AUTONOMIC NEUROPATHY

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

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

**FORWARD** ................................................................................................................................. 1  
**CHAPTER 1. STUDIES ON AUTONOMIC NEUROPATHY** ................................................................. 3  
  * Overview ................................................................. 3  
  * The Combined Health Information Database ......................................................... 3  
  * Federally Funded Research on Autonomic Neuropathy ............................................. 7  
  * The National Library of Medicine: PubMed ................................................................. 17  
**CHAPTER 2. NUTRITION AND AUTONOMIC NEUROPATHY** ......................................................... 63  
  * Overview ................................................................. 63  
  * Finding Nutrition Studies on Autonomic Neuropathy .............................................. 63  
  * Federal Resources on Nutrition ............................................................................... 65  
  * Additional Web Resources ....................................................................................... 65  
**CHAPTER 3. ALTERNATIVE MEDICINE AND AUTONOMIC NEUROPATHY** .................................. 67  
  * Overview ................................................................. 67  
  * National Center for Complementary and Alternative Medicine .............................. 67  
  * Additional Web Resources ....................................................................................... 73  
  * General References ................................................................................................. 74  
**CHAPTER 4. BOOKS ON AUTONOMIC NEUROPATHY** ................................................................. 75  
  * Overview ................................................................. 75  
  * Book Summaries: Federal Agencies ...................................................................... 75  
  * Chapters on Autonomic Neuropathy ...................................................................... 77  
**CHAPTER 5. MULTIMEDIA ON AUTONOMIC NEUROPATHY** ....................................................... 79  
  * Overview ................................................................. 79  
  * Video Recordings ..................................................................................................... 79  
**CHAPTER 6. PERIODICALS AND NEWS ON AUTONOMIC NEUROPATHY** .................................... 81  
  * Overview ................................................................. 81  
  * News Services and Press Releases .......................................................... 81  
  * Newsletter Articles ............................................................................................... 83  
  * Academic Periodicals covering Autonomic Neuropathy ........................................ 83  
**CHAPTER 7. RESEARCHING MEDICATIONS** ................................................................................. 85  
  * Overview ................................................................. 85  
  * U.S. Pharmacopeia .................................................................................................. 85  
  * Commercial Databases ....................................................................................... 86  
**APPENDIX A. PHYSICIAN RESOURCES** ..................................................................................... 89  
  * Overview ................................................................. 89  
  * NIH Guidelines .................................................................................................... 89  
  * NIH Databases ...................................................................................................... 91  
  * Other Commercial Databases ............................................................................. 93  
**APPENDIX B. PATIENT RESOURCES** .......................................................................................... 95  
  * Overview ................................................................. 95  
  * Patient Guideline Sources ................................................................................... 95  
  * Finding Associations ......................................................................................... 99  
**APPENDIX C. FINDING MEDICAL LIBRARIES** .......................................................................... 101  
  * Overview ................................................................. 101  
  * Preparation ...................................................................................................... 101  
  * Finding a Local Medical Library ..................................................................... 101  
  * Medical Libraries in the U.S. and Canada ......................................................... 101  
**ONLINE GLOSSARIES** .............................................................................................................. 107  
  * Online Dictionary Directories .............................................................................. 109  
**AUTONOMIC NEUROPATHY DICTIONARY** .............................................................................. 111
INDEX .......................................................................................................................... 161
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 autonomic neuropathy is indexed in search engines, such as [www.google.com](http://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 autonomic neuropathy, 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 autonomic neuropathy, 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 autonomic neuropathy. 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 autonomic neuropathy, 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 autonomic neuropathy.

*The Editors*

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CHAPTER 1. STUDIES ON AUTONOMIC NEUROPATHY

Overview

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

The Combined Health Information Database

The Combined Health Information Database summarizes studies across numerous federal agencies. To limit your investigation to research studies and autonomic neuropathy, 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 “autonomic neuropathy” (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:

- Autonomic Neuropathy: Clinical Presentation and Differential Diagnosis
  Summary: Autonomic neuropathy (AN) may occur in the elderly in connection with other common illnesses afflicting this age group such as diabetes or Parkinson’s disease or even as the primary illness. Symptoms of AN are numerous, but syncope, with its risk for fractures and head trauma, is the most serious. The clinical evaluation and workup of an elderly patient with AN is described. Reasonable autonomic testing and treatment strategies are also outlined, and a description of the autonomic nervous system is offered. 2 figures. 3 tables. 17 references. (AA-M).
• Diabetic Autonomic Neuropathy: Part 2: Treatment
Contact: Available from R.A. Rapaport Publishing, Inc. 150 West 22nd Street, New York, NY 10011. (212) 989-0200 or (773) 777-6801.

Summary: Autonomic neuropathy affects the nerves that regulate involuntary body functions and systems such as the digestive system, the sexual organs, the urinary tract, the heart, and the sweat glands. Symptoms include sexual dysfunction, delayed emptying of the stomach (gastroparesis), diarrhea, and difficulty urinating. This article, the second in a two part series on autonomic neuropathy of diabetes (DAN), reviews the treatments for early autonomic neuropathy and strategies to prevent possible complications. The author discusses the systematic treatment of DAN, including glycemic control, the use of an insulin pump, pancreas transplantation, the use of alpha lipoic acid (thioctic acid), and the use of other antioxidants. The author then outlines the prevention strategies, first in the area of the cardiovascular system. Extra precautions should be taken to guard against the development of heart disease and to catch and treat disease at the earliest possible time. The diagnosis of DAN should prompt a stronger bias toward the treatment of blood pressure, dyslipidemia (abnormal levels of fats, including cholesterol, in the blood), and other related conditions. Exercise stress testing should be considered for patients with DAN to identify and treat those with silent myocardial infarctions (heart attack). Other preventive approaches include the use of exercise, ACE inhibitors to preserve kidney function, increased perioperative vigilance, and increased vigilance for other end organ dysfunction (including foot conditions, eye disease, and kidney disease, or nephropathy). The author reiterates the importance of physicians and patients working together to identify and try to modify risk factors associated with DAN. 16 references.

• Diabetic Autonomic Neuropathy and Cardiovascular Risk: Pittsburgh Epidemiology of Diabetes Complications Study III

Summary: Diabetic autonomic neuropathy (DAN) has been shown to confer a high risk of mortality. The association between DAN and cardiovascular risk factors was examined in a well-defined cohort of 25-to 34-year-old insulin-dependent diabetes mellitus subjects (n=168) with and without DAN as evaluated by heart rate response to deep breathing, standing, and the Valsalva maneuver. The autonomic tests were performed using both an office-based procedure and a method employed by the Diabetes Control and Complications Trial with analyses performed by the Diabetes Research and Analysis Association, Lexington, Ky. Agreement was found to exist between the procedures for the assessment modalities of heart rate response to deep breathing. Modeling potential correlates in logistic analyses, where heart rate response to deep breathing was the dependent variable, revealed hypertension status, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, and gender (female) to be independent determinants of DAN. The results suggest that traditional cardiovascular risk factors are important correlates of Dan and may relate to both its cause and poor prognosis. Since these results are from a cross-sectional study, prospective follow-up of this cohort will be needed for confirmation. 5 tables, 44 references. (AA).

• Pupil Signs of Sympathetic Autonomic Neuropathy in Patients with Type 1 Diabetes
Studies


Summary: Pupillary autonomic neuropathy is considered an early sign of the development of systemic autonomic neuropathy (nerve disease). Sympathetic denervation is related to the duration of diabetes and the development of systemic autonomic dysfunction. This article investigated pupil responsiveness to directly and indirectly acting sympathomimetics in patients with type 1 diabetes with and without long-term complications, defined as cardiac autonomic neuropathy (CAN), peripheral sensomotor neuropathy, retinopathy (eye disease), and nephropathy (kidney disease), and in healthy subjects. A total of 47 randomly chosen type 1 diabetes patients and 20 healthy subjects were selected for this study. Patients were divided into groups determined by whether they had long-term diabetes complications. Horizontal pupil diameter (HPD) was measured at the beginning of the pharmacological tests and at defined time points after instillation of eye drops. Analyses showed a significantly smaller HPD in the patients before instilling eye drops. In particular, the HPD was significantly smaller in the patient group without CAN when compared with healthy subjects. Maximal cocaine reaction was diminished in the complication group. Epinephrine test, visual acuity, ocular pressure, and HbA1c (a measure of blood glucose levels over time) did not differ in patients with or without long-term complications. The results clearly show that sympathetic denervation does exist in the pupils of patients with diabetes and that is can be rapidly assessed using the cocaine test. 2 figures. 1 table. 26 references.

• Autonomic Neuropathy and Gastroparesis Diabeticorum


Summary: This article discusses autonomic diabetic neuropathy, particularly gastroparesis diabeticorum. Topics include how autonomic neuropathy can affect the gastrointestinal tract; a definition of gastroparesis diabeticorum or gastric dilatation with delayed emptying; gastric anatomy and physiology; gastrointestinal hormones and peptides; treatment; and the use of prokinetic agents in treatment. 6 tables. 5 references.

• Progression of Diabetic Autonomic Neuropathy over a Decade in Insulin-Dependent Diabetics


Summary: This article reports on a study that followed the progress of young people with insulin-dependent diabetes mellitus (IDDM) who were first identified as having abnormal autonomic nerve function 10-15 years ago. The results show that the mortality rate among people with diabetes who have symptomatic autonomic neuropathy is increased, but is lower than previously reported. Other results discussed include causes of death, progression of symptoms including diarrhea, postural hypotension, gustatory sweating, and progression of autonomic function tests. The excess mortality in symptomatic autonomic neuropathy is principally caused by end-stage renal failure, macrovascular disease in patients with proteinuria, and sudden unexpected death. 5 figures. 4 tables. 29 references. (AA-M).

• Diabetic Autonomic Neuropathy. Part 1: Early Detection

Autonomic Neuropathy

Contact: Available from R.A. Rapaport Publishing, Inc. 150 West 22nd Street, New York, NY 10011. (212) 989-0200 or (773) 777-6801.

Summary: This article, the first of two parts, focuses on the diagnosis of diabetic autonomic neuropathy (DAN). This dysfunction of the autonomic nerve system (ANS) is one of the most prevalent and debilitating complications of diabetes, affecting more than 25 percent of patients with diabetes. The ANS is the part of the peripheral nervous system that is responsible for maintaining homeostasis. ANS dysfunction can affect any and every organ in the body. Autonomic neuropathy is more subtle than the sensory or motor neuropathies, so patients experience it only indirectly through its effects on the organs that the ANS influences. When ANS dysfunction is detected in one organ, there is generally dysfunction throughout the body. Autonomic neuropathy progresses slowly and often causes damage for years before the development of obvious symptoms. Some of the most common and severe conditions associated with DAN include silent myocardial infarction, cardiac arrhythmias, ulceration, gangrene, amputation, nephropathy, impotence, and hypoglycemic unawareness. DAN first appears in the longer nerves and later progresses to the shorter nerves. Early detection of DAN is important because it identifies patients with early, asymptomatic disease, thus allowing changes in treatment to produce better clinical outcomes. The most sensitive, repeatable, and practical measure of DAN is the heart rate variability test in response to provocative stimuli. The three most common provocative stimuli used for enhancing heart rate are deep breathing, Valsalva maneuver, and standing from the supine position. The article provides guidelines on selecting the proper test and interpreting test results. 1 figure. 1 table. 18 references.

Cardiovascular Autonomic Neuropathy: Clinical Manifestations and Measurement


Contact: Available from American Diabetes Association, Inc. 1701 North Beauregard Street, Alexandria, VA 22311. (800) 232-3472.

Summary: This review article provides information on the epidemiology, pathogenesis, clinical manifestations, measurement, and outcome of cardiovascular autonomic neuropathy (CAN). Several prospective studies have demonstrated an increased mortality among diabetic patients who have CAN. The overall mortality rates over periods up to 10 years were approximately 27 percent in diabetic patients with CAN detected by reduced heart rate variability (HRV) compared with 5 percent in those without evidence of CAN. However, reduced HRV is an independent indicator of poor prognosis in the absence of diabetes, as a consequence of common cardiovascular diseases such as coronary artery disease, myocardial infarction, and heart failure. Besides reduced HRV, the clinical manifestations of CAN include fixed heart rate, increased resting heart rate, sinus tachycardia, orthostatic hypotension with systolic blood pressure fall 30 mm Hg or greater, possibly increased susceptibility to silent myocardial ischemia or infarction, reduced circadian rhythm of heart rate and blood pressure, abnormal hormonal regulation to standing and exercise, antibodies to autonomic tissue, denervation hypersensitivity to alpha and beta adrenergic agonists, inadequate increase in heart rate or blood pressure to exercise, reduced left ventricular diastolic filling or ejection fraction, intraoperative cardiovascular instability, corrected QT interval prolongation, and increased QT dispersion. Sensitive and early assessment of CAN is currently possible by means of noninvasive autonomic function tests (AFTs), including time domain and frequency domain indices of HRV, aiming at prevention of the advanced stages. However, a generally accepted standardization of the various test procedures is needed. Despite this problem, it is estimated that CAN can be detected by
abnormal AFTs in at least one fourth to one third of people who have type 2 diabetes. In some cases, autonomic dysfunction may be present at the time of manifestation of both type 1 and type 2 diabetes. There is increasing evidence suggesting that the statistical, geometric, frequency domain, and nonlinear measures of 24 hour HRV could be more sensitive and reliable in detecting CAN when compared with AFTs. Moreover, 24 hour recording of HRV provides insights into abnormal patterns of circadian rhythms modulated by sympathovagal activity. Recent studies using cardiac radionuclide imaging techniques have quantified myocardial adrenergic dysinnervation by diminished uptake of the norepinephrine analogs [123I]metaiodobenzylguanidine or [11C]hydroxyephedrine. These methods provide a unique and sensitive tool for direct assessment of the pathophysiology and progression of early sympathetic innervation defects not accessible to indirect autonomic function testing. The prognostic significance of these defects and that of reduced measures of 24 hour HRV in CAN need to be determined in large scale prospective clinical trials. 2 figures. 3 tables. 107 references. (AA-M).

- **Cardiovascular Autonomic Neuropathy: Advances in Testing Help Unlock Its Complexity**


Summary: This series of articles explores cardiovascular autonomic neuropathy (CAN) associated with diabetes mellitus. There are at least three major syndromes associated with CAN in patients with diabetes: postural hypotension, cardiac denervation syndrome, and exercise intolerance. Research articles, summaries, and commentaries cover specific topics, including metabolic and cardiovascular responses to epinephrine in diabetic autonomic neuropathy; increased intraoperative cardiovascular morbidity; abnormal cardiac function; silent myocardial infarction; assessment using exercise thallium scintigraphy; and sudden cardiac death in patients with diabetic autonomic neuropathy. The editor concludes that tests for CAN can be performed with equipment available commercially. The tests have clinical meaning, are reimbursable, practical, simple to perform, and will add to the patient's well-being. They should become a regular part of care for the patient with diabetes. Numerous figures, tables, and references accompany each article.

**Federally Funded Research on Autonomic Neuropathy**

The U.S. Government supports a variety of research studies relating to autonomic neuropathy. These studies are tracked by the Office of Extramural Research at the National Institutes of Health. 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](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 autonomic neuropathy.

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2 Healthcare projects are funded by the National Institutes of Health (NIH), Substance Abuse and Mental Health Services (SAMHSA), Health Resources and Services Administration (HRSA), Food and Drug Administration (FDA), Centers for Disease Control and Prevention (CDCP), Agency for Healthcare Research and Quality (AHRQ), and Office of Assistant Secretary of Health (OASH).
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 autonomic neuropathy. The following is typical of the type of information found when searching the CRISP database for autonomic neuropathy:

**Project Title: DIABETIC AUTONOMIC NEUROPATHY**
Principal Investigator & Institution: Low, Phillip A.; Professor; Mayo Clinic Coll of Medicine, Rochester 200 1St St Sw Rochester, Mn 55905
Timing: Fiscal Year 2001; Project Start 30-SEP-1999; Project End 31-AUG-2004
Summary: The pathogenesis and pathophysiology of diabetic autonomic neuropathy is poorly understood and its treatment unsatisfactory. Autonomic dysfunction of IDDM may be different to that of NIDDM, but studies to date have been limited by significant selection bias and the instruments to evaluate symptoms and autonomic dysfunction have not been available. We will undertake a population-based study to test the hypothesis that autonomic symptoms and deficits in the neuropathy of IDDM are different to those of NIDDM, with greater involvement of the splanchnic-mesenteric bed in IDDM. In this study we will evaluate autonomic symptoms using our validated instrument, the autonomic symptom profile, in the entire cohort of 322 patients (IDDM and NIDDM; Specific aim number 1) in the Rochester Diabetic Project (Director: Peter Dyck). This autonomic symptom profile will be combined with a laboratory profile of cardiovagal, adrenergic and sudomotor dysfunction, and by laboratory evaluation of the splanchnic-mesenteric, systemic, and cerebrovascular beds, catecholaminergic responses, and gastric transit and accommodation studies (Specific aim number 2). Mesenteric blood flow will be measured using 2-D doppler ultrasound, cerebral perfusion using transcranial doppler, beat-to-beat BP using Finapres, and heart rate from electrocardiographic monitor. Whether a patient develops symptoms of orthostatic hypotension depends on cerebral autoregulation, a process whereby cerebral perfusion remains unchanged in the face of changing systemic BP. We hypothesize that the autoregulatory slope relating the change in cerebral perfusion to that of blood pressure (BP) (deltaBFV: deltaBP), and is an index of autoregulatory adaptation, changes with duration and severity of orthostatic hypotension in diabetic autonomic neuropathy. We will evaluate cerebrovascular autoregulatory adaptation in patients with IDDM and NIDDM (Specific aim number 3). Treatment of diabetic orthostatic hypotension with alpha-agonists or fludrocortisone cause or aggravate supine hypertension. This is a particular problem in diabetics, who have increased small and large vessel atherosclerotic disease. We will evaluate if cholinesterase inhibition, by increasing ganglionic neurotransmission, will, by restoring transmission of some fibers, and amplify the efficiency of residual baroreflexes, improve orthostatic hypotension without supine hypertension (Specific aim number 4).
Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

**Project Title: DIABETIC AUTONOMIC NEUROPATHY & MITRAL VALVE DYSFUNCTION**
Principal Investigator & Institution: Jew, Jean Y.; Anatomy and Cell Biology; University of Iowa Iowa City, Ia 52242
Timing: Fiscal Year 2002; Project Start 30-SEP-1999; Project End 31-AUG-2004
Summary: This abstract is not available.
Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen
• **Project Title: EVALUATION OF MYOCARDIAL VASCULAR RESPONSE IN DIABETIC AUTONOMIC NEUROPATHY**

Principal Investigator & Institution: Stevens, Martin J.; Professor; University of Michigan at Ann Arbor 3003 South State, Room 1040 Ann Arbor, MI 481091274

Timing: Fiscal Year 2002

Summary: This abstract is not available.

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

• **Project Title: EXPERIMENTAL AUTOIMMUNE AUTONOMIC NEUROPATHY**

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

Timing: Fiscal Year 2002; Project Start 19-FEB-2001; Project End 31-JAN-2006

Summary: (Adapted from the Applicant's Abstract): The discovery of acetylcholine receptor (AChR) antibodies in patients with myasthenia gravis (MG) led to recognition of other IgG-mediated neurologic diseases and had practical implications for serological diagnosis and immunomodulatory therapy of MG, the Lambert-Eaton myasthenic syndrome and other disorders. Our recent serological studies have implicated autoantibodies against the neuronal AChR in autonomic ganglia as the cause of acquired severe dysautonomia in some patients. In addition, these ganglionic AChR antibodies are proving to be useful serological markers of subacute autonomic neuropathy. Serum ganglionic AChR antibody levels correlate significantly with the severity of autonomic dysfunction, and a reduction in antibody level correlates with improvement in clinical and laboratory indices of autonomic function. As part of a program to nurture the career of a young neurologist clinician-investigator, we propose to develop and study animal models of autoimmunity against the ganglionic AChR to establish the etiology of human subacute autonomic neuropathy. Initial rodent experiments will examine indices of ganglionic synaptic transmission in vitro and autonomic function in vivo. Using these studies as a baseline, subsequent experiments will evaluate the effects of passive ganglionic AChR antibody transfer and active immunization on autonomic function in animals. This project is the first step toward complete understanding of a serious human neurologic disease and lays the foundation for investigating other disorders of neuronal cholinergic transmission. Novel therapeutic trials are anticipated as a clinical translational outcome of this research. The proposed project involves close interaction with established mentors at an institution with a record of excellence in clinically-relevant basic science research. The candidate has already shown potential for independent patient-based laboratory research, and with further training will develop a successful independent research program including clinically based laboratory research and translational clinical research in neurology.

