted to another species. [NIH]

X-ray: High-energy radiation used in low doses to diagnose diseases and in high doses to treat cancer. [NIH]

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]

Zygote: The fertilized ovum. [NIH]

Zymogen: Inactive form of an enzyme which can then be converted to the active form, usually by excision of a polypeptide, e. g. trypsinogen is the zymogen of trypsin. [NIH]

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