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

• **Project Title: EXPERIMENTAL DIABETIC AUTONOMIC NEUROPATHY**

Principal Investigator & Institution: Schmidt, Robert E.; Professor; Pathology and Immunology; Washington University Lindell and Skinker Blvd St. Louis, Mo 63130

Timing: Fiscal Year 2002; Project Start 01-FEB-1977; Project End 30-JUN-2004

Summary: This abstract is not available.

Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen
**Project Title: INTERSTITIAL CELLS OF CAJAL IN DIABETIC GASTROPATHY**
Principal Investigator & Institution: Ordog, Tamas; Physiology and Cell Biology; University of Nevada Reno 204 Ross Hall Mailstop 325 Reno, Nv 89557
Timing: Fiscal Year 2002; Project Start 01-SEP-2002; Project End 31-AUG-2005
Summary: (provided by applicant): Upper gastrointestinal symptoms arising from diabetic gastropathy, and gastroparesis, the irreversible, end-stage form of gastropathy, have been reported in 30-60% of patients after approximately 10 years of both insulin-dependent and non-insulin-dependent diabetes mellitus. These gastric motor abnormalities can seriously affect the patients' quality of life, may affect glycemic control and can occasionally result in incapacitating symptoms like malnutrition, water and electrolyte imbalance or even aspiration. Most basic and clinical scientists view these complications of diabetes as a manifestation of autonomic neuropathy but their exact pathomechanism remains unclear. In the present proposal we offer a novel hypothesis. Recently, interstitial cells of Cajal (ICC), a mesenchymal cell type residing in the myenteric region (ICC-MY) and within smooth muscle layers (ICC-IM) of the stomach, have been identified as pacemakers and mediators of neurotransmission, respectively. Because both functions are seriously affected in diabetic gastropathy, it is possible that disruption of ICC networks could underlie some of the pathological changes characteristic of this disease. Our published work and additional preliminary studies using non-obese, spontaneously diabetic (NOD) mice, as well as a recent report about the human gastrointestinal complications of diabetes (He et al., Gastroenterology 121: 427-434, 2001) support the validity of this hypothesis. Thus, NOD mice offer an exciting new animal model for studies of diabetic gastropathy. In this project we plan to characterize and use this model to: (1) study how networks of gastric ICC are altered in diabetic gastroparesis and how alterations in ICC-MY number and distribution could lead to gastric arrhythmias and impaired gastric emptying; (2) to investigate whether ICC depletion in the stomach of diabetic NOD mice is due to hyperglycemia or hypoinsulinemia and to study the mechanisms by which these factors influence ICC phenotype and function; and (3) to examine what cellular mechanisms (e.g. apoptosis, necrosis or transdifferentiation) lead to the reduction of ICC in the distal stomach. The proposed experiments could provide the basic concepts needed for the development of novel, more effective treatment options for patients with diabetic gastropathy.
Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

**Project Title: LUPUS COHORT**
Principal Investigator & Institution: Petri, Michelle A.; Associate Professor; Medicine; Johns Hopkins University 3400 N Charles St Baltimore, Md 21218
Timing: Fiscal Year 2002; Project Start 30-SEP-1996; Project End 31-MAR-2007
Summary: (provided by applicant): The Hopkins Lupus Cohort is an ongoing, prospective study in which SLE patients are followed by protocol, with visits at a minimum of every 3 months, now in its 16th year. The Cohort is racially balanced, with one-half of the members being African-American, and reflects a broad socioeconomic range. The Cohort represents a 15 year investment in the study of SLE outcomes, sponsored by NIH. It has led to a unique, prospective database of demographic, social, clinical and laboratory (routine, serologic, and antiphospholipid antibody) measures. The four major accomplishments of the Cohort during the last funding period were: 1) the determination that serologic markers of disease activity, such as anti-dsDNA, C3, and C4, have limited utility in the prediction of SLE flare; 2) the determination that the cumulative prednisone dose is predictive of coronary artery disease and osteoporosis,
whereas high-dose prednisone is predictive of avascular necrosis; 3) the determination that antiphospholipid antibodies are associated with future risk of thrombosis and with atherosclerosis; and 4) the finding that the poor health status of SLE patients is associated with fibromyalgia, whereas fibromyalgia itself correlates highly with neurally-mediated hypotension, a form of autonomic neuropathy. In this revised grant, four new specific aims will be undertaken. First, in the cohort as a whole and in an inception cohort followed since diagnosis, we will determine the relative importance of disease activity versus corticosteroid treatment as a predictor of specific types of organ damage. Second, in a study of 75 patients seen monthly, we will investigate cytokines and platelet-related factors as predictors of disease activity. Third, 250 patients from the inception cohort will have carotid duplex and helical CT (for coronary calcification scores) at baseline and 2 years later to determine associates and predictors of atherosclerosis, including traditional and novel cardiovascular risk factors. Fourth, we will assess, in 100 SLE patients with and 100 without fibromyalgia, the frequency of autonomic neuropathy and the correlation with health status.

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- **Project Title: MECHANISM OF FAMILIAL DYSAUTONOMIA**

  Principal Investigator & Institution: Slaugenhaupt, Susan A.; Massachusetts General Hospital 55 Fruit St Boston, Ma 02114

  Timing: Fiscal Year 2004; Project Start 15-APR-1997; Project End 31-DEC-2008

  Summary: (provided by applicant): Familial dysautonomia (FD; Riley-Day syndrome) is the best known and most frequent of a group of congenital sensory neuropathies characterized by widespread sensory and variable autonomic dysfunction. First described in 1949, FD is a devastating disorder that involves progressive neuronal degeneration with a broad impact on the operation of many of the body’s systems leading to a vastly reduced quality of life and premature death. Affected individuals demonstrate lack of overflow tears, impaired temperature and pain sensation and autonomic dysfunction. Despite recent advances in its management, FD is inevitably fatal, with only 50% of patients reaching 30 years of age. FD is due to a recessive genetic defect with a remarkably high carrier frequency in Ashkenazi Jews of 1 in 32, rivaling the gene frequencies of more widely recognized disorders such as Tay-Sachs disease and cystic fibrosis. Recently we reported that a single non-coding mutation in the gene IKBKAP causes 99.5% of all FD cases. IKAP, the protein product of the gene IKBKAP, is a member of the recently identified human Elongator complex, thought to play a role in transcriptional elongation. Interestingly, IKAP has also been implicated in the mammalian stress response pathway through an interaction with c-Jun N-terminal kinase (JNK). The major FD mutation is a single-base change in the donor splice site of intron 20 that results in an apparent decrease in splicing efficiency and variable skipping of exon 20 in the IKBKAP mRNA. Interestingly, despite the fact that FD is a recessive disease, homozygous mutant cells are capable of expressing normal mRNA and protein. In this grant, we aim to further characterize mutations in IKBKAP and functionally related proteins that can cause sensory and autonomic neuropathy, to investigate the nature of the splicing defect, to develop a transgenic mouse model using an FD BAC in order to examine the tissue specific splicing of IKBKAP, and to identify drugs that increase the efficiency of accurate splicing from the FD mutant alleles as a promising route to an effective therapy for this devastating disorder.

  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen
• Project Title: MECHANISMS OF SYMPTOMS IN NEUROPATHIC PAIN & RSD
  
  Principal Investigator & Institution: Dotson, Rose; Mayo Clinic Coll of Medicine, Rochester 200 1St St Sw Rochester, Mn 55905
  
  Timing: Fiscal Year 2002
  
  Summary: The hypothesis and specific aims are focused on the pathophysiology of two different groups of conditions. The first group is orthostatic intolerance, specifically the postural tachycardia syndrome (POTS). The second group is neuropathic pain. The studies on neuropathic pain have been organized into 2 types of painfulness in response to a normally non-painful stimulus (allodynia) and to the enigma of reflex sympathetic dystrophy. The allodynias are in response to light touch (dynamic allodynia) and to pressure (static allodynia). The primary hypothesis is that patients with POTS develop a post-viral, presumably immune-mediated length-dependent autonomic neuropathy and that secondary brain-stem mechanisms supervene, resulting in a hyperadrenergic state. We will evaluate the pathophysiology of orthostatic intolerance using microneurographic recordings of muscle sympathetic nerve activity from peroneal nerves of patients with the postural tachycardia syndrome (POTS) and controls. We will specifically evaluate if resting muscle sympathetic nerve activity is increased (due to increased central drive) or reduced (due to denervation) and, to evaluate varoflex responsiveness, if the response to orthostatic stress and to induced blood pressure alterations are impaired. The hypothesis for the study of patients with neuropathic pain who have dynamic mechanical allodynia is that low threshold mechanoreceptor primary afferents propagate neural impulses to the central nervous system and result in the experience of pain with dynamic mechanical allodynia. The study will determine if rapid repetitive intraneural microstimulation of single low threshold mechanoreceptor primary afferents in patients with peripheral neurogenic pain and dynamic mechanical allodynia causes pain as the first perceived sensation with liminal intensity (the lowest intensity at which the subjects report a perceived sensation) of electrical stimulation.

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

• Project Title: MENTORED PATIENT-ORIENTED RESEARCH CAREER DEVELOPMENT AW
  
  Principal Investigator & Institution: Sandroni, Paola; Mayo Clinic Coll of Medicine, Rochester 200 1St St Sw Rochester, Mn 55905
  
  Timing: Fiscal Year 2002; Project Start 01-MAY-2000; Project End 30-APR-2005
  
  Summary: Pathophysiology of Pure Autonomic Failure and Idiopathic Autonomic Neuropathy The primary hypothesis is that pure autonomic failure (PAF) and idiopathic autonomic neuropathy (IAN), two disabling and together, relatively common disorders, are different clinically, pathogenetically and pathophysiologicaly. We posit that PAF is a progressive selective postganglionic autonomic neuropathy, whereas IAN is a monophasic immune-mediated multifocal small fiber neuropathy, affecting both somatic and autonomic fibers. The two disorders are often confused. We will undertake a prospective study to develop a predictive prognostic model of PAF and IAN to evaluate their differentiation, course and outcome. It will be possible to generate insights into the pathophysiology of IAN and PAF with the availability of the ganglionic antibody (positive in IAN selectively), a validated instrument to evaluate the severity and distribution of autonomic symptoms, new techniques to undertake laboratory evaluation of the systemic, splanchnic-mesenteric and cerebrovascular vasoregulation and the ability to measure muscle sympathetic nerve activity directly.
Studies using microneurography. Dr. Sandroni will acquire the necessary training to undertake microneurographic, superior mesenteric blood flow, and cerebral blood flow recordings and apply them to autonomic studies on IAN and PAF. It is also possible to study the sympathetic supply to eccrine sweat gland and unmyelinated somatic fiber innervation of the skin (positive in IAN, negative in PAF) using punch skin biopsies. She will acquire training in morphometry of skin innervation, labeled with the panaxonal marker PGP 9.5 and antibodies to tyrosine hydroxylase (autonomic fibers) and sensory neuropeptidic fibers (calcitonin gene-related peptide, substance P, vasoactive intestinal polypeptide). Finally, she will undertake a double-blind, randomized, 4-way crossover study of pyridostigmine in the treatment of neurogenic orthostatic hypotension of PAF and IAN. This strategy of acetylcholinesterase inhibition to improve ganglionic transmission could improve orthostatic hypotension without complicating supine hypertension. This research is set up to create a balance in research and clinical responsibility. The planned training in autonomic techniques and specific pathophysiologic studies will provide Dr. Sandroni with the necessary conceptual development, publications track record and investigational tools to effectively compete as an independent investigator in autonomic disorders in future years.

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- **Project Title: MOLECULAR STUDIES OF EXPERIMENTAL DIABETIC NEUROPATHY**

Principal Investigator & Institution: Christ, George J.; Professor; Urology; Yeshiva University 500 W 185Th St New York, Ny 10033

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

Summary: (Adapted from the Applicant's Abstract): More than 50 percent of patients with diabetes have erectile dysfunction, with autonomic neuropathy playing a proximal role. However, the precise contribution of autonomic neuropathy to diabetic erectile dysfunction remains undefined. Part of the difficulty in establishing the etiologic role of the autonomic nervous system in diabetic erectile dysfunction is related to the fact that the penis is endowed with multiple mechanisms for preserving syncytial tissue function. In particular, the interaction among: 1. neuronal innervation, 2. cell-to-cell communication, and 3. myogenic intracellular signal transduction processes, are critical to guarantee erectile function over a wide range of physiological conditions. Such plasticity is expected of an organ critical to the survival of the species and the physiological well being of men and their sexual partners. The explicit aim of these studies is to utilize an established rat model of experimental diabetic neuropathy to evaluate the effects of diabetes on autonomic innervation in the penis, and any correlative changes that occur in intercellular communication and myogenic responsivity. In particular, we will test the hypothesis that autonomic neuropathy is associated with global alterations in tissue function, that result, at least in part, from alterations in ion flow through potassium (K) and gap junction channels. Specifically, we shall induce a 1-6 month period of streptozotocin (STZ)-diabetes in Fischer-344 (F-344) rats, and: 1. Evaluate the functional correlates of molecular changes in K channels and gap junctions that are associated with experimental diabetic neuropathy/hyperglycemia, and 2. To evaluate the functional correlates of the molecular changes in K channels and gap junctions that are produced by a novel gene therapy approach for the amelioration of erectile dysfunction. To this end, we will utilize techniques ranging from in vivo animal studies, through in vitro studies at the tissue, cellular, subcellular and molecular/genetic levels. By bringing to bear such a diverse array of techniques on this important medical problem we hope to gain the
greatest insight possible into the functional correlates in vivo of well quantified molecular alterations.

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- **Project Title: OXIDATIVE STRESS: ROLES IN DIABETIC AUTONOMIC NEUROPATHY**

Principal Investigator & Institution: Lincoln, Jill; U of L University College London University College London London,

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

Summary: (Applicant's abstract): Autonomic neuropathy is a recognized complication of diabetes and can lead to dysfunction in the gastrointestinal, cardiovascular and urogenital systems. The overall objective of this study is to examine the hypothesis that oxidative stress plays a major role in the development of autonomic neuropathy in diabetes and that differences in anti-oxidant defense mechanisms in subpopulations of autonomic nerves can account for their relative susceptibility to diabetes-induced nerve damage. The study has been designed with the long-term objective of identifying specific targets for treatment and potential agents that may be beneficial clinically in preventing and reversing autonomic neuropathy. A multi-disciplinary approach, including microscopical, biochemical, molecular biological, pharmacological and electrophysiological techniques will be used to assess structure and function of a range of autonomic nerve types supplying the gastrointestinal tract. Studies will be carried out in an animal model of insulin-dependent (Type 1) diabetes mellitus and in isolated neurons in culture subjected to hyperglycemic conditions. Specific aims include investigation of apoptotic changes and the characterization of changes in indicators of oxidative stress, anti-oxidant defense mechanisms, heat shock protein 32 (induced by oxidative stress) and advanced glycation endproducts in subpopulations of autonomic nerves identified by their neurotransmitter content. Such changes will be correlated with the presence or absence of diabetes-induced damage in the same autonomic nerves. In addition, bimoclomol (an inducer of heat shock proteins) and aminoguanidine (an inhibitor of advanced glycation endproducts) will be examined in vivo and in vitro for their ability to prevent autonomic neuropathy and to reverse neuropathic changes once they have been allowed to develop.

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- **Project Title: PACIFIC REGION DIABETES EDUCATION PROGRAM**

Principal Investigator & Institution: Chang, Healani K.; None; University of Hawaii at Manoa Honolulu, Hi 96822

Timing: Fiscal Year 2003; Project Start 30-SEP-2003; Project End 31-JUL-2008

Summary: (provided by applicant): The goal of the proposed University of Hawaii at Manoa (UHM) Pacific Region Diabetes Education (Pride) Program is to expose high school and undergraduate students to the exciting discovery of scientific inquiry early in their academic training to increase the likelihood they choose to pursue a biomedical career path. The aim of this proposal is to fill the nation's shortage of minority individuals in biomedical research careers. We plan to achieve this objective by offering the student research assistants a ten-week mentored laboratory experience and a well-structured educational enrichment component. Proposed projects for the student includes the genetics of obesity in Hawaii's multi-ethnic populations, autonomic neuropathy, metabolic disorders and alternative medicine, hyperlipidemia and insulin resistance. It is anticipated through the proposed "hands on" laboratory experiences and
enrichment activities the students research environment will be enhanced. Educational activities to develop both the students research capabilities and their interests in pursuing a biomedical career includes orientation week, scientific communication skills, verbal skills training, seminar series in responsible conduct of research, time management, and environmental and health safety training. The primary learning environment will be in the laboratory with a seasoned research mentor. Students will also have the opportunity to interact with junior and senior minority undergraduates at UHM's Haumana Biomedical Program MBRS and MARC U'STAR Program. A common objective of these two programs is to increase the number of underrepresented minorities in the biomedical sciences who choose to pursue the PhD degree. These two well established programs offer Pride program students the opportunity to visit off-campus laboratories, as well as on-campus seminars, workshops, and informal discussions with visiting minority scientists. Hawaii's geographically isolated location heightens the value of such research experiences for the Pride students who will be making decisions on post-high school and post-baccalaureate careers

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- **Project Title: PYRIDOSTIGMINE FOR CONSTIPATION IN PATIENTS W/ AN AUTONOMIC NEUROPATHY**

Principal Investigator & Institution: Bharucha, Adil E.; Mayo Clinic Coll of Medicine, Rochester 200 1St St Sw Rochester, Mn 55905

Timing: Fiscal Year 2002

Summary: Patients with an autonomic neuropathy frequently have severe constipation unresponsive to our current therapeutic armamentarium. We recently demonstrated that i.v. neostigmine increases colonic contractility and transit in healthy volunteers; neostigmine also increased colonic tone and improved symptoms in one patient with autonomic neuropathy and intractable constipation. Pyridostigmine is an acetylcholinesterase inhibitor with higher bioavailability than neostigmine. Hypotheses- 1) In patients with slow transit constipation due to an autonomic neuropathy resulting from diabetes, pure autonomic failure, an immune-mediated process or multiple system atrophy, the acetylcholinesterase inhibitor pyridostigmine is safe, well tolerated, will improve colonic transit and satisfaction with bowel habits, 2) The effect of intravenous neostigmine on colonic tone during a motility study will predict treatment success with pyridostigmine. Aims - To assess the safety, tolerability, effect on symptoms, colonic transit and satisfaction with bowel movements of pyridostigmine in patients with constipation due to an autonomic neuropathy, and to determine if neostigmine's effects on the colonic pressure-volume relationship during a motility study predict the therapeutic response to pyridostigmine. Methods - Open-label, phase II pilot study of an escalating dose of pyridostigmine (60 mg t.i.d. to 180 mg t.i.d) in 10 patients with an autonomic neuropathy and constipation. A two-week run-in single-blind placebo phase will be followed by a 6-week single-blind treatment phase. Standard clinical assessments and a radionuclide whole-gut transit study will be performed at the beginning and end of the study. The effect of i.v. neostigmine on colonic tone and compliance will be assessed prior to the therapeutic trial. Primary endpoints are the effect of pyridostigmine on colonic transit and patient reported satisfaction with bowel movements during the last 2 weeks of the treatment period. Secondary endpoints are derived from the Rome Criteria for constipation (number of stools/week, stool consistency, frequency of straining and incomplete evacuation) and the proximal colonic emptying rate. A total of 10 patients in this pilot study should provide sufficient information to estimate the response magnitude and variability of the quantitative
primary response variable, colonic transit. Significance - A successful therapeutic response in >6/10 patients in this pilot study will lead to an placebo-controlled study of pyridostigmine in a similar patient population and perhaps other patient groups with constipation due to an autonomic neuropathy.

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- Project Title: ROLE OF PICROLIV IN ANGIOGENESIS AND WOUND HEALING
  Principal Investigator & Institution: Maheshwari, Radha K.; Professor of Pathology; Henry M. Jackson Fdn for the Adv Mil/Med Rockville, Md 20852
  Timing: Fiscal Year 2002; Project Start 10-SEP-2001; Project End 31-MAR-2005
  Summary: (APPLICANT'S ABSTRACT): Tissue repair and wound healing are complex processes involving clotting, fibrin-fibronectin deposition, inflammation, re-epithelialization, neovascularization, fibroplasia, and wound contraction. Interactions of different cell types, extracellular matrix proteins and their receptors are involved in these biological significant processes, which are mediated by cytokines and growth factors. In the normal host, wound healing is usually uncomplicated and proceeds at a rapid rate. In contrast, most healing failures are associated with some form of host impairment, including diabetes, infection, immunosuppression, obesity, or malnutrition. Wound healing studies that focus on models of impaired healing, therefore, have greater clinical relevance. Diabetes probably represents the prototype of impaired healing models since multiple factors contribute towards the impairment, including peripheral vascular disease, sensory and autonomic neuropathy, and lowered immunity against infections. Recently, we have shown that treatment with a novel pharmacological agent picroliv, resulted in enhanced proliferation and migration of endothelial cells in an ex-vivo model of angiogenesis. Picroliv treatment also increased expression of growth factors that regulate the angiogenic process. The objective of this proposal is to understand effectiveness and underlying mechanism of angiogenic agent picroliv for the better management of chronic and diabetic wounds. To accomplish this objective, we plan to study the effect of picroliv on the growth of human vein endothelial cells. Cell viability and cytotoxicity studies will include cell morphology and lactate dehydrogenase (LDH) activity. We will examine whether picroliv enhances angiogenesis in an in-vitro and in vivo model of angiogenesis. We will use genetically diabetic mice models of impaired healing for our study. Additionally, it is well known that the anti-inflammatory and immunosuppressive activities of corticosteroids suppress healing. We will therefore use animal models wherein healing has been impaired by treatment with steroids. Several wound healing parameters such as wound width and gap, vessel formation, collagenization, apoptosis will be studied in tissues obtained from these models. The regulation of growth factors viz. TGFb-1, bFGF, PDGF, IGF-1 and adhesion molecules will be examined in the wound tissue by immunohistochemistry, RT-PCR as well as by in situ hybridization. Further, to understand the molecular mechanism of action of picroliv, we will examine the profile of metalloproteinases such as MMP1, MMP9, MMP2, and their tissue inhibitors (TIMPs) in the wound tissue by gelatinography and PCR. We believe that these studies will provide information regarding the mechanism(s) underlying the angiogenic effects of picroliv in better management of chronic wounds.
  Website: http://crisp.cit.nih.gov/crisp/Crisp_Query.Generate_Screen

- Project Title: SYMPATHETIC FUNCTION IN DIABETES
  Principal Investigator & Institution: Randall, David C.; Professor; Physiology; University of Kentucky 109 Kinkead Hall Lexington, Ky 40506
Timing: Fiscal Year 2002; Project Start 30-SEP-2000; Project End 31-AUG-2004

Summary: (Applicant's abstract): We propose to apply our expertise in the measurement, analysis and interpretation of autonomic function to develop an index of autonomic neuropathy and then to use this index to assess the progressive effects of the diabetic state upon sympathetic and parasympathetic regulation of cardiovascular function. The ultimate goal of Specific Aim 1 is to develop a non-invasive index for the early detection and management of diabetic autonomic nervous dysfunction. BP and SNA will be recorded in the unanesthetized, diabetes-prone rat (BBDP), and in age-matched diabetes resistant animals (BBDR), at progressive stages before and during the establishment of diabetic dysautonomia. The dynamic relationship between SNA and arterial BP will be analyzed at each stage, and at each of 5 different controlled combinations of plasma glucose and insulin levels. Modern signal processing algorithms will be used to detect and characterize the effects of diabetes upon the coupling of sympathetic and vascular function. The SNA and BP recordings, and the heart rate (HR) power spectrum will be tested along with classical indices of diabetic neuropathy to substantiate the proposed use of very specific aspects of BP and HR recordings to index the development of autonomic dysfunction. The goal of Specific Aim 2 is to quantify the progressive effects of the development of diabetic neuropathy upon (a) the central nervous control of autonomic function and (b) the sympathetic control of peripheral vascular function. The ameliorative effects of exposure to vitamin E upon central and peripheral autonomic control of cardiovascular function will also be tested. These goals will be possible because: (1) we will implant a telemetry device in the subjects prior to their conversion to a diabetic state and monitor their BP, HR and the indices developed in Aim 1 at regular intervals for up to eight months post-conversion; (2) we will train the rats in an acute stress paradigm and evoke this behavioral response at regular intervals before and after their conversion to a diabetic state. Specific components of the stress response result (a) from a "central command" and (b) from increases in peripheral vascular resistance in response to an increase in SNA. We believe these experiments will help develop better clinical approaches to the control and management of diabetic autonomic neuropathy.

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To generate your own bibliography of studies dealing with autonomic neuropathy, simply go to the PubMed Web site at http://www.ncbi.nlm.nih.gov/pubmed. Type “autonomic neuropathy” (or synonyms) into the search box, and click “Go.” The following is the type of

3 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.
output you can expect from PubMed for autonomic neuropathy (hyperlinks lead to article summaries):

- **A novel method for the assessment of autonomic neuropathy in type 2 diabetic patients: a comparative evaluation of 123I-MIBG myocardial scintigraphy and power spectral analysis of heart rate variability.**
  Author(s): Murata K, Sumida Y, Murashima S, Matsumura K, Takeda H, Nakagawa T, Shima T.

- **Abnormal response to exercise in middle-aged NIDDM patients with and without autonomic neuropathy.**
  Author(s): Radice M, Rocca A, Bedon E, Musacchio N, Morabito A, Segalini G.

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  Author(s): Salo TM, Viikari JS, Antila KJ, Voipio-Pulkki LM, Jalonen JO, Valimaki IA.

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• **Autonomic neuropathy is associated with increased cardiovascular risk factors: the EURODIAB IDDM Complications Study.**

• **Autonomic neuropathy predicts the development of stroke in patients with non-insulin-dependent diabetes mellitus.**
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  Author(s): Poirier P, Bogaty P, Philippon F, Garneau C, Fortin C, Dumesnil JG.  

• Predictive value of cardiac autonomic neuropathy in diabetic patients with or without silent myocardial ischemia.  

• Prerenal azotemia in a diabetic patient with hyporeninemic hypoaldosteronism and autonomic neuropathy.  
  Author(s): Elisaf MS, Tomos PP, Milionis HJ, Siamopoulos KC.  

• Presence of autonomic neuropathy is a poor prognostic indicator in patients with advanced liver disease.  
  Author(s): Fleckenstein JF, Frank S, Thuluvath PJ.  

• Prevalence of central autonomic neuropathy in elderly dialysis patients.  
  Author(s): Jassal SV, Douglas JF, Stout RW.  
• Primary Sjogren's syndrome presenting as autonomic neuropathy. Case report.
  Author(s): Barendregt PJ, Markusse HM, Man In`t Veld AJ.

• Prognostic value of cardiac autonomic neuropathy independent and incremental to perfusion defects in patients with diabetes and suspected coronary artery disease.
  Author(s): Lee KH, Jang HJ, Kim YH, Lee EJ, Choe YS, Choi Y, Lee MG, Lee SH, Kim BT.

• Prospective study of autonomic neuropathy as a predictor of mortality in patients with diabetes.
  Author(s): Wheeler SG, Ahroni JH, Boyko EJ.

• Proximal gastric motor activity in response to a liquid meal in type I diabetes mellitus with autonomic neuropathy.
  Author(s): Samsom M, Roelofs JM, Akkermans LM, van Berge Henegouwen GP, Smout AJ.

• Pupil abnormality in amyloidosis with autonomic neuropathy.
  Author(s): Davies DR, Smith SE.

• Pupil signs of sympathetic autonomic neuropathy in patients with type 1 diabetes.
  Author(s): Pittasch D, Lobmann R, Behrens-Baumann W, Lehnert H.

• QT interval in diabetic autonomic neuropathy.
  Author(s): Jermendy G, Toth L, Voros P, Koltai MZ, Pogatsa G.
• QT interval in diabetic patients with cardiac autonomic neuropathy.
  Author(s): Jermendy G.

• QT interval length and diabetic autonomic neuropathy.
  Author(s): Ewing DJ, Neilson JM.

• QT interval prolongation and sudden cardiac death in diabetic autonomic neuropathy.
  Author(s): Kahn JK, Sisson JC, Vinik AI.

• QT interval prolongation in type 2 (non-insulin-dependent) diabetic patients with cardiac autonomic neuropathy.
  Author(s): Jermendy G, Koltai MZ, Pogatsa G.

• QT interval, autonomic neuropathy, and alcoholic liver disease.
  Author(s): Hendrickse MT.

• QT prolongation on the electrocardiogram in diabetic autonomic neuropathy.
  Author(s): Chambers JB, Sampson MJ, Sprigings DC, Jackson G.

• Quantitation of skin vasomotor control in normal subjects and in diabetic patients with autonomic neuropathy.
  Author(s): Donk AF, Faes TJ, Broere D, van der Veen EA, Bertelsmann FW.
• Quantitative evaluation of diabetic autonomic neuropathy by using heart rate variations: relationship between cardiac parasympathetic or sympathetic damage and clinical conditions.
  Author(s): Oikawa N, Umetsu M, Toyota T, Goto Y.

• Quantitative evaluation of diabetic autonomic neuropathy by using heart rate variations--determination of the normal range for the diagnosis of autonomic neuropathy.
  Author(s): Oikawa N, Umetsu M, Toyota T, Goto Y.

• Reassessment of circadian profile of blood pressure and heart rate in diabetic patients with autonomic neuropathy.
  Author(s): Zoneraich S, Lodha A, Tibaldi J, Hyman RB, Mollura JL.

• Recognizing and treating diabetic autonomic neuropathy.
  Author(s): Vinik AI, Erbas T.

• Reduced gastric emptying and mesenteric blood flow in IDDM with cardiac autonomic neuropathy.
  Author(s): Weck M, Ott P, Matthies K.

• Reduced intraindividual variability of repeated cardiovascular reflex tests: an additional marker of autonomic neuropathy in insulin-dependent (type I) diabetes mellitus?
  Author(s): Kronert K, Luft D, Baumann B, Muller PH, Eggstein M.

• Relationship between autonomic neuropathy, 24-h blood pressure profile, and nephropathy in normotensive IDDM patients.
  Author(s): Spallone V, Gambardella S, Maiello MR, Barini A, Frontoni S, Menzinger G.
• **Relationship between autonomic neuropathy, 24-hr blood pressure and retinopathy in normoalbuminuric and normotensive type 1 diabetic patients.**
  Author(s): Duvnjak L, Vuckovic S, Pepeonik Z, Metelko Z.
  Source: Diabetes Nutr Metab. 2003 April; 16(2): 102-8.

• **Relationship between cardiac autonomic neuropathy and diabetic microangiopathies and macroangiopathy in patients with non-insulin-dependent diabetes mellitus.**

• **Relationship of medial arterial calcinosis to autonomic neuropathy and adverse outcomes in a diabetic veteran population.**
  Author(s): Mayfield JA, Caps MT, Boyko EJ, Ahroni JH, Smith DG.

• **Relative preservation of the renin-angiotensin-aldosterone system response to active orthostatism in type 2 diabetic patients with autonomic neuropathy and postural hypotension.**
  Author(s): Jarmuzewska EA, Ghidoni A, Mangoni AA.

• **Reproducibility and persistence of neural and adrenal autoantibodies in diabetic autonomic neuropathy.**
  Author(s): Cachia MJ, Peakman M, Zanone M, Watkins PJ, Vergani D.

• **Resolution of diabetic autonomic neuropathy.**
  Author(s): Burden ML, Burden AC.
• Retinal blood flow regulation in diabetes mellitus: impaired autoregulation and No detectable effect of autonomic neuropathy using laser doppler velocimetry, computer assisted image analysis, and isometric exercise.
  Author(s): Dumskyj MJ, Kohner EM.

• Risks for sensorimotor peripheral neuropathy and autonomic neuropathy in non-insulin-dependent diabetes mellitus (NIDDM).
  Author(s): Cohen JA, Jeffers BW, Faldut D, Marcoux M, Schrier RW.

• Role of heart rate variability in the early diagnosis of diabetic autonomic neuropathy in children.
  Author(s): Chessa M, Butera G, Lanza GA, Bossone E, Delogu A, De Rosa G, Marietti G, Rosti L, Carminati M.

• Role of vasopressin in 24-hour blood pressure regulation in diabetic patients with autonomic neuropathy.
  Author(s): Monteagudo PT, Gavras H, Gavras I, Kohlmann O Jr, Ribeiro AB, Zanella MT.

• Sensory and autonomic neuropathy in patients with idiopathic slow-transit constipation.
  Author(s): Knowles CH, Scott SM, Wellmer A, Misra VP, Pilot MA, Williams NS, Anand P.

• Severe hypertension induced by the long-acting somatostatin analogue sandostatin LAR in a patient with diabetic autonomic neuropathy.
  Author(s): Pop-Busui R, Chey W, Stevens MJ.
• **Silent coeliac disease is not a cause of autonomic neuropathy in patients with Type 1 diabetes.**
  Author(s): Schmid S, Schnell O, Bonifacio E, Ziegler AG, Hummel M.

• **Silent coronary artery disease in diabetes--a feature of autonomic neuropathy or accelerated atherosclerosis?**
  Author(s): Airaksinen KE.

• **Silent myocardial ischemia and cardiac autonomic neuropathy in diabetics.**
  Author(s): Jalal S, Alai MS, Khan KA, Jan VM, Rather HA, Iqbal K, Tramboo NA, Lone NA, Dar MA, Hayat A, Abbas SM.

• **Sleep-disordered breathing in nonobese diabetic subjects with autonomic neuropathy.**
  Author(s): Bottini P, Dottorini ML, Cristina Cordoni M, Casucci G, Tantucci C.

• **Small-bowel bacterial overgrowth in diabetic subjects is associated with cardiovascular autonomic neuropathy.**
  Author(s): Zietz B, Lock G, Straub RH, Braun B, Scholmerich J, Palitzsch KD.

• **Sympathetic skin responses in hereditary sensory and autonomic neuropathy and familial amyloid neuropathy are different.**
  Author(s): Shivji ZM, Ashby P.

• **System identification of closed-loop cardiovascular control mechanisms: diabetic autonomic neuropathy.**
  Author(s): Mukkamala R, Mathias JM, Mullen TJ, Cohen RJ, Freeman R.
• Terminal changes in hereditary sensory and autonomic neuropathy: a long-term follow-up of a sporadic case.
  Author(s): Lee SS, Lee SH, Han SH.

• The association between cardiovascular autonomic neuropathy and mortality in individuals with diabetes: a meta-analysis.
  Author(s): Maser RE, Mitchell BD, Vinik AI, Freeman R.

• The effect of cardiovascular autonomic neuropathy on resting ECG in type 1 diabetic patients.
  Author(s): Krahulec B, Mikes Z, Balazovjech I.

• The influence of autonomic neuropathy on hypotension during hemodialysis.
  Author(s): Calvo C, Maule S, Mecca F, Quadri R, Martina G, Cavallo Perin P.

• The natural history of recently diagnosed autonomic neuropathy over a period of 2 years.
  Author(s): Karamitsos DT, Didangelos TP, Athyros VG, Kontopoulos AG.

• The natural progression of autonomic neuropathy and autonomic function tests in a cohort of people with IDDM.
  Author(s): Levitt NS, Stansberry KB, Wynchank S, Vinik AI.

• The relationship between QTc interval and cardiac autonomic neuropathy in diabetes mellitus.
  Author(s): Pourmoghaddas A, Hekmatnia A.
• The role of autonomic neuropathy in the genesis of intradialytic hypotension.
  Author(s): Chang MH, Chou KJ.

• The unmasking of hyperreninemic hypovolemia by captopril test in a hypertensive HD patient unaccompanied by autonomic neuropathy.
  Author(s): Kursat S, Ozgur B, Yurtman G.

• Time- and frequency-domain estimation of early diabetic cardiovascular autonomic neuropathy.
  Author(s): Ziegler D, Laude D, Akila F, Elghozi JL.

• Unawareness of hypoglycaemia and inadequate hypoglycaemic counterregulation: no causal relation with diabetic autonomic neuropathy.
  Author(s): Ryder RE, Owens DR, Hayes TM, Ghatei MA, Bloom SR.

• Unawareness of hypoglycaemia in insulin-treated diabetic patients: prevalence and relationship to autonomic neuropathy.
  Author(s): Hepburn DA, Patrick AW, Eadington DW, Ewing DJ, Frier BM.

• Unique hereditary sensory and autonomic neuropathy with growth hormone deficiency.
  Author(s): Liberfarb RM, Jackson AH, Eavey RD, Robb RM.

• Uraemic autonomic neuropathy.
  Author(s): Bartosik-Psujek H, Psujek M, Mitosek-Szewczyk K.
• **Uremic autonomic neuropathy studied by spectral analysis of heart rate.**
  Author(s): Vita G, Bellinghieri G, Trusso A, Costantino G, Santoro D, Monteleone F, Messina C, Savica V.

• **Uremic autonomic neuropathy: evaluation of ephedrine sulphate therapy for hemodialysis-induced hypotension.**
  Author(s): Hirszel P, Martin RH, Mizell MW, Nolph KD.

• **Uremic autonomic neuropathy: recovery following bicarbonate hemodialysis.**
  Author(s): Vita G, Savica V, Milone S, Trusso A, Bellinghieri G, Messina C.

• **Urinary albumin excretion rate is independently related to autonomic neuropathy in type 2 diabetes mellitus.**
  Author(s): Wirta OR, Pasternack AI, Mustonen JT, Laippala PJ, Reinikainen PM.

• **Urinary bladder dysfunction in diabetic children with and without subclinical cardiovascular autonomic neuropathy.**
  Author(s): Barkai L, Szabo L.

• **Use of heart rate reserve and rating of perceived exertion to prescribe exercise intensity in diabetic autonomic neuropathy.**
  Author(s): Colberg SR, Swain DP, Vinik AI.

• **Vagal impairment of gastric secretion in diabetic autonomic neuropathy.**
  Author(s): Hosking DJ, Moody F, Stewart IM, Atkinson M.
• Validation of a computerised measurement system for guided routine evaluation of cardiovascular autonomic neuropathy.

• Valsalva manoeuver as a test of autonomic neuropathy in diabetes mellitus.
  Author(s): Bhatia SG, Sainani GS, Nayak NJ, Diwate PG.

• Variable relationship between peripheral somatic and autonomic neuropathy in patients with different syndromes of diabetic polyneuropathy.
  Author(s): Young RJ, Zhou YQ, Rodriguez E, Prescott RJ, Ewing DJ, Clarke BF.

• Vascular calcification, autonomic neuropathy, and peripheral blood flow in patients with diabetic nephropathy.
  Author(s): Gilbey SG, Walters H, Edmonds ME, Archer AG, Watkins PJ, Parsons V, Grenfell A.

• Vasopressin secretion in diabetic subjects with and without autonomic neuropathy: responses to osmotic and postural stimulation.
  Author(s): Reid W, Ewing DJ, Lightman SL, Eadington D, Williams TD, Roulston JE, Clarke BF.

• Ventilatory response to exercise in diabetic subjects with autonomic neuropathy.
  Author(s): Tantucci C, Bottini P, Dottorini ML, Puxeddu E, Casucci G, Scionti L, Sorbini CA.
• Vestibular and ventilatory dysfunction in sensory and autonomic neuropathy associated with primary Sjögren's syndrome.
   Author(s): McCombe PA, Sheean GL, McLaughlin DB, Pender MP.

   Author(s): Orchard TJ, Lloyd CE, Maser RE, Kuller LH.
CHAPTER 2. NUTRITION AND AUTONOMIC NEUROPATHY

Overview

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

Finding Nutrition Studies on Autonomic Neuropathy

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

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

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

4 Adapted from http://ods.od.nih.gov. IBIDS is produced by the Office of Dietary Supplements (ODS) at the National Institutes of Health to assist the public, healthcare providers, educators, and researchers in locating credible, scientific information on dietary supplements. IBIDS was developed and will be maintained through an interagency partnership with the Food and Nutrition Information Center of the National Agricultural Library, U.S. Department of Agriculture.
The following is a typical result when searching for recently indexed consumer information on autonomic neuropathy:

- **Effects of treatment with the antioxidant alpha-lipoic acid on cardiac autonomic neuropathy in NIDDM patients. A 4-month randomized controlled multicenter trial (DEKAN Study). Deutsche Kardiale Autonome Neuropathie.**
  Author(s): Diabetes-Forschungsinstitut an der Heinrich-Heine-Universitat, Dusseldorf, Germany.

The following information is typical of that found when using the “Full IBIDS Database” to search for “autonomic neuropathy” (or a synonym):

- **A non-invasive approach to cardiac autonomic neuropathy in patients with diabetes mellitus.**
  Author(s): Department of Pathophysiology, Medical Academy of Magdeburg, GDR.

- **Amelioration of autonomic neuropathy by methylcobalamin in uremics on hemodialysis.**

- **An approach to the detection of autonomic neuropathy by use of signal-averaged electrocardiography.**
  Author(s): Division of Cardiology, Osaka Prefectural Hospital, Japan.

- **Apparent improvement in diabetic autonomic neuropathy induced by captopril.**
  Author(s): Department of Medicine, City Hospital, Nottingham, UK.

- **Effect of erythromycin on gallbladder emptying in diabetic patients with and without autonomic neuropathy and high levels of motilin.**
  Author(s): Istituto di Gastroenterologia ed Endoscopia Digestiva, Universita di Perugia, Italy.
  Source: Fiorucci, S Scionti, L Bosso, R Desando, A Bottini, P Marino, C Morelli, A Dig-Dis-Sci. 1992 November; 37(11): 1671-7 0163-2116

- **Improvement of autonomic neuropathy after mecobalamin treatment in uremic patients on hemodialysis.**
  Author(s): Second Department of Internal Medicine, Kobe University School of Medicine, Japan.

- **The effectiveness of treatments of diabetic autonomic neuropathy is not the same in autonomic nerves supplying different organs.**
  Author(s): Department of Anatomy and Developmental Biology, Autonomic Neuroscience Institute, Royal Free and University College Medical School, London, U.K.
• The effects of myoinositol on the autonomic neuropathy in the streptozotocin diabetic rat—a freeze fracture study.
  Author(s): Muttart-Collip Memorial E.M. Laboratory, Department of Medicine, University of Alberta, Edmonton, Canada.

Federal Resources on Nutrition

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

• healthfinder®, HHS’s gateway to health information, including diet and nutrition: http://www.healthfinder.gov/scripts/SearchContext.asp?topic=238&page=0

• The United States Department of Agriculture’s Web site dedicated to nutrition information: www.nutrition.gov

• The Food and Drug Administration’s Web site for federal food safety information: www.foodsafety.gov

• The National Action Plan on Overweight and Obesity sponsored by the United States Surgeon General: http://www.surgeongeneral.gov/topics/obesity/

• The Center for Food Safety and Applied Nutrition has an Internet site sponsored by the Food and Drug Administration and the Department of Health and Human Services: http://vm.cfsan.fda.gov/

• Center for Nutrition Policy and Promotion sponsored by the United States Department of Agriculture: http://www.usda.gov/cnpp/

• Food and Nutrition Information Center, National Agricultural Library sponsored by the United States Department of Agriculture: http://www.nal.usda.gov/fnic/

• Food and Nutrition Service sponsored by the United States Department of Agriculture: http://www.fns.usda.gov/fns/

Additional Web Resources

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

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

• Family Village: http://www.familyvillage.wisc.edu/med_nutrition.html

• Google: http://directory.google.com/Top/Health/Nutrition/

• Healthnotes: http://www.healthnotes.com/

• Open Directory Project: http://dmoz.org/Health/Nutrition/

• Yahoo.com: http://dir.yahoo.com/Health/Nutrition/

• WebMD®Health: http://my.webmd.com/nutrition

• WholeHealthMD.com: http://www.wholehealthmd.com/reflib/0,1529,00.html
The following is a specific Web list relating to autonomic neuropathy; 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:

- **Food and Diet**

  **Diabetes**
  
  Source: Healthnotes, Inc.; www.healthnotes.com
CHAPTER 3. ALTERNATIVE MEDICINE AND AUTONOMIC NEUROPATHY

Overview

In this chapter, we will begin by introducing you to official information sources on complementary and alternative medicine (CAM) relating to autonomic neuropathy. 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 autonomic neuropathy 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 “autonomic neuropathy” (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 autonomic neuropathy:

- A pilot study on the influence of a corticotropin (4-9) analogue on Vinca alkaloid-induced neuropathy.
  Author(s): van Kooten B, van Diemen HA, Groenhout KM, Huijgens PC, Ossenkoppele GJ, Nauta JJ, Heimans JJ.

- Acute encephalopathy associated with continuous vincristine sulfate combination therapy: case report.
  Author(s): Scheithauer W, Ludwig H, Maida E.
• Alterations in reflex function contributing to syncope: orthostatic hypotension, carotid sinus hypersensitivity and drug-induced dysfunction.
  Author(s): Hopson JR, Rea RF, Kienzle MG.

• Amsacrine and etoposide induced paralytic ileus in a patient with acute myelomonocytic leukemia.
  Author(s): Kucuk O, Apostol JV.

• Asystolic cardiac arrest: an unusual reaction following iv metoclopramide.
  Author(s): Grenier Y, Drolet P.

• Autonomic neuropathy after treatment with cisplatin, vinblastine, and bleomycin for germ cell cancer.
  Author(s): Hansen SW.

• Autonomic neuropathy following treatment with flavone acetic acid.
  Author(s): Lewis CR, Jardine A, Rankin EM, Kaye SB.

• Autonomic neuropathy in a diabetic patient with renal failure.
  Author(s): Ciccarelli LL, Ford CM, Tsueda K.

• Autonomic neuropathy in Type 2 diabetic patients is associated with hyperinsulinaemia and hypertriglyceridaemia.
  Author(s): Gottsater A, Ahmed M, Fernlund P, Sundkvist G.
• Autonomic neuropathy predicts deterioration in glomerular filtration rate in patients with IDDM.
  Author(s): Sundkvist G, Lilja B.

• Carboplatin and vinorelbine in untreated locally advanced and metastatic non-small cell lung cancer.
  Author(s): Horvath L, Boyer M, Clarke S, Beale P, Beith J, Underhill C, Stockler M, Bishop J.

• Chemotherapy-induced peripheral neuropathy.
  Author(s): Quasthoff S, Hartung HP.

• Chronic fatigue syndrome: a literature review from a physiatric perspective.
  Author(s): Jain SS, DeLisa JA.

• Cisplatin-induced gastric paresis.
  Author(s): Cohen SC, Mollman JE.

• Clinical and electrophysiological studies in vincristine induced neuropathy.
  Author(s): Pal PK.

• Clinical and laboratory profile of diabetes in elderly.
  Author(s): Singh NP, Pugazhendhi V, Das AK, Prakash A, Agarwal SK.

• Comparison of the microvascular response to transcutaneous electrical nerve stimulation and postocclusive ischemia in the diabetic foot.
  Author(s): Forst T, Pfutzner A, Bauersachs R, Arin M, Bach B, Biehlmaier H, Kustner E, Beyer J.
• **Diabetic neuropathy: an intensive review.**
  Author(s): Duby JJ, Campbell RK, Setter SM, White JR, Rasmussen KA.

• **Discordance in the development of peripheral and autonomic neuropathy during vincristine therapy.**
  Author(s): Lahtinen R, Koponen A, Mustonen J, Soppi E, Lansimies E, Nousiainen T, Lahtinen R.

• **Disorders of colonic motility in patients with diabetes mellitus.**
  Author(s): Battle WM, Cohen JD, Snape WJ Jr.

• **Docetaxel and autonomic cardiovascular control in anthracycline treated breast cancer patients.**
  Author(s): Ekholm E, Rantanen V, Bergman M, Vesalainen R, Antila K, Salminen E.

• **Effect of hyperbaric oxygen on ophthalmic artery blood velocity in patients with diabetic neuropathy.**
  Author(s): Okamoto N, Nishimura Y, Goami K, Harino S.

• **Effects of sorbinil, dietary myo-inositol supplementation, and insulin on resolution of neuroaxonal dystrophy in mesenteric nerves of streptozocin-induced diabetic rats.**
  Author(s): Schmidt RE, Plurad SB, Coleman BD, Williamson JR, Tilton RG.

• **Endogenous cyclo-oxygenase substrates mediate the neuroactivity of evening primrose oil in rats.**
  Author(s): Julu PO, Gow JW, Jamal GA.
• **Glomerular filtration rate, autonomic nerve function, and orthostatic blood pressure in patients with diabetes mellitus.**
  Author(s): Lilja B, Nosslin B, Bergstrom B, Sundkvist G.

• **Incapacitating autonomic neuropathy precipitated by taxol.**
  Author(s): Jerian SM, Sarosy GA, Link CJ Jr, Fingert HJ, Reed E, Kohn EC.

• **Increased intestinal permeability as a cause of fluctuating postprandial blood glucose levels in Type 1 diabetic patients.**
  Author(s): Damci T, Nuhoglu I, Devranoglu G, Osar Z, Demir M, Ilkova H.

• **Licorice ameliorates postural hypotension caused by diabetic autonomic neuropathy.**
  Author(s): Basso A, Dalla Paola L, Erle G, Boscaro M, Armanini D.

• **Nerve growth factor prevents neurotoxic effects of cisplatin, vincristine and taxol, on adult rat sympathetic ganglion explants in vitro.**
  Author(s): Hayakawa K, Sobue G, Itoh T, Mitsuma T.

• **Neurologic manifestations of podophyllin toxicity.**
  Author(s): Filley CM, Graff-Richard NR, Lacy JR, Heitner MA, Earnest MP.

• **Neurological complications of antineoplastic therapy.**
  Author(s): Shapiro WR, Young DF.
• **Overdosage with vincristine.**
  Author(s): Kaufman IA, Kung FH, Koenig HM, Giammona ST.

• **Paclitaxel changes sympathetic control of blood pressure.**
  Author(s): Ekholm E, Rantanen V, Antila K, Salminen E.

• **Peripheral neurotoxicity of taxol in patients previously treated with cisplatin.**

• **Prevalence of microvascular and neurologic abnormalities in a population of diabetic children.**
  Author(s): Karavanaki K, Baum JD.

• **Quantitative noninvasive electrophysiological evaluation of the activity of the cutaneous division of the sympathetic nervous system.**
  Author(s): Ionescu-Tirgoviste C, Pruna S.

• **Recovery of hypoglycaemia-associated compromised cerebral function after a short interval of euglycaemia in insulin-dependent diabetic patients.**
  Author(s): Lingenfelser T, Buettner UW, Uhl H, Renn W, Tobis M, Teichmann R, Eggstein M, Jakober B.

• **Signs of autonomic neuropathy in childhood uremia.**
  Author(s): Tory K, Sallay P, Toth-Heyn P, Szabo A, Szabo A, Tulassay T, Reusz GS.
• The effectiveness of treatments of diabetic autonomic neuropathy is not the same in autonomic nerves supplying different organs.
  Author(s): Shotton HR, Clarke S, Lincoln J.

• Vinca alkaloid-induced cardiovascular autonomic neuropathy.
  Author(s): Roca E, Bruera E, Politi PM, Barugel M, Cedaro L, Carraro S, Chacon RD.

• Vincristine-induced autonomic neuropathy.
  Author(s): Hancock BW, Naysmith A.

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/
• 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 autonomic neuropathy; 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**

  *Diabetes*
  
  Source: Prima Communications, Inc.  [www.personalhealthzone.com](http://www.personalhealthzone.com)

- **Herbs and Supplements**

  *Alpha Lipoic Acid*
  
  Source: Healthnotes, Inc.; [www.healthnotes.com](http://www.healthnotes.com)

  *Alpha-Lipoic Acid*
  
  Source: Integrative Medicine Communications; [www.drkoop.com](http://www.drkoop.com)

  *Glycyrrhiza*
  
  Alternative names: Licorice; Glycyrrhiza glabra L.
  
  Source: Alternative Medicine Foundation, Inc.; [www.amfoundation.org](http://www.amfoundation.org)

  *Lipoic Acid*
  
  Source: Prima Communications, Inc.  [www.personalhealthzone.com](http://www.personalhealthzone.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](http://www.nlm.nih.gov/medlineplus/alternativemedicine.html). This Web site provides a general overview of various topics and can lead to a number of general sources.
CHAPTER 4. BOOKS ON AUTONOMIC NEUROPATHY

Overview

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

Book Summaries: Federal Agencies

The Combined Health Information Database collects various book abstracts from a variety of healthcare institutions and federal agencies. To access these summaries, go directly to the following hyperlink: http://chid.nih.gov/detail/detail.html. You will need to use the “Detailed Search” option. To find book summaries, use the drop boxes at the bottom of the search page where “You may refine your search by.” Select the dates and language you prefer. For the format option, select “Monograph/Book.” Now type “autonomic neuropathy” (or synonyms) into the “For these words:” box. You should check back periodically with this database which is updated every three months. The following is a typical result when searching for books on autonomic neuropathy:

- Diabetic Neuropathy
  Summary: If one considers the unpleasant, painful sensory and muscle wasting syndromes, problems of the neuropathic foot, and the significant contribution to the development of impotence, then diabetic neuropathy must be regarded as the single most common clinical problem associated with complications of diabetes. This symposium report covers all aspects of current research on diabetic neuropathies. Seventy-one chapters are divided into eight sections: an introduction; morphology of human and animal nerve; aldose reductase; vascular factors in diabetic neuropathy; measurement, quantitation, and clinical assessment; autonomic neuropathy; other
potential treatments of diabetic neuropathy; and the diabetic foot. Each chapter includes numerous tables, figures, and references for additional research. A detailed subject index is appended.

- **Type I Diabetes: Etiology and Treatment**


  Contact: Available from Humana Press. 999 Riverview Drive, Suite 208, Totowa, NJ 07512. (973) 256-1699. Fax (973) 256-8341. E-mail: Humana@Humanapr.com. Website: www.humanapress.com. PRICE: $130.50; plus shipping and handling. ISBN: 896039315.

  Summary: The increasing incidence of diabetes worldwide has prompted a rapid growth in the pace of scientific discovery and clinical understanding of this disease. In this book, well-recognized physicians and researchers review the latest thinking about the causes of type 1 diabetes and the best approaches to treating both its acute and chronic complications. The book includes 32 chapters in four sections: etiology (cause), treatment, special management issues, and long-term complications. Specific topics include epidemiology, genetics, prediction and prevention of type 1 diabetes, beta-cell destruction by autoimmune processes, the metabolic basis of insulin secretion, prevention and correction of hypoglycemia, nonautoimmune forms of diabetes, diabetic ketoacidosis, insulin regimens, relationship between metabolic control and complications, insulin delivery systems and glucose sensors, patient and family education, nutritional management, management of diabetes in very young children, children, adolescents, hypoglycemia, pregnancy, surgery for the patient with type 1 diabetes, diabetic retinopathy (eye disease), diabetic nephropathy (kidney disease), diabetic peripheral and **autonomic neuropathy** (nerve disease), the diabetic foot, atherosclerosis in type 1 diabetes, cutaneous (skin) complications, infection and diabetes, pancreas transplantation, islet transplantation, beta cell replacement therapy, and islet growth factors. Each chapter concludes with a list of references and a subject index concludes the textbook.

- **Diabetes Annual/6**


  Summary: This annual publication reviews recent developments in all the major areas of diabetes research. Synthesized by experts in the field, each review focuses on a specific topic, including the epidemiology of diabetes mellitus and related disorders; the immunology of insulin-dependent diabetes mellitus (IDDM); the etiology of noninsulin-dependent diabetes mellitus (NIDDM); diabetes in tropical developing countries; the molecular genetics of diabetes; trends in the dietary management of diabetes mellitus; the sulfonylureas; insulin injection therapy; diabetes and exercise; diabetes education; computers in diabetes care; pregnancy; pancreatic transplantation; the development of implantable amperometric glucose sensors; diabetic nephropathy; **autonomic neuropathy**; obesity, insulin resistance and diabetes; non-enzymatic glycosylation; hyperglycemic emergencies; proinsulin; plasma lipids and lipoproteins; macroangiopathy; insulin secretion in vitro; insulin infusion devices; hyperglycemia in IDDM; growth hormone and insulin-like growth factor I in experimental and human diabetes; glucose transport in muscle and fat; ketone body metabolism; and progress in
the understanding of diabetes through study of its pathogenesis in animal models. 3272 references.

Chapters on Autonomic Neuropathy

In order to find chapters that specifically relate to autonomic neuropathy, an excellent source of abstracts is the Combined Health Information Database. You will need to limit your search to book chapters and autonomic neuropathy 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 “autonomic neuropathy” (or synonyms) into the “For these words:” box. The following is a typical result when searching for book chapters on autonomic neuropathy:

- **Diabetic Peripheral and Autonomic Neuropathy**


  Contact: Available from Humana Press Inc. 999 Riverview Drive, Suite 208, Totowa, NJ 07512. (973) 256-1699. Fax (973) 256-8341. E-mail: Humana@Humanapr.com. Website: www.humanapress.com. PRICE: $165.00; plus shipping and handling. ISBN: 896039315.

  Summary: Several distinct syndromes affecting the peripheral nervous system occur in patients with diabetes. This chapter focuses on the two most common neuropathic complications, diabetic polyneuropathy (DPN) and diabetic **autonomic neuropathy** (DAN), with a short discussion of polyradiculopathy and mononeuropathies. The pathogenesis, diagnosis, epidemiology, and treatment of DPN and DAN are addressed, with an emphasis, when possible on patients with type 1 diabetes. This chapter is from a book in which well-recognized physicians and researchers review the latest thinking about the causes of type 1 diabetes and the best approaches to treating both its acute and chronic complications. Topics covered in this chapter include gastrointestinal **autonomic neuropathy**, genitourinary **autonomic neuropathy**, abnormal pupillary function, peripheral autonomic denervation, defective glucose counterregulation, cardiovascular **autonomic neuropathy**, postural hypotension, cardiac denervation syndrome, gustatory sweating, orthostatic hypotension, and cardiorespiratory arrest. 4 tables. 166 references.
CHAPTER 5. MULTIMEDIA ON AUTONOMIC NEUROPATHY

Overview

In this chapter, we show you how to keep current on multimedia sources of information on autonomic neuropathy. We start with sources that have been summarized by federal agencies, and then show you how to find bibliographic information catalogued by the National Library of Medicine.

Video Recordings

An excellent source of multimedia information on autonomic neuropathy is the Combined Health Information Database. You will need to limit your search to “Videorecording” and “autonomic neuropathy” using the “Detailed Search” option. Go directly to the following hyperlink: http://chid.nih.gov/detail/detail.html. To find video productions, 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 “Videorecording (videotape, videocassette, etc.).” Type “autonomic neuropathy” (or synonyms) into the “For these words:” box. The following is a typical result when searching for video recordings on autonomic neuropathy:

- Feet First Video
  Contact: Available from Pennsylvania Diabetes Academy. 777 East Park Drive, P.O. Box 8820, Harrisburg, PA 17105-8820. (717) 558-7750 ext. 1271. Fax (717) 558-7818. E-mail: info@padiabetes.org. PRICE: $14.95.
  Summary: This videotape program is designed to encourage older people with diabetes to take an active part in their own daily foot care, in the interest of preventing foot complications. The videotape is animated with cartoon drawings, depicting older people. The program covers the physiology of cells and how both diabetes and aging can impact the circulation system, particularly that affecting the feet. The program emphasizes that proper foot care can prevent most foot and leg amputations. The program outlines the different ways that diabetic complications, such as peripheral neuropathy and autonomic neuropathy, can affect the feet, causing changes in foot size
Autonomic Neuropathy

and shape, and causing some reflexes to be lost, including those for hot, cold, and pain. Signs of circulation problems in the feet including cramps (particularly pain upon resting), cold feet, a pale, shiny, purple or puffy appearance, cuts and bruises that heal slowly, feet looking dry and cracked, toenails thickened or infected, and corns or callouses. The program then describes ways to prevent foot problems related to pressure, cold or hot, smoking, breaks in the skin, or infection. Viewers are encouraged to inspect their feet daily, to wear clean socks, to test water temperatures before bathing feet, to treat corns and callouses, to properly care for toenails, and to wear shoes that fit. The program concludes with a list of what not to do.
CHAPTER 6. PERIODICALS AND NEWS ON AUTONOMIC NEUROPATHY

Overview

In this chapter, we suggest a number of news sources and present various periodicals that cover autonomic neuropathy.

News Services and Press Releases

One of the simplest ways of tracking press releases on autonomic neuropathy is to search the news wires. In the following sample of sources, we will briefly describe how to access each service. These services only post recent news intended for public viewing.

PR Newswire

To access the PR Newswire archive, simply go to http://www.prnewswire.com/. Select your country. Type “autonomic neuropathy” (or synonyms) into the search box. You will automatically receive information on relevant news releases posted within the last 30 days. The search results are shown by order of relevance.

Reuters Health

The Reuters’ Medical News and Health eLine databases can be very useful in exploring news archives relating to autonomic neuropathy. While some of the listed articles are free to view, others are available for purchase for a nominal fee. To access this archive, go to http://www.reutershealth.com/en/index.html and search by “autonomic neuropathy” (or synonyms). The following was recently listed in this archive for autonomic neuropathy:

- **Pupillary signs reflect sympathetic autonomic neuropathy in diabetic patients**
  Source: Reuters Medical News
  Date: October 02, 2002
• Early treatment of diabetic autonomic neuropathy may improve patient outcome  
Source: Reuters Medical News  
Date: August 10, 2001

• Pulse Oximetry Detects Autonomic Neuropathy In Diabetics  
Source: Reuters Medical News  
Date: March 20, 1997

The NIH


Business Wire

Business Wire is similar to PR Newswire. To access this archive, simply go to [http://www.businesswire.com/](http://www.businesswire.com/). You can scan the news by industry category or company name.

Market Wire

Market Wire is more focused on technology than the other wires. To browse the latest press releases by topic, such as alternative medicine, biotechnology, fitness, healthcare, legal, nutrition, and pharmaceuticals, access Market Wire’s Medical/Health channel at [http://www.marketwire.com/mw/release_index?channel=MedicalHealth](http://www.marketwire.com/mw/release_index?channel=MedicalHealth). Or simply go to Market Wire’s home page at [http://www.marketwire.com/mw/home](http://www.marketwire.com/mw/home), type “autonomic neuropathy” (or synonyms) into the search box, and click on “Search News.” As this service is technology oriented, you may wish to use it when searching for press releases covering diagnostic procedures or tests.

Search Engines

Medical news is also available in the news sections of commercial Internet search engines. See the health news page at Yahoo ([http://dir.yahoo.com/Health/News_and_Media/](http://dir.yahoo.com/Health/News_and_Media/)), or you can use this Web site’s general news search page at [http://news.yahoo.com/](http://news.yahoo.com/). Type in “autonomic neuropathy” (or synonyms). If you know the name of a company that is relevant to autonomic neuropathy, you can go to any stock trading Web site (such as [http://www.etrade.com/](http://www.etrade.com/)) and search for the company name there. News items across various news sources are reported on indicated hyperlinks. Google offers a similar service at [http://news.google.com/](http://news.google.com/).
BBC

Covering news from a more European perspective, the British Broadcasting Corporation (BBC) allows the public free access to their news archive located at http://www.bbc.co.uk/. Search by “autonomic neuropathy” (or synonyms).

Newsletter Articles

Use the Combined Health Information Database, and limit your search criteria to “newsletter articles.” Again, you will need to use the “Detailed Search” option. Go directly to the following hyperlink: http://chid.nih.gov/detail/detail.html. Go to the bottom of the search page where “You may refine your search by.” Select the dates and language that you prefer. For the format option, select “Newsletter Article.” Type “autonomic neuropathy” (or synonyms) into the “For these words:” box. You should check back periodically with this database as it is updated every three months. The following is a typical result when searching for newsletter articles on autonomic neuropathy:

- **Diabetic Cardiovascular Autonomic Neuropathy**
  
  
  Contact: Available from Excerpta Medica. P.O. Box 1126, 1000 BC Amsterdam, The Netherlands.

  Summary: This article reviews cardiovascular autonomic neuropathy (CAN), a serious complication of diabetes. CAN is associated with a poor prognosis and may result in severe postural hypotension, exercise intolerance, enhanced intraoperative instability, and possibly an increased incidence of silent myocardial infarction and ischemia. The author discusses the classification of CAN and its prognosis, clinical features, diagnostic assessment, epidemiology, and treatment. The author stresses that the most important therapeutic measure is achievement of the best possible glycemic control. The success of any treatment depends on the severity of CAN, and the best preventive results can be expected when measures are instituted during the early asymptomatic stages of the complication. References are available by request. 1 figure. 1 table. (AA-M).

Academic Periodicals covering Autonomic Neuropathy

Numerous periodicals are currently indexed within the National Library of Medicine’s PubMed database that are known to publish articles relating to autonomic neuropathy. In addition to these sources, you can search for articles covering autonomic neuropathy that have been published by any of the periodicals listed in previous chapters. To find the latest studies published, go to http://www.ncbi.nlm.nih.gov/pubmed, type the name of the periodical into the search box, and click “Go.”

If you want complete details about the historical contents of a journal, you can also visit the following Web site: http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi. Here, type in the name of the journal or its abbreviation, and you will receive an index of published articles. At http://locatorplus.gov/, you can retrieve more indexing information on medical periodicals (e.g. the name of the publisher). Select the button “Search LOCATORplus.” Then type in the name of the journal and select the advanced search option “Journal Title Search.”
CHAPTER 7. RESEARCHING MEDICATIONS

Overview

While a number of hard copy or CD-ROM resources are available for researching medications, a more flexible method is to use Internet-based databases. Broadly speaking, there are two sources of information on approved medications: public sources and private sources. We will emphasize free-to-use public sources.

U.S. Pharmacopeia

Because of historical investments by various organizations and the emergence of the Internet, it has become rather simple to learn about the medications recommended for autonomic neuropathy. One such source is the United States Pharmacopeia. In 1820, eleven physicians met in Washington, D.C. to establish the first compendium of standard drugs for the United States. They called this compendium the U.S. Pharmacopeia (USP). Today, the USP is a non-profit organization consisting of 800 volunteer scientists, eleven elected officials, and 400 representatives of state associations and colleges of medicine and pharmacy. The USP is located in Rockville, Maryland, and its home page is located at http://www.usp.org/. The USP currently provides standards for over 3,700 medications. The resulting USP DI® Advice for the Patient® can be accessed through the National Library of Medicine of the National Institutes of Health. The database is partially derived from lists of federally approved medications in the Food and Drug Administration’s (FDA) Drug Approvals database, located at http://www.fda.gov/cder/da/da.htm.

While the FDA database is rather large and difficult to navigate, the Pharmacopeia is both user-friendly and free to use. It covers more than 9,000 prescription and over-the-counter medications. To access this database, simply type the following hyperlink into your Web browser: http://www.nlm.nih.gov/medlineplus/druginformation.html. To view examples of a given medication (brand names, category, description, preparation, proper use, precautions, side effects, etc.), simply follow the hyperlinks indicated within the United States Pharmacopeia (USP).

Below, we have compiled a list of medications associated with autonomic neuropathy. If you would like more information on a particular medication, the provided hyperlinks will direct you to ample documentation (e.g. typical dosage, side effects, drug-interaction risks,
The following drugs have been mentioned in the Pharmacopeia and other sources as being potentially applicable to autonomic neuropathy:

**Bethanechol**
- **Systemic - U.S. Brands:** Duvoid; Urabeth; Urecholine
  

**Fludrocortisone**
- **Systemic - U.S. Brands:** Florinef
  

### Commercial Databases

In addition to the medications listed in the USP above, a number of commercial sites are available by subscription to physicians and their institutions. Or, you may be able to access these sources from your local medical library.

**Mosby’s Drug Consult™**

Mosby’s Drug Consult™ database (also available on CD-ROM and book format) covers 45,000 drug products including generics and international brands. It provides prescribing information, drug interactions, and patient information. Subscription information is available at the following hyperlink: [http://www.mosbysdrugconsult.com/](http://www.mosbysdrugconsult.com/).

**PDRhealth**

The PDRhealth database is a free-to-use, drug information search engine that has been written for the public in layman’s terms. It contains FDA-approved drug information adapted from the Physicians’ Desk Reference (PDR) database. PDRhealth can be searched by brand name, generic name, or indication. It features multiple drug interactions reports. Search PDRhealth at [http://www.pdrhealth.com/drug_info/index.html](http://www.pdrhealth.com/drug_info/index.html).

**Other Web Sites**

Drugs.com ([www.drugs.com](http://www.drugs.com)) reproduces the information in the Pharmacopeia as well as commercial information. You may also want to consider the Web site of the Medical Letter, Inc. ([http://www.medletter.com/](http://www.medletter.com/)) which allows users to download articles on various drugs and therapeutics for a nominal fee.

If you have any questions about a medical treatment, the FDA may have an office near you. Look for their number in the blue pages of the phone book. You can also contact the FDA through its toll-free number, 1-888-INFO-FDA (1-888-463-6332), or on the World Wide Web at [www.fda.gov](http://www.fda.gov).
APPENDICES
APPENDIX A. PHYSICIAN RESOURCES

Overview

In this chapter, we focus on databases and Internet-based guidelines and information resources created or written for a professional audience.

NIH Guidelines

Commonly referred to as “clinical” or “professional” guidelines, the National Institutes of Health publish physician guidelines for the most common diseases. Publications are available at the following by relevant Institute:

- 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 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 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/

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. 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:

- **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](http://www.nlm.nih.gov/databases/databases_bioethics.html)


- **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](http://www.nlm.nih.gov/databases/databases_population.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](http://www.nlm.nih.gov/databases/alerts/clinical_alerts.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](http://www.nlm.nih.gov/databases/databases_medline.html)

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Autonomic Neuropathy

- **Toxicology and Environmental Health Information (TOXNET):** Databases covering toxicology and environmental health: [http://sis.nlm.nih.gov/Tox/ToxMain.html](http://sis.nlm.nih.gov/Tox/ToxMain.html)

**The NLM Gateway**

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. To use the NLM Gateway, simply go to the search site at [http://gateway.nlm.nih.gov/gw/Cmd](http://gateway.nlm.nih.gov/gw/Cmd). Type “autonomic neuropathy” (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**

<table>
<thead>
<tr>
<th>Category</th>
<th>Items Found</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Articles</td>
<td>3608</td>
</tr>
<tr>
<td>Books / Periodicals / Audio Visual</td>
<td>6</td>
</tr>
<tr>
<td>Consumer Health</td>
<td>837</td>
</tr>
<tr>
<td>Meeting Abstracts</td>
<td>6</td>
</tr>
<tr>
<td>Other Collections</td>
<td>110</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4567</strong></td>
</tr>
</tbody>
</table>

**HSTAT**

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

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9 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).


12 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

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. 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. 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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14 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.
15 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 autonomic neuropathy 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 autonomic neuropathy. 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 autonomic neuropathy. 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 “autonomic neuropathy”:
Degenerative Nerve Diseases

Diabetic Nerve Problems

Neurologic Diseases

Peripheral Nerve Disorders

You may also choose to use the search utility provided by MEDLINEplus at the following Web address: http://www.nlm.nih.gov/medlineplus/. Simply type a keyword into the search box and click “Search.” This utility is similar to the NIH search utility, with the exception that it only includes materials that are linked within the MEDLINEplus system (mostly patient-oriented information). It also has the disadvantage of generating unstructured results. We recommend, therefore, that you use this method only if you have a very targeted search.

The Combined Health Information Database (CHID)

CHID Online is a reference tool that maintains a database directory of thousands of journal articles and patient education guidelines on autonomic neuropathy. CHID offers summaries that describe the guidelines available, including contact information and pricing. CHID’s general Web site is http://chid.nih.gov/. To search this database, go to http://chid.nih.gov/detail/detail.html. In particular, you can use the advanced search options to look up pamphlets, reports, brochures, and information kits. The following was recently posted in this archive:

• Diabetic Neuropathies: The Nerve Damage of Diabetes

Contact: Available from National Diabetes Information Clearinghouse (NDIC). 1 Information Way, Bethesda, MD 20892-3560. (800) 860-8747 or (301) 654-3327. Fax (301) 634-0716. E-mail: ndic@info.niddk.nih.gov. Also available at http://www.niddk.nih.gov/. PRICE: Full-text available online at no charge; $5.00 for package of 25. Order number: 02-3185.

Summary: Diabetic neuropathies are a family of nerve disorders caused by diabetes. Neuropathies lead to numbness and sometimes pain and weakness in the hands, arms, feet, and legs. Problems may also occur in every organ system, including the digestive tract, heart, and sex organs. People with diabetes can develop nerve problems at any time, but the longer a person has diabetes, the greater the risk. This fact sheet reviews diabetic neuropathies. Topics include causes, symptoms, the different types of diabetic neuropathy, peripheral neuropathy, autonomic neuropathy, proximal neuropathy, focal neuropathy, diagnosis and diagnostic tests used to confirm neuropathies, treatment options, foot care, and pain relief. One additional section briefly reports on future research projects in this area. The fact sheet concludes with a brief description of the goals and activities of the National Diabetes Information Clearinghouse (NDIC) and a list of resource organizations through which readers can obtain additional information.
• **Fighting Long-Term Complications**


Contact: Available from Joslin Diabetes Center. One Joslin Place, Boston, MA 02215. (800) 344-4501 or (508) 583-3240. Fax (617) 732-2562. Website: www.joslin.harvard.edu. PRICE: $34.00 for package of 10; plus shipping and handling. Order number JDC140.

Summary: This booklet provides people who have diabetes with information on the long-term complications of diabetes, including eye, kidney, foot, nerve, and cardiovascular problems. The booklet discusses the importance of the hemoglobin A1c test for determining overall diabetes control. This is followed by an examination of specific complications and ways to prevent and treat them. Eye diseases associated with diabetes include glaucoma, cataract, retinopathy, macular edema, and vitreous hemorrhages. Some of the more common complications of diabetes that can affect the kidneys include urinary tract infections, nonfunctioning bladder, and nephropathy. Treatment for advanced kidney disease includes hemodialysis and peritoneal dialysis and kidney transplantation. Nerve damage caused by diabetes is called neuropathy. Types of neuropathy include sensory and **autonomic neuropathy**. Sensory neuropathy, which usually affects the extremities, results in a loss of feeling in affected parts of the body. **Autonomic neuropathy** affects involuntary nerves in the body, including nerves that control the actions of the stomach, intestine, esophagus, bladder, penis, and the circulatory system. Methods of treating neuropathy include pain relievers, antidepressants, and pain management techniques. Cardiovascular diseases associated with diabetes include heart disease. In addition to high blood glucose from diabetes, other risk factors that contribute to heart disease include being overweight, having high blood pressure, smoking, and having high levels of cholesterol in the blood. Foot problems are one of the most common long-term complications of diabetes. Good foot care is important to preventing foot problems associated with diabetes. People who have diabetes may also have skin problems, including excessively dry skin, shin spots, xanthomas, and necrobiosis lipoidica diabeticorum.

• **Understanding Neuropathy**


Contact: Available from University of Michigan. Biomedical Communications, Media Library. 1327 Jones Drive, Ann Arbor, MI 48105. (313) 998-6140. PRICE: $35 for set of 10 in series. Number 865.

Summary: This booklet, written for people with diabetes and their families, presents information about diabetic neuropathies, their causes, and treatments in a clear, easy-to-read format. Topics include the physiology of diabetic neuropathy, peripheral neuropathy, **autonomic neuropathy**, other neuropathies, and new developments in the areas of research and treatment. New or technical terms are defined in the margins of the text and a glossary is included. Simple line drawings illustrate some of the concepts presented. Two appendixes detail foot care guidelines.

• **What is Neuropathy?**


Summary: This brochure describes neuropathy associated with diabetes mellitus. Written in a question-and-answer format, the brochure discusses how neuropathy affects the nerves; who gets neuropathy; how a health care provider diagnoses neuropathy; how poor diabetes control impacts neuropathy; peripheral neuropathy and its complications; managing neuropathy-associated pain; foot ulcers and how they occur; amputation and its prevention; preventing foot ulcers; autonomic neuropathy and its complications, including severe insulin reactions and postural hypotension; how autonomic neuropathy affects sexual function; gastroparesis; and other problems associated with autonomic neuropathy.

- Neuropathy


Contact: Available from American Diabetes Association, Inc. Order Fulfillment Department, P.O. Box 930850, Atlanta, GA 31193-0850. (800) 232-6733. Fax (770) 442-9742. PRICE: $9.95 (members), $11.95 (nonmembers) for 50 copies; single copy free. Order number CDBD38.

Summary: This fact sheet, which is one in a series of 42 fact sheets about daily living and coping with diabetes, provides information on diabetic neuropathy (nerve damage). Nerve damage is both a serious and highly preventable complication. Topics include a definition of neuropathy, causes of neuropathy, types of neuropathy (distal symmetric polyneuropathy, charcot's joint, cranial neuropathy, autonomic neuropathy, compression mononeuropathy, and other neuropathies), diagnosis, and treatment. The fact sheet notes that neuropathy is more likely to affect people who have had diabetes a long time or whose blood glucose control is poor. (AA-M).

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 autonomic neuropathy. 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/
Finding Associations

There are several Internet directories that provide lists of medical associations with information on or resources relating to autonomic neuropathy. By consulting all of associations listed in this chapter, you will have nearly exhausted all sources for patient associations concerned with autonomic neuropathy.

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 autonomic neuropathy. For more information, see the NHIC’s Web site at [http://www.health.gov/NHIC/](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](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/](http://dirline.nlm.nih.gov/). Simply type in “autonomic neuropathy” (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/](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 “autonomic neuropathy”. Type the following hyperlink into your Web browser: [http://chid.nih.gov/detail/detail.html](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 “autonomic neuropathy” (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](http://www.rarediseases.org/search/orgsearch.html). Type “autonomic neuropathy” (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.16

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

16 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)\(^\text{17}\):

- **Alabama**: Health InfoNet of Jefferson County (Jefferson County Library Cooperative, Lister Hill Library of the Health Sciences), [http://www.uab.edu/infonet/](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](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](http://www.humboldt1.com/~kkhic/index.html)
- **California**: Community Health Library of Los Gatos, [http://www.healthlib.org/orgresources.html](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](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/](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](http://sfghdean.ucsf.edu/barnett/PERC/default.asp)
- **California**: Redwood Health Library (Petaluma Health Care District), [http://www.phcd.org/crdwdlib.html](http://www.phcd.org/crdwdlib.html)
- **California**: Los Gatos PlaneTree Health Library, [http://planetreesanjose.org/](http://planetreesanjose.org/)
- **California**: Sutter Resource Library (Sutter Hospitals Foundation, Sacramento), [http://suttermedicalcenter.org/library/](http://suttermedicalcenter.org/library/)
- **California**: Health Sciences Libraries (University of California, Davis), [http://www.lib.ucdavis.edu/healthsci/](http://www.lib.ucdavis.edu/healthsci/)
- **California**: ValleyCare Health Library & Ryan Comer Cancer Resource Center (ValleyCare Health System, Pleasanton), [http://gaelnet.stmarysca.edu/other.lib/gbal/east/vchl.html](http://gaelnet.stmarysca.edu/other.lib/gbal/east/vchl.html)
- **California**: Washington Community Health Resource Library (Fremont), [http://www.healthlibrary.org/](http://www.healthlibrary.org/)
- **Connecticut**: Hartford Hospital Health Science Libraries (Hartford Hospital), [http://www.harthosp.org/library/](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/](http://library.uchc.edu/departm/hnet/)

• **Connecticut**: Waterbury Hospital Health Center Library (Waterbury Hospital, Waterbury), [http://www.waterburyhospital.com/library/consumer.shtml](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_pmr1_health_info.cfm](http://www.christianacare.org/health_guide/health_guide_pmr1_health_info.cfm)

• **Delaware**: Lewis B. Flinn Library (Delaware Academy of Medicine, Wilmington), [http://www.delamed.org/chls.html](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](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](http://www.mccg.org/hrc/hrchome.asp)

• **Hawaii**: Hawaii Medical Library: Consumer Health Information Service (Hawaii Medical Library, Honolulu), [http://hml.org/CHIS/](http://hml.org/CHIS/)

• **Idaho**: DeArmond Consumer Health Library (Kootenai Medical Center, Coeur d’Alene), [http://www.nicon.org/DeArmond/index.htm](http://www.nicon.org/DeArmond/index.htm)

• **Illinois**: Health Learning Center of Northwestern Memorial Hospital (Chicago), [http://www.nnmh.org/health_info/hlc.html](http://www.nnmh.org/health_info/hlc.html)

• **Illinois**: Medical Library (OSF Saint Francis Medical Center, Peoria), [http://www.osfsaintfrancis.org/general/library/](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](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/](http://www.mc.uky.edu/PatientEd/)

• **Louisiana**: Alton Ochsner Medical Foundation Library (Alton Ochsner Medical Foundation, New Orleans), [http://www.ochsner.org/library/](http://www.ochsner.org/library/)

• **Louisiana**: Louisiana State University Health Sciences Center Medical Library-Shreveport, [http://lib-sh.lsuhssc.edu/](http://lib-sh.lsuhssc.edu/)

• **Maine**: Franklin Memorial Hospital Medical Library (Franklin Memorial Hospital, Farmington), [http://www.fchn.org/fmh/lib.htm](http://www.fchn.org/fmh/lib.htm)

• **Maine**: Gerrish-True Health Sciences Library (Central Maine Medical Center, Lewiston), [http://www.cmmmc.org/library/library.html](http://www.cmmmc.org/library/library.html)

• **Maine**: Hadley Parrot Health Science Library (Eastern Maine Healthcare, Bangor), [http://www.emh.org/hll/hpl/guide.htm](http://www.emh.org/hll/hpl/guide.htm)

• **Maine**: Maine Medical Center Library (Maine Medical Center, Portland), [http://www.mmc.org/library/](http://www.mmc.org/library/)

• **Maine**: Parkview Hospital (Brunswick), [http://www.parkviewhospital.org/](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](http://www.smmc.org/services/service.php3?choice=10)

• **Maine**: Stephens Memorial Hospital’s Health Information Library (Western Maine Health, Norway), [http://www.wmhhc.org/Library/](http://www.wmhhc.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, Worcester),
  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 Resource Center - University of Michigan Cancer Center (University of Michigan Comprehensive Cancer Center, Ann Arbor),
  http://www.cancer.med.umich.edu/learn/learesh.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.htmlld/conshealth.htmlld/

• 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.engagehospital.com/links/index.htm

• New Jersey: Meland Foundation (Englewood Hospital and Medical Center, Englewood), http://www.geocities.com/ResearchTriangle/9360/


• 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/ch/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.shscare.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](http://www.rcrh.org/Services/Library/Default.asp)

• **Texas:** Houston HealthWays (Houston Academy of Medicine-Texas Medical Center Library), [http://hhw.library.tmc.edu/](http://hhw.library.tmc.edu/)

• **Washington:** Community Health Library (Kittitas Valley Community Hospital), [http://www.kvch.com/](http://www.kvch.com/)

• **Washington:** Southwest Washington Medical Center Library (Southwest Washington Medical Center, Vancouver), [http://www.swmedicalcenter.com/body.cfm?id=72](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:

- 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.aspentys.com/asp/diseases/diseases.asp

Beyond these, MEDLINEplus contains a very patient-friendly encyclopedia covering every aspect of medicine (licensed from A.D.A.M., Inc.). The ADAM Medical Encyclopedia can be accessed at http://www.nlm.nih.gov/medlineplus/encyclopedia.html. ADAM is also available on commercial Web sites such as drkoop.com (http://www.drkoop.com/) and Web MD (http://my.webmd.com/adam/asset/adam_disease_articles/a_to_z/a). The NIH suggests the following Web sites in the ADAM Medical Encyclopedia when searching for information on autonomic neuropathy:

- **Basic Guidelines for Autonomic Neuropathy**
  
  Autonomic neuropathy

- **Signs & Symptoms for Autonomic Neuropathy**
  
  Abdomen, swollen

  Abdominal bloating

  Constipation

  Diarrhea
Difficulty beginning to urinate

Difficulty swallowing

Dizziness

Early satiety

Excessive sweating

Heat intolerance

High blood pressure

Hypotension

Impotence

Incontinence

Male impotence

Nausea

Vomiting

Weight loss

- Diagnostics and Tests for Autonomic Neuropathy
  
  Blood pressure
  
  Blood sugar levels
  
  EGD (esophagogastroduodenoscopy)
Heart rate

Isotope study

Ulcers

Voiding cystourethrogram

• Background Topics for Autonomic Neuropathy

Auscultation

Central nervous system

Chronic

Electrolyte

Exercise

Inspection

Palpation

Percussion

Peripheral

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

• 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
AUTONOMIC NEUROPATHY 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]

**Accommodation**: Adjustment, especially that of the eye for various distances. [EU]

**ACE**: Angiotensin-converting enzyme. A drug used to decrease pressure inside blood vessels. [NIH]

**Acetaminophen**: Analgesic antipyretic derivative of acetanilide. It has weak anti-inflammatory properties and is used as a common analgesic, but may cause liver, blood cell, and kidney damage. [NIH]

**Acetylcholine**: A neurotransmitter. Acetylcholine in vertebrates is the major transmitter at neuromuscular junctions, autonomic ganglia, parasympathetic effector junctions, a subset of sympathetic effector junctions, and at many sites in the central nervous system. It is generally not used as an administered drug because it is broken down very rapidly by cholinesterases, but it is useful in some ophthalmological applications. [NIH]

**Acetylcholinesterase**: An enzyme that catalyzes the hydrolysis of acetylcholine to choline and acetate. In the CNS, this enzyme plays a role in the function of peripheral neuromuscular junctions. EC 3.1.1.7. [NIH]

**Adaptation**: 1. The adjustment of an organism to its environment, or the process by which it enhances such fitness. 2. The normal ability of the eye to adjust itself to variations in the intensity of light; the adjustment to such variations. 3. The decline in the frequency of firing of a neuron, particularly of a receptor, under conditions of constant stimulation. 4. In dentistry, (a) the proper fitting of a denture, (b) the degree of proximity and interlocking of restorative material to a tooth preparation, (c) the exact adjustment of bands to teeth. 5. In microbiology, the adjustment of bacterial physiology to a new environment. [EU]

**Adenocarcinoma**: A malignant epithelial tumor with a glandular organization. [NIH]

**Adjustment**: The dynamic process wherein the thoughts, feelings, behavior, and biophysiological mechanisms of the individual continually change to adjust to the environment. [NIH]

**Adrenal Cortex**: The outer layer of the adrenal gland. It secretes mineralocorticoids, androgens, and glucocorticoids. [NIH]

**Adrenal Glands**: Paired glands situated in the retroperitoneal tissues at the superior pole of each kidney. [NIH]

**Adrenal Medulla**: The inner part of the adrenal gland; it synthesizes, stores and releases catecholamines. [NIH]

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

**Adrenergic Agonists**: Drugs that bind to and activate adrenergic receptors. [NIH]

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

**Age of Onset**: The age or period of life at which a disease or the initial symptoms or
manifestations of a disease appear in an individual. [NIH]

**Agonist:** In anatomy, a prime mover. In pharmacology, a drug that has affinity for and stimulates physiologic activity at cell receptors normally stimulated by naturally occurring substances. [EU]

**Albumin:** 1. Any protein that is soluble in water and moderately concentrated salt solutions and is coagulable by heat. 2. Serum albumin; the major plasma protein (approximately 60 per cent of the total), which is responsible for much of the plasma colloidal osmotic pressure and serves as a transport protein carrying large organic anions, such as fatty acids, bilirubin, and many drugs, and also carrying certain hormones, such as cortisol and thyroxine, when their specific binding globulins are saturated. Albumin is synthesized in the liver. Low serum levels occur in protein malnutrition, active inflammation and serious hepatic and renal disease. [EU]

**Albuminuria:** More than normal amounts of a protein called albumin in the urine. Albuminuria may be a sign of kidney disease. [NIH]

**Aldosterone:** (11 beta)-11,21-Dihydroxy-3,20-dioxopregn-4-en-18-al. A hormone secreted by the adrenal cortex that functions in the regulation of electrolyte and water balance by increasing the renal retention of sodium and the excretion of potassium. [NIH]

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

**Alimentary:** Pertaining to food or nutritive material, or to the organs of digestion. [EU]

**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]

**Alleles:** Mutually exclusive forms of the same gene, occupying the same locus on homologous chromosomes, and governing the same biochemical and developmental process. [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]

**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 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]

**Ammonia:** A colorless alkaline gas. It is formed in the body during decomposition of organic materials during a large number of metabolically important reactions. [NIH]

**Amphetamines:** Analogs or derivatives of amphetamine. Many are sympathomimetics and central nervous system stimulators causing excitation, vasopression, bronchodilation, and to varying degrees, anorexia, analgesis, nasal decongestion, and some smooth muscle relaxation. [NIH]
Amputation: Surgery to remove part or all of a limb or appendage. [NIH]

Amyloid: A general term for a variety of different proteins that accumulate as extracellular fibrils of 7-10 nm and have common structural features, including a beta-pleated sheet conformation and the ability to bind such dyes as Congo red and thioflavine (Kandel, Schwartz, and Jessel, Principles of Neural Science, 3rd ed). [NIH]

Amyloidosis: A group of diseases in which protein is deposited in specific organs (localized amyloidosis) or throughout the body (systemic amyloidosis). Amyloidosis may be either primary (with no known cause) or secondary (caused by another disease, including some types of cancer). Generally, primary amyloidosis affects the nerves, skin, tongue, joints, heart, and liver; secondary amyloidosis often affects the spleen, kidneys, liver, and adrenal glands. [NIH]

Analgesic: An agent that alleviates pain without causing loss of consciousness. [EU]

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

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

Androgens: A class of sex hormones associated with the development and maintenance of the secondary male sex characteristics, sperm induction, and sexual differentiation. In addition to increasing virility and libido, they also increase nitrogen and water retention and stimulate skeletal growth. [NIH]

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

Anemic: Hypoxia due to reduction of the oxygen-carrying capacity of the blood as a result of a decrease in the total hemoglobin or an alteration of the hemoglobin constituents. [NIH]

Anesthetics: Agents that are capable of inducing a total or partial loss of sensation, especially tactile sensation and pain. They may act to induce general anesthesia, in which an unconscious state is achieved, or may act locally to induce numbness or lack of sensation at a targeted site. [NIH]

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

Angiotensinogen: An alpha-globulin of which a fragment of 14 amino acids is converted by renin to angiotensin I, the inactive precursor of angiotensin II. It is a member of the serpin superfamily. [NIH]

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

Anions: Negatively charged atoms, radicals or groups of atoms which travel to the anode or positive pole during electrolysis. [NIH]

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

Anthracycline: A member of a family of anticancer drugs that are also antibiotics. [NIH]

Antiallergic: Counteracting allergy or allergic conditions. [EU]

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]

**Antidiuretic**: Suppressing the rate of urine formation. [EU]

**Antiemetic**: An agent that prevents or alleviates nausea and vomiting. Also antinauseant. [EU]

**Antigen**: Any substance which is capable, under appropriate conditions, of inducing a specific immune response and of reacting with the products of that response, that is, with specific antibody or specifically sensitized T-lymphocytes, or both. Antigens may be soluble substances, such as toxins and foreign proteins, or particulate, such as bacteria and tissue cells; however, only the portion of the protein or polysaccharide molecule known as the antigenic determinant (q.v.) combines with antibody or a specific receptor on a lymphocyte. Abbreviated Ag. [EU]

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

**Anti-Inflammatory Agents**: Substances that reduce or suppress inflammation. [NIH]

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

**Antioxidant**: A substance that prevents damage caused by free radicals. Free radicals are highly reactive chemicals that often contain oxygen. They are produced when molecules are split to give products that have unpaired electrons. This process is called oxidation. [NIH]

**Antipyretic**: An agent that relieves or reduces fever. Called also antifebrile, antithermic and febrifuge. [EU]

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

**Apnoea**: Cessation of breathing. [EU]

**Apolipoproteins**: The protein components of lipoproteins which remain after the lipids to which the proteins are bound have been removed. They play an important role in lipid transport and metabolism. [NIH]

**Aponeurosis**: Tendinous expansion consisting of a fibrous or membranous sheath which serves as a fascia to enclose or bind a group of muscles. [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]

**Arrhythmia**: Any variation from the normal rhythm or rate of the heart beat. [NIH]

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

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

**Arterioles**: The smallest divisions of the arteries located between the muscular arteries and the capillaries. [NIH]
**Artery:** Vessel-carrying blood from the heart to various parts of the body. [NIH]

**Arthropathy:** Any joint disease. [EU]

**Aspiration:** The act of inhaling. [NIH]

**Asymptomatic:** Having no signs or symptoms of disease. [NIH]

**Asystole:** Cardiac standstill or arrest; absence of a heartbeat; called also Beau's syndrome. [EU]

**Ataxia:** Impairment of the ability to perform smoothly coordinated voluntary movements. This condition may affect the limbs, trunk, eyes, pharnyx, larnyx, and other structures. Ataxia may result from impaired sensory or motor function. Sensory ataxia may result from posterior column injury or peripheral nerve diseases. Motor ataxia may be associated with cerebellar diseases; cerebral cortex diseases; thalamic diseases; basal ganglia diseases; injury to the red nucleus; and other conditions. [NIH]

**Atrophic Pressure:** The pressure at any point in an atmosphere due solely to the weight of the atmospheric gases above the point concerned. [NIH]

**Atrial:** Pertaining to an atrium. [EU]

**Atrioventricular:** Pertaining to an atrium of the heart and to a ventricle. [EU]

**Atrium:** A chamber; used in anatomical nomenclature to designate a chamber affording entrance to another structure or organ. Usually used alone to designate an atrium of the heart. [EU]

**Atrophy:** Decrease in the size of a cell, tissue, organ, or multiple organs, associated with a variety of pathological conditions such as abnormal cellular changes, ischemia, malnutrition, or hormonal changes. [NIH]

**Auricular:** Pertaining to an auricle or to the ear, and, formerly, to an atrium of the heart. [EU]

**Autoantibodies:** Antibodies that react with self-antigens (autoantigens) of the organism that produced them. [NIH]

**Autoantigens:** Endogenous tissue constituents that have the ability to interact with autoantibodies and cause an immune response. [NIH]

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

**Autoimmunity:** Process whereby the immune system reacts against the body's own tissues. Autoimmunity may produce or be caused by autoimmune diseases. [NIH]

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

**Autonomic Denervation:** The removal or interruption of some part of the autonomic nervous system for therapeutic or research purposes. [NIH]

**Autonomic Nervous System:** The enteric, parasympathetic, and sympathetic nervous systems taken together. Generally speaking, the autonomic nervous system regulates the internal environment during both peaceful activity and physical or emotional stress. Autonomic activity is controlled and integrated by the central nervous system, especially the hypothalamus and the solitary nucleus, which receive information relayed from visceral afferents; these and related central and sensory structures are sometimes (but not here) considered to be part of the autonomic nervous system itself. [NIH]

**Autonomic Neuropathy:** A disease of the nerves affecting mostly the internal organs such as the bladder muscles, the cardiovascular system, the digestive tract, and the genital organs. These nerves are not under a person's conscious control and function automatically. Also called visceral neuropathy. [NIH]
Azotemia: An excess of urea or other nitrogenous compounds in the blood. [EU]

Bacteria: Unicellular prokaryotic microorganisms which generally possess rigid cell walls, multiply by cell division, and exhibit three principal forms: round or coccal, rodlke or bacillary, and spiral or spirochetal. [NIH]

Bacterial Physiology: Physiological processes and activities of bacteria. [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]

Bacteriostatic: 1. Inhibiting the growth or multiplication of bacteria. 2. An agent that inhibits the growth or multiplication of bacteria. [EU]

Basal Ganglia: Large subcortical nuclear masses derived from the telencephalon and located in the basal regions of the cerebral hemispheres. [NIH]

Basal Ganglia Diseases: Diseases of the basal ganglia including the putamen; globus pallidus; claustrum; amygdala; and caudate nucleus. Dyskinesias (most notably involuntary movements and alterations of the rate of movement) represent the primary clinical manifestations of these disorders. Common etiologies include cerebrovascular disease; neurodegenerative diseases; and cranio-cerebral trauma. [NIH]

Basement Membrane: Ubiquitous supportive tissue adjacent to epithelium and around smooth and striated muscle cells. This tissue contains intrinsic macromolecular components such as collagen, laminin, and sulfated proteoglycans. As seen by light microscopy one of its subdivisions is the basal (basement) lamina. [NIH]

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

Beta-pleated: Particular three-dimensional pattern of amyloidoses. [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]

Bilirubin: A bile pigment that is a degradation product of heme. [NIH]

Bioavailability: The degree to which a drug or other substance becomes available to the target tissue after administration. [EU]

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

Biological therapy: Treatment to stimulate or restore the ability of the immune system to fight infection and disease. Also used to lessen side effects that may be caused by some cancer treatments. Also known as immunotherapy, biotherapy, or biological response modifier (BRM) therapy. [NIH]

Biotechnology: Body of knowledge related to the use of organisms, cells or cell-derived constituents for the purpose of developing products which are technically, scientifically and clinically useful. Alteration of biologic function at the molecular level (i.e., genetic engineering) is a central focus; laboratory methods used include transfection and cloning technologies, sequence and structure analysis algorithms, computer databases, and gene and protein structure function analysis and prediction. [NIH]

Bladder: The organ that stores urine. [NIH]

Bleomycin: A complex of related glycopeptide antibiotics from Streptomyces verticillus
consisting of bleomycin A2 and B2. It inhibits DNA metabolism and is used as an antineoplastic, especially for solid tumors. [NIH]

**Bloating:** Fullness or swelling in the abdomen that often occurs after meals. [NIH]

**Blood Glucose:** Glucose in blood. [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]

**Blood-Brain Barrier:** Specialized non-fenestrated tightly-joined endothelial cells (tight junctions) that form a transport barrier for certain substances between the cerebral capillaries and the brain tissue. [NIH]

**Body Mass Index:** One of the anthropometric measures of body mass; it has the highest correlation with skinfold thickness or body density. [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]

**Bowel:** The long tube-shaped organ in the abdomen that completes the process of digestion. There is both a small and a large bowel. Also called the intestine. [NIH]

**Bowel Movement:** Body wastes passed through the rectum and anus. [NIH]

**Bradycardia:** Excessive slowness in the action of the heart, usually with a heart rate below 60 beats per minute. [NIH]

**Bronchi:** The larger air passages of the lungs arising from the terminal bifurcation of the trachea. [NIH]

**Bronchodilator:** A drug that relaxes the smooth muscles in the constricted airway. [NIH]

**Calcification:** Deposits of calcium in the tissues of the breast. Calcification in the breast can be seen on a mammogram, but cannot be detected by touch. There are two types of breast calcification, macrocalcification and microcalcification. Macrocalcifications are large deposits and are usually not related to cancer. Microcalcifications are specks of calcium that may be found in an area of rapidly dividing cells. Many microcalcifications clustered together may be a sign of cancer. [NIH]

**Calcinosis:** Pathologic deposition of calcium salts in tissues. [NIH]

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

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

**Calcium:** A basic element found in nearly all organized tissues. It is a member of the alkaline earth family of metals with the atomic symbol Ca, atomic number 20, and atomic weight 40. Calcium is the most abundant mineral in the body and combines with phosphorus to form calcium phosphate in the bones and teeth. It is essential for the normal functioning of nerves and muscles and plays a role in blood coagulation (as factor IV) and in many enzymatic processes. [NIH]

**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]

**Capsules:** Hard or soft soluble containers used for the oral administration of medicine. [NIH]

**Captopril:** A potent and specific inhibitor of peptidyl-dipeptidase A. It blocks the conversion of angiotensin I to angiotensin II, a vasoconstrictor and important regulator of arterial blood pressure. Captopril acts to suppress the renin-angiotensin system and inhibits pressure responses to exogenous angiotensin. [NIH]

**Carbohydrate:** An aldehyde or ketone derivative of a polyhydric alcohol, particularly of the pentahydric and hexahydric alcohols. They are so named because the hydrogen and oxygen are usually in the proportion to form water, (CH2O)n. The most important carbohydrates are the starches, sugars, cellulosics, and gums. They are classified into mono-, di-, tri-, poly- and heterosaccharides. [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]

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

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

**Cardiac arrest:** A sudden stop of heart function. [NIH]

**Cardiac catheterization:** A procedure in which a thin, hollow tube is inserted into a blood vessel. The tube is then advanced through the vessel into the heart, enabling a physician to study the heart and its pumping activity. [NIH]

**Cardiomyopathy:** A general diagnostic term designating primary myocardial disease, often of obscure or unknown etiology. [EU]

**Cardiorespiratory:** Relating to the heart and lungs and their function. [EU]

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

**Cardiovascular disease:** Any abnormal condition characterized by dysfunction of the heart and blood vessels. CVD includes atherosclerosis (especially coronary heart disease, which can lead to heart attacks), cerebrovascular disease (e.g., stroke), and hypertension (high blood pressure). [NIH]

**Cardiovascular System:** The heart and the blood vessels by which blood is pumped and circulated through the body. [NIH]

**Carotid Sinus:** The dilated portion of the common carotid artery at its bifurcation into external and internal carotids. It contains baroreceptors which, when stimulated, cause slowing of the heart, vasodilatation, and a fall in blood pressure. [NIH]

**Carpal Tunnel Syndrome:** A median nerve injury inside the carpal tunnel that results in symptoms of pain, numbness, tingling, clumsiness, and a lack of sweating, which can be
caused by work with certain hand and wrist postures. [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]

**Cataract:** An opacity, partial or complete, of one or both eyes, on or in the lens or capsule, especially an opacity impairing vision or causing blindness. The many kinds of cataract are classified by their morphology (size, shape, location) or etiology (cause and time of occurrence). [EU]

**Catecholamines:** A general class of ortho-dihydroxyphenylalkylamines derived from tyrosine. [NIH]

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

**Celiac Disease:** A disease characterized by intestinal malabsorption and precipitated by gluten-containing foods. The intestinal mucosa shows loss of villous structure. [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 Communication:** Any of several ways in which living cells of an organism communicate with one another, whether by direct contact between cells or by means of chemical signals carried by neurotransmitter substances, hormones, and cyclic AMP. [NIH]

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

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

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

**Cell membrane:** Cell membrane = plasma membrane. The structure enveloping a cell, enclosing the cytoplasm, and forming a selective permeability barrier; it consists of lipids, proteins, and some carbohydrates, the lipids thought to form a bilayer in which integral proteins are embedded to varying degrees. [EU]

**Cell Survival:** The span of viability of a cell characterized by the capacity to perform certain functions such as metabolism, growth, reproduction, some form of responsiveness, and adaptability. [NIH]

**Central Nervous System:** The main information-processing organs of the nervous system, consisting of the brain, spinal cord, and meninges. [NIH]

**Cerebellar:** Pertaining to the cerebellum. [EU]

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

**Cerebral Cortex:** The thin layer of gray matter on the surface of the cerebral hemisphere that develops from the telencephalon and folds into gyri. It reaches its highest development in man and is responsible for intellectual faculties and higher mental functions. [NIH]

**Cerebrovascular:** Pertaining to the blood vessels of the cerebrum, or brain. [EU]

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

**Chin:** The anatomical frontal portion of the mandible, also known as the mentum, that contains the line of fusion of the two separate halves of the mandible (symphysis menti). This line of fusion divides inferiorly to enclose a triangular area called the mental protuberance. On each side, inferior to the second premolar tooth, is the mental foramen for
the passage of blood vessels and a nerve. [NIH]

**Cholesterol:** The principal sterol of all higher animals, distributed in body tissues, especially the brain and spinal cord, and in animal fats and oils. [NIH]

**Cholesterol Esters:** Fatty acid esters of cholesterol which constitute about two-thirds of the cholesterol in the plasma. The accumulation of cholesterol esters in the arterial intima is a characteristic feature of atherosclerosis. [NIH]

**Choline:** A basic constituent of lecithin that is found in many plants and animal organs. It is important as a precursor of acetylcholine, as a methyl donor in various metabolic processes, and in lipid metabolism. [NIH]

**Cholinergic:** Resembling acetylcholine in pharmacological action; stimulated by or releasing acetylcholine or a related compound. [EU]

**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]

**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 renal:** Slow and progressive loss of kidney function over several years, often resulting in end-stage renal disease. People with end-stage renal disease need dialysis or transplantation to replace the work of the kidneys. [NIH]

**Chylomicrons:** A class of lipoproteins that carry dietary cholesterol and triglycerides from the small intestines to the tissues. [NIH]

**Circadian:** Repeated more or less daily, i.e. on a 23- to 25-hour cycle. [NIH]

**Circadian Rhythm:** The regular recurrence, in cycles of about 24 hours, of biological processes or activities, such as sensitivity to drugs and stimuli, hormone secretion, sleeping, feeding, etc. This rhythm seems to be set by a ‘biological clock’ which seems to be set by recurring daylight and darkness. [NIH]

**Circulatory system:** The system that contains the heart and the blood vessels and moves blood throughout the body. This system helps tissues get enough oxygen and nutrients, and it helps them get rid of waste products. The lymph system, which connects with the blood system, is often considered part of the circulatory system. [NIH]

**Cirrhosis:** A type of chronic, progressive liver disease. [NIH]

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

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

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

**Coca:** Any of several South American shrubs of the Erythroxylon genus (and family) that yield cocaine; the leaves are chewed with alum for CNS stimulation. [NIH]

**Cocaine:** An alkaloid ester extracted from the leaves of plants including coca. It is a local anesthetic and vasoconstrictor and is clinically used for that purpose, particularly in the eye, ear, nose, and throat. It also has powerful central nervous system effects similar to the
amphetamine and is a drug of abuse. Cocaine, like amphetamines, acts by multiple mechanisms on brain catecholaminergic neurons; the mechanism of its reinforcing effects is thought to involve inhibition of dopamine uptake. [NIH]

**Coenzyme:** An organic nonprotein molecule, frequently a phosphorylated derivative of a water-soluble vitamin, that binds with the protein molecule (apoenzyme) to form the active enzyme (holoenzyme). [EU]

**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]

**Colloidal:** Of the nature of a colloid. [EU]

**Complement:** A term originally used to refer to the heat-labile factor in serum that causes immune cytolysis, the lysis of antibody-coated cells, and now referring to the entire functionally related system comprising at least 20 distinct serum proteins that is the effector not only of immune cytolysis but also of other biologic functions. Complement activation occurs by two different sequences, the classic and alternative pathways. The proteins of the classic pathway are termed 'components of complement' and are designated by the symbols C1 through C9. C1 is a calcium-dependent complex of three distinct proteins C1q, C1r and C1s. The proteins of the alternative pathway (collectively referred to as the properdin system) and complement regulatory proteins are known by semisystematic or trivial names. Fragments resulting from proteolytic cleavage of complement proteins are designated with lower-case letter suffixes, e.g., C3a. Inactivated fragments may be designated with the suffix 'i', e.g. C3bi. Activated components or complexes with biological activity are designated by a bar over the symbol e.g. C1 or C4b,2a. The classic pathway is activated by the binding of C1 to classic pathway activators, primarily antigen-antibody complexes containing IgM, IgG1, IgG3; C1q binds to a single IgM molecule or two adjacent IgG molecules. The alternative pathway can be activated by IgA immune complexes and also by nonimmunologic materials including bacterial endotoxins, microbial polysaccharides, and cell walls. Activation of the classic pathway triggers an enzymatic cascade involving C1, C4, C2 and C3; activation of the alternative pathway triggers a cascade involving C3 and factors B, D and P. Both result in the cleavage of C5 and the formation of the membrane attack complex. Complement activation also results in the formation of many biologically active complement fragments that act as anaphylatoxins, opsonins, or chemotactic factors. [EU]

**Complementary and alternative medicine:** CAM. Forms of treatment that are used in addition to (complementary) or instead of (alternative) standard treatments. These practices are not considered standard medical approaches. CAM includes dietary supplements, megadose vitamins, herbal preparations, special teas, massage therapy, magnet therapy, spiritual healing, and meditation. [NIH]

**Complementary medicine:** Practices not generally recognized by the medical community as standard or conventional medical approaches and used to enhance or complement the standard treatments. Complementary medicine includes the taking of dietary supplements, megadose vitamins, and herbal preparations; the drinking of special teas; and practices such as massage therapy, magnet therapy, spiritual healing, and meditation. [NIH]

**Compliance:** Distensibility measure of a chamber such as the lungs (lung compliance) or bladder. Compliance is expressed as a change in volume per unit change in pressure. [NIH]

**Computational Biology:** A field of biology concerned with the development of techniques
for the collection and manipulation of biological data, and the use of such data to make biological discoveries or predictions. This field encompasses all computational methods and theories applicable to molecular biology and areas of computer-based techniques for solving biological problems including manipulation of models and datasets. [NIH]

**Confusion**: A mental state characterized by bewilderment, emotional disturbance, lack of clear thinking, and perceptual disorientation. [NIH]

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

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

**Connexins**: A group of homologous proteins which form the intermembrane channels of gap junctions. The connexins are the products of an identified gene family which has both highly conserved and highly divergent regions. The variety contributes to the wide range of functional properties of gap junctions. [NIH]

**Consciousness**: Sense of awareness of self and of the environment. [NIH]

**Constipation**: Infrequent or difficult evacuation of feces. [NIH]

**Constitutional**: 1. Affecting the whole constitution of the body; not local. 2. Pertaining to the constitution. [EU]

**Constriction**: The act of constricting. [NIH]

**Contractility**: Capacity for becoming short in response to a suitable stimulus. [EU]

**Contraindications**: Any factor or sign that it is unwise to pursue a certain kind of action or treatment, e.g. giving a general anesthetic to a person with pneumonia. [NIH]

**Contrast medium**: A substance that is introduced into or around a structure and, because of the difference in absorption of x-rays by the contrast medium and the surrounding tissues, allows radiographic visualization of the structure. [EU]

**Controlled study**: An experiment or clinical trial that includes a comparison (control) group. [NIH]

**Convulsions**: A general term referring to sudden and often violent motor activity of cerebral or brainstem origin. Convulsions may also occur in the absence of an electrical cerebral discharge (e.g., in response to hypotension). [NIH]

**Cor**: The muscular organ that maintains the circulation of the blood. c. adiposum a heart that has undergone fatty degeneration or that has an accumulation of fat around it; called also fat or fatty, heart. c. arteriosum the left side of the heart, so called because it contains oxygenated (arterial) blood. c. biloculare a congenital anomaly characterized by failure of formation of the atrial and ventricular septums, the heart having only two chambers, a single atrium and a single ventricle, and a common atrioventricular valve. c. bovinum (L. 'ox heart') a greatly enlarged heart due to a hypertrophied left ventricle; called also c. taurinum and bucardia. c. dextrum (L. 'right heart') the right atrium and ventricle. c. hirsutum, c. villosum. c. mobile (obs.) an abnormally movable heart. c. pendulum a heart so movable that it seems to be hanging by the great blood vessels. c. pseudotriloculare biaatriatum a congenital cardiac anomaly in which the heart functions as a three-chambered heart because of tricuspid atresia, the right ventricle being extremely small or rudimentary and the right atrium greatly dilated. Blood passes from the right to the left atrium and thence disease due to pulmonary hypertension secondary to disease of the lung, or its blood vessels, with hypertrophy of the right ventricle. [EU]

**Coronary**: Encircling in the manner of a crown; a term applied to vessels; nerves, ligaments, etc. The term usually denotes the arteries that supply the heart muscle and, by extension, a
pathologic involvement of them. [EU]

**Coronary Arteriosclerosis**: Thickening and loss of elasticity of the coronary arteries. [NIH]

**Coronary heart disease**: A type of heart disease caused by narrowing of the coronary arteries that feed the heart, which needs a constant supply of oxygen and nutrients carried by the blood in the coronary arteries. When the coronary arteries become narrowed or clogged by fat and cholesterol deposits and cannot supply enough blood to the heart, CHD results. [NIH]

**Coronary Thrombosis**: Presence of a thrombus in a coronary artery, often causing a myocardial infarction. [NIH]

**Corpus**: The body of the uterus. [NIH]

**Corticosteroid**: Any of the steroids elaborated by the adrenal cortex (excluding the sex hormones of adrenal origin) in response to the release of corticotrophin (adrenocorticotropic hormone) by the pituitary gland, to any of the synthetic equivalents of these steroids, or to angiotensin II. They are divided, according to their predominant biological activity, into three major groups: glucocorticoids, chiefly influencing carbohydrate, fat, and protein metabolism; mineralocorticoids, affecting the regulation of electrolyte and water balance; and C19 androgens. Some corticosteroids exhibit both types of activity in varying degrees, and others exert only one type of effect. The corticosteroids are used clinically for hormonal replacement therapy, for suppression of ACTH secretion by the anterior pituitary, as antineoplastic, antiallergic, and anti-inflammatory agents, and to suppress the immune response. Called also adrenocortical hormone and corticoid. [EU]

**Cortisol**: A steroid hormone secreted by the adrenal cortex as part of the body's response to stress. [NIH]

**Cortisone**: A natural steroid hormone produced in the adrenal gland. It can also be made in the laboratory. Cortisone reduces swelling and can suppress immune responses. [NIH]

**Cranial**: Pertaining to the cranium, or to the anterior (in animals) or superior (in humans) end of the body. [EU]

**Cumulative Trauma Disorders**: Harmful and painful condition caused by overuse or overexertion of some part of the musculoskeletal system, often resulting from work-related physical activities. It is characterized by inflammation, pain, or dysfunction of the involved joints, bones, ligaments, and nerves. [NIH]

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

**Cutaneous**: Having to do with the skin. [NIH]

**Cyclic**: Pertaining to or occurring in a cycle or cycles; the term is applied to chemical compounds that contain a ring of atoms in the nucleus. [EU]

**Cytokines**: Non-antibody proteins secreted by inflammatory leukocytes and some non-leukocytic cells, that act as intercellular mediators. They differ from classical hormones in that they are produced by a number of tissue or cell types rather than by specialized glands. They generally act locally in a paracrine or autocrine rather than endocrine manner. [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 (phaheroplasm), 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]

**Degenerative**: Undergoing degeneration : tending to degenerate; having the character of or involving degeneration; causing or tending to cause degeneration. [EU]
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]

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

Dermal: Pertaining to or coming from the skin. [NIH]

Dermis: A layer of vascular connective tissue underneath the epidermis. The surface of the dermis contains sensitive papillae. Embedded in or beneath the dermis are sweat glands, hair follicles, and sebaceous glands. [NIH]

Desensitization: The prevention or reduction of immediate hypersensitivity reactions by administration of graded doses of allergen; called also hyposensitization and immunotherapy. [EU]

Developing Countries: Countries in the process of change directed toward economic growth, that is, an increase in production, per capita consumption, and income. The process of economic growth involves better utilization of natural and human resources, which results in a change in the social, political, and economic structures. [NIH]

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

Diabetic Foot: Ulcers of the foot as a complication of diabetes. Diabetic foot, often with infection, is a common serious complication of diabetes and may require hospitalization and disfiguring surgery. The foot ulcers are probably secondary to neuropathies and vascular problems. [NIH]

Diabetic Ketoacidosis: Complication of diabetes resulting from severe insulin deficiency coupled with an absolute or relative increase in glucagon concentration. The metabolic acidosis is caused by the breakdown of adipose stores and resulting increased levels of free fatty acids. Glucagon accelerates the oxidation of the free fatty acids producing excess ketone bodies (ketosis). [NIH]

Diabetic Retinopathy: Retinopathy associated with diabetes mellitus, which may be of the background type, progressively characterized by microaneurysms, interretinal punctuate macular edema, or of the proliferative type, characterized by neovascularization of the retina and optic disk, which may project into the vitreous, proliferation of fibrous tissue, vitreous hemorrhage, and retinal detachment. [NIH]

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

Dialyzer: A part of the hemodialysis machine. (See hemodialysis under dialysis.) The dialyzer has two sections separated by a membrane. One section holds dialysate. The other holds the patient's blood. [NIH]

Diarrhea: Passage of excessively liquid or excessively frequent stools. [NIH]

Diastole: Period of relaxation of the heart, especially the ventricles. [NIH]

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

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

Digestive system: The organs that take in food and turn it into products that the body can use to stay healthy. Waste products the body cannot use leave the body through bowel movements. The digestive system includes the salivary glands, mouth, esophagus, stomach, liver, pancreas, gallbladder, small and large intestines, and rectum. [NIH]

Digestive tract: The organs through which food passes when food is eaten. These organs are the mouth, esophagus, stomach, small and large intestines, and rectum. [NIH]
**Dihydrotestosterone:** Anabolic agent. [NIH]

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

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

**Distal:** Remote; farther from any point of reference; opposed to proximal. In dentistry, used to designate a position on the dental arch farther from the median line of the jaw. [EU]

**Domperidone:** A specific blocker of dopamine receptors. It speeds gastrointestinal peristalsis, causes prolactin release, and is used as antiemetic and tool in the study of dopaminergic mechanisms. [NIH]

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

**Dorsum:** A plate of bone which forms the posterior boundary of the sella turcica. [NIH]

**Dose-dependent:** Refers to the effects of treatment with a drug. If the effects change when the dose of the drug is changed, the effects are said to be dose dependent. [NIH]

**Double-blind:** Pertaining to a clinical trial or other experiment in which neither the subject nor the person administering treatment knows which treatment any particular subject is receiving. [EU]

**Drive:** A state of internal activity of an organism that is a necessary condition before a given stimulus will elicit a class of responses; e.g., a certain level of hunger (drive) must be present before food will elicit an eating response. [NIH]

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

**Duct:** A tube through which body fluids pass. [NIH]

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

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

**Dyslipidemia:** Disorders in the lipoprotein metabolism; classified as hypercholesterolemia, hypertriglyceridemia, combined hyperlipidemia, and low levels of high-density lipoprotein (HDL) cholesterol. All of the dyslipidemias can be primary or secondary. Both elevated levels of low-density lipoprotein (LDL) cholesterol and low levels of HDL cholesterol predispose to premature atherosclerosis. [NIH]

**Dyspepsia:** Impaired digestion, especially after eating. [NIH]

**Dystrophy:** Any disorder arising from defective or faulty nutrition, especially the muscular dystrophies. [EU]

**Edema:** Excessive amount of watery fluid accumulated in the intercellular spaces, most commonly present in subcutaneous tissue. [NIH]

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

**Ejection fraction:** A measure of ventricular contractility, equal to normally 65-8 per cent;
lower values indicate ventricular dysfunction. [EU]

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

**Electrocardiogram**: Measurement of electrical activity during heartbeats. [NIH]

**Electrocardiography**: Recording of the moment-to-moment electromotive forces of the heart as projected onto various sites on the body’s surface, delineated as a scalar function of time. [NIH]

**Electrolyte**: A substance that dissociates into ions when fused or in solution, and thus becomes capable of conducting electricity; an ionic solute. [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]

**Electrophysiological**: Pertaining to electrophysiology, that is a branch of physiology that is concerned with the electric phenomena associated with living bodies and involved in their functional activity. [EU]

**Embolus**: Bit of foreign matter which enters the blood stream at one point and is carried until it is lodged or impacted in an artery and obstructs it. It may be a blood clot, an air bubble, fat or other tissue, or clumps of bacteria. [NIH]

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

**Endemic**: Present or usually prevalent in a population or geographical area at all times; said of a disease or agent. Called also endemial. [EU]

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

**Endorphins**: One of the three major groups of endogenous opioid peptides. They are large peptides derived from the pro-opiomelanocortin precursor. The known members of this group are alpha-, beta-, and gamma-endorphin. The term endorphin is also sometimes used to refer to all opioid peptides, but the narrower sense is used here; opioid peptides is used for the broader group. [NIH]

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

**End-stage renal**: Total chronic kidney failure. When the kidneys fail, the body retains fluid and harmful wastes build up. A person with ESRD needs treatment to replace the work of the failed kidneys. [NIH]

**Enkephalin**: A natural opiate painkiller, in the hypothalamus. [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]

**Ephedrine**: An alpha- and beta-adrenergic agonist that may also enhance release of norepinephrine. It has been used in the treatment of several disorders including asthma, heart failure, rhinitis, and urinary incontinence, and for its central nervous system stimulatory effects in the treatment of narcolepsy and depression. It has become less extensively used with the advent of more selective agonists. [NIH]
**Epidemic**: Occurring suddenly in numbers clearly in excess of normal expectancy; said especially of infectious diseases but applied also to any disease, injury, or other health-related event occurring in such outbreaks. [EU]

**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]

**Erectile**: The inability to get or maintain an erection for satisfactory sexual intercourse. Also called impotence. [NIH]

**Erection**: The condition of being made rigid and elevated; as erectile tissue when filled with blood. [EU]

**Erythrocyte Volume**: Volume of circulating erythrocytes. It is usually measured by radioisotope dilution technique. [NIH]

**Erythromycin**: A bacteriostatic antibiotic substance produced by Streptomyces erythreus. Erythromycin A is considered its major active component. In sensitive organisms, it inhibits protein synthesis by binding to 50S ribosomal subunits. This binding process inhibits peptidyl transferase activity and interferes with translocation of amino acids during translation and assembly of proteins. [NIH]

**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]

**Esophagitis**: Inflammation, acute or chronic, of the esophagus caused by bacteria, chemicals, or trauma. [NIH]

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

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

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

**Evacuation**: An emptying, as of the bowels. [EU]

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

**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]

**Excitatory**: When cortical neurons are excited, their output increases and each new input they receive while they are still excited raises their output markedly. [NIH]

**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]

**Expiration:** The act of breathing out, or expelling air from the lungs. [EU]

**Extracellular:** Outside a cell or cells. [EU]

**Extracellular Matrix:** A meshwork-like substance found within the extracellular space and in association with the basement membrane of the cell surface. It promotes cellular proliferation and provides a supporting structure to which cells or cell lysates in culture dishes adhere. [NIH]

**Extracellular Matrix Proteins:** Macromolecular organic compounds that contain carbon, hydrogen, oxygen, nitrogen, and usually, sulfur. These macromolecules (proteins) form an intricate meshwork in which cells are embedded to construct tissues. Variations in the relative types of macromolecules and their organization determine the type of extracellular matrix, each adapted to the functional requirements of the tissue. The two main classes of macromolecules that form the extracellular matrix are: glycosaminoglycans, usually linked to proteins (proteoglycans), and fibrous proteins (e.g., collagen, elastin, fibronectins and laminin). [NIH]

**Extracellular Space:** Interstitial space between cells, occupied by fluid as well as amorphous and fibrous substances. [NIH]

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

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

**Fallopian tube:** The oviduct, a muscular tube about 10 cm long, lying in the upper border of the broad ligament. [NIH]

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

**Fat:** Total lipids including phospholipids. [NIH]

**Fatigue:** The state of weariness following a period of exertion, mental or physical, characterized by a decreased capacity for work and reduced efficiency to respond to stimuli. [NIH]

**Feces:** The excrement discharged from the intestines, consisting of bacteria, cells exfoliated from the intestines, secretions, chiefly of the liver, and a small amount of food residue. [EU]

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

**Fibrinolytic:** Pertaining to, characterized by, or causing the dissolution of fibrin by enzymatic action. [EU]

**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]

**Filtration:** The passage of a liquid through a filter, accomplished by gravity, pressure, or vacuum (suction). [EU]

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

**Fludrocortisone:** A synthetic mineralocorticoid with anti-inflammatory activity. [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]

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

**Foot Care**: Taking special steps to avoid foot problems such as sores, cuts, bunions, and calluses. Good care includes daily examination of the feet, toes, and toenails and choosing shoes and socks or stockings that fit well. People with diabetes have to take special care of their feet because nerve damage and reduced blood flow sometimes mean they will have less feeling in their feet than normal. They may not notice cuts and other problems as soon as they should. [NIH]

**Foot Ulcer**: Lesion on the surface of the skin of the foot, usually accompanied by inflammation. The lesion may become infected or necrotic and is frequently associated with diabetes or leprosy. [NIH]

**Forearm**: The part between the elbow and the wrist. [NIH]

**Free Radicals**: Highly reactive molecules with an unsatisfied electron valence pair. Free radicals are produced in both normal and pathological processes. They are proven or suspected agents of tissue damage in a wide variety of circumstances including radiation, damage from environment chemicals, and aging. Natural and pharmacological prevention of free radical damage is being actively investigated. [NIH]

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

**Gallbladder Emptying**: A process whereby bile is delivered from the gallbladder into the duodenum. The emptying is caused by both contraction of the gallbladder and relaxation of the sphincter mechanism at the choledochal terminus. [NIH]

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

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

**Gangrene**: Death and putrefaction of tissue usually due to a loss of blood supply. [NIH]

**Gap Junctions**: Connections between cells which allow passage of small molecules and electric current. Gap junctions were first described anatomically as regions of close apposition between cells with a narrow (1-2 nm) gap between cell membranes. The variety in the properties of gap junctions is reflected in the number of connexins, the family of proteins which form the junctions. [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]

**Gas exchange**: Primary function of the lungs; transfer of oxygen from inhaled air into the blood and of carbon dioxide from the blood into the lungs. [NIH]

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

**Gastric Emptying**: The evacuation of food from the stomach into the duodenum. [NIH]

**Gastrin**: A hormone released after eating. Gastrin causes the stomach to produce more acid. [NIH]

**Gastrointestinal**: Refers to the stomach and intestines. [NIH]
**Gastrointestinal Hormones**: Hormones secreted by the gastrointestinal mucosa that affect the timing or the quality of secretion of digestive enzymes, and regulate the motor activity of the digestive system organs. [NIH]

**Gastrointestinal tract**: The stomach and intestines. [NIH]

**Gastroparesis**: Nerve or muscle damage in the stomach. Causes slow digestion and emptying, vomiting, nausea, or bloating. Also called delayed gastric emptying. [NIH]

**Gene**: The functional and physical unit of heredity passed from parent to offspring. Genes are pieces of DNA, and most genes contain the information for making a specific protein. [NIH]

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

**Gene Therapy**: The introduction of new genes into cells for the purpose of treating disease by restoring or adding gene expression. Techniques include insertion of retroviral vectors, transfection, homologous recombination, and injection of new genes into the nuclei of single cell embryos. The entire gene therapy process may consist of multiple steps. The new genes may be introduced into proliferating cells in vivo (e.g., bone marrow) or in vitro (e.g., fibroblast cultures) and the modified cells transferred to the site where the gene expression is required. Gene therapy may be particularly useful for treating enzyme deficiency diseases, hemoglobinopathies, and leukemias and may also prove useful in restoring drug sensitivity, particularly for leukemia. [NIH]

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

**Genital**: Pertaining to the genitalia. [EU]

**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]

**Glomerular**: Pertaining to or of the nature of a glomerulus, especially a renal glomerulus. [EU]

**Glomerular Filtration Rate**: The volume of water filtered out of plasma through glomerular capillary walls into Bowman's capsules per unit of time. It is considered to be equivalent to inulin clearance. [NIH]

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

**Glucocorticoid**: A compound that belongs to the family of compounds called corticosteroids (steroids). Glucocorticoids affect metabolism and have anti-inflammatory and immunosuppressive effects. They may be naturally produced (hormones) or synthetic (drugs). [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]

**Glutamate**: Excitatory neurotransmitter of the brain. [NIH]

**Glutamic Acid**: A non-essential amino acid naturally occurring in the L-form. Glutamic acid
Glycocytes are the most common excitatory neurotransmitter in the central nervous system. [NIH]

Gluten: The protein of wheat and other grains which gives to the dough its tough elastic character. [EU]

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

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

Glycosaminoglycans: Heteropolysaccharides which contain an N-acetylated hexosamine in a characteristic repeating disaccharide unit. The repeating structure of each disaccharide involves alternate 1,4- and 1,3-linkages consisting of either N-acetylglucosamine or N-acetylgalactosamine. [NIH]

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

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

Gravis: Eruption of watery blisters on the skin among those handling animals and animal products. [NIH]

Growth factors: Substances made by the body that function to regulate cell division and cell survival. Some growth factors are also produced in the laboratory and used in biological therapy. [NIH]

Headache: Pain in the cranial region that may occur as an isolated and benign symptom or as a manifestation of a wide variety of conditions including subarachnoid hemorrhage; craniocerebral trauma; central nervous system infections; intracranial hypertension; and other disorders. In general, recurrent headaches that are not associated with a primary disease process are referred to as headache disorders (e.g., migraine). [NIH]

Health Status: The level of health of the individual, group, or population as subjectively assessed by the individual or by more objective measures. [NIH]

Heart attack: A seizure of weak or abnormal functioning of the heart. [NIH]

Heart failure: Loss of pumping ability by the heart, often accompanied by fatigue, breathlessness, and excess fluid accumulation in body tissues. [NIH]

Heart Transplantation: The transference of a heart from one human or animal to another. [NIH]

Heartbeat: One complete contraction of the heart. [NIH]

Heme: The color-furnishing portion of hemoglobin. It is found free in tissues and as the prosthetic group in many hemoproteins. [NIH]

Hemodialysis: The use of a machine to clean wastes from the blood after the kidneys have failed. The blood travels through tubes to a dialyzer, which removes wastes and extra fluid. The cleaned blood then flows through another set of tubes back into the body. [NIH]

Hemoglobin: One of the fractions of glycosylated hemoglobin A1c. Glycosylated hemoglobin is formed when linkages of glucose and related monosaccharides bind to hemoglobin A and its concentration represents the average blood glucose level over the previous several weeks. HbA1c levels are used as a measure of long-term control of plasma glucose (normal, 4 to 6 percent). In controlled diabetes mellitus, the concentration of glycosylated hemoglobin A is within the normal range, but in uncontrolled cases the level may be 3 to 4 times the normal concentration. Generally, complications are substantially lower among patients with Hb levels of 7 percent or less than in patients with HbA1c levels
of 9 percent or more. [NIH]

**Hemoglobin C:** A commonly occurring abnormal hemoglobin in which lysine replaces a glutamic acid residue at the sixth position of the beta chains. It results in reduced plasticity of erythrocytes. [NIH]

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

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

**Hepatic:** Refers to 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]

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

**Homogeneous:** Consisting of or composed of similar elements or ingredients; of a uniform quality throughout. [EU]

**Homologous:** Corresponding in structure, position, origin, etc., as (a) the feathers of a bird and the scales of a fish, (b) antigen and its specific antibody, (c) allelic chromosomes. [EU]

**Hormonal:** Pertaining to or of the nature of a hormone. [EU]

**Hormone:** A substance in the body that regulates certain organs. Hormones such as gastrin help in breaking down food. Some hormones come from cells in the stomach and small intestine. [NIH]

**Hydrogen:** The first chemical element in the periodic table. It has the atomic symbol H, atomic number 1, and atomic weight 1. It exists, under normal conditions, as a colorless, odorless, tasteless, diatomic gas. Hydrogen ions are protons. Besides the common H1 isotope, hydrogen exists as the stable isotope deuterium and the unstable, radioactive isotope tritium. [NIH]

**Hydrolysis:** The process of cleaving a chemical compound by the addition of a molecule of water. [NIH]

**Hydrophobic:** Not readily absorbing water, or being adversely affected by water, as a hydrophobic colloid. [EU]

**Hyperbaric:** Characterized by greater than normal pressure or weight; applied to gases under greater than atmospheric pressure, as hyperbaric oxygen, or to a solution of greater specific gravity than another taken as a standard of reference. [EU]

**Hyperbaric oxygen:** Oxygen that is at an atmospheric pressure higher than the pressure at sea level. Breathing hyperbaric oxygen to enhance the effectiveness of radiation therapy is being studied. [NIH]

**Hypercapnia:** A clinical manifestation of abnormal increase in the amount of carbon dioxide in arterial blood. [NIH]

**Hypercholesterolemia:** Abnormally high levels of cholesterol in the blood. [NIH]

**Hyperglycemia:** Abnormally high blood sugar. [NIH]

**Hyperlipidemia:** An excess of lipids in the blood. [NIH]

**Hypersensitivity:** Altered reactivity to an antigen, which can result in pathologic reactions upon subsequent exposure to that particular antigen. [NIH]

**Hypertension:** Persistently high arterial blood pressure. Currently accepted threshold levels
are 140 mm Hg systolic and 90 mm Hg diastolic pressure. [NIH]

**Hypertriglyceridemia:** Condition of elevated triglyceride concentration in the blood; an inherited form occurs in familial hyperlipoproteinemia IIb and hyperlipoproteinemia type IV. It has been linked to higher risk of heart disease and arteriosclerosis. [NIH]

**Hypertrophy:** General increase in bulk of a part or organ, not due to tumor formation, nor to an increase in the number of cells. [NIH]

**Hypoglycaemia:** An abnormally diminished concentration of glucose in the blood, which may lead to tremulousness, cold sweat, piloerection, hypothermia, and headache, accompanied by irritability, confusion, hallucinations, bizarre behaviour, and ultimately, convulsions and coma. [EU]

**Hypoglycemia:** Abnormally low blood sugar [NIH]

**Hypoglycemic:** An orally active drug that produces a fall in blood glucose concentration. [NIH]

**Hypotension:** Abnormally low blood pressure. [NIH]

**Hypothalamus:** Ventral part of the diencephalon extending from the region of the optic chiasm to the caudal border of the mammary bodies and forming the inferior and lateral walls of the third ventricle. [NIH]

**Hypothermia:** Lower than normal body temperature, especially in warm-blooded animals; in man usually accidental or unintentional. [NIH]

**Hypovolemia:** An abnormally low volume of blood circulating through the body. It may result in hypovolemic shock. [NIH]

**Hypoxia:** Reduction of oxygen supply to tissue below physiological levels despite adequate perfusion of the tissue by blood. [EU]

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

**Ileus:** Obstruction of the intestines. [EU]

**Immersion:** The placing of a body or a part thereof into a liquid. [NIH]

**Immune response:** The activity of the immune system against foreign substances (antigens). [NIH]

**Immune Sera:** Serum that contains antibodies. It is obtained from an animal that has been immunized either by antigen injection or infection with microorganisms containing the antigen. [NIH]

**Immune system:** The organs, cells, and molecules responsible for the recognition and disposal of foreign ("non-self") material which enters the body. [NIH]

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

**Immunodeficiency:** The decreased ability of the body to fight infection and disease. [NIH]

**Immunohistochemistry:** Histochemical localization of immunoreactive substances using labeled antibodies as reagents. [NIH]

**Immunologic:** The ability of the antibody-forming system to recall a previous experience with an antigen and to respond to a second exposure with the prompt production of large amounts of antibody. [NIH]

**Immunology:** The study of the body's immune system. [NIH]
**Immunosuppression**: Deliberate prevention or diminution of the host's immune response. It may be nonspecific as in the administration of immunosuppressive agents (drugs or radiation) or by lymphocyte depletion or may be specific as in desensitization or the simultaneous administration of antigen and immunosuppressive drugs. [NIH]

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

**Immunosuppressive Agents**: Agents that suppress immune function by one of several mechanisms of action. Classical cytotoxic immunosuppressants act by inhibiting DNA synthesis. Others may act through activation of suppressor T-cell populations or by inhibiting the activation of helper cells. While immunosuppression has been brought about in the past primarily to prevent rejection of transplanted organs, new applications involving mediation of the effects of interleukins and other cytokines are emerging. [NIH]

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

**Impotence**: The inability to perform sexual intercourse. [NIH]

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

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

**In vitro**: In the laboratory (outside the body). The opposite of in vivo (in the body). [NIH]

**In vivo**: In the body. The opposite of in vitro (outside the body or in the laboratory). [NIH]

**Incision**: A cut made in the body during surgery. [NIH]

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

**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]

**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]

**Ingestion**: Taking into the body by mouth [NIH]

**Inhalation**: The drawing of air or other substances into the lungs. [EU]

**Innervation**: 1. The distribution or supply of nerves to a part. 2. The supply of nervous energy or of nerve stimulus sent to a part. [EU]

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

**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]

Instillation: [EU]

Insulin: A protein hormone secreted by beta cells of the pancreas. Insulin plays a major role in the regulation of glucose metabolism, generally promoting the cellular utilization of glucose. It is also an important regulator of protein and lipid metabolism. Insulin is used as a drug to control insulin-dependent diabetes mellitus. [NIH]

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

Insulin-like: Muscular growth factor. [NIH]

Intermittent: Occurring at separated intervals; having periods of cessation of activity. [EU]

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

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

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

Intestine: A long, tube-shaped organ in the abdomen that completes the process of digestion. There is both a large intestine and a small intestine. Also called the bowel. [NIH]

Intoxication: Poisoning, the state of being poisoned. [EU]

Intracellular: Inside a cell. [NIH]

Intraindividual: Being or occurring within the individual. [EU]

Intravenous: IV. Into a vein. [NIH]

Inulin: A starch found in the tubers and roots of many plants. Since it is hydrolyzable to fructose, it is classified as a fructosan. It has been used in physiologic investigation for determination of the rate of glomerular function. [NIH]

Invasive: 1. Having the quality of invasiveness. 2. Involving puncture or incision of the skin or insertion of an instrument or foreign material into the body; said of diagnostic techniques. [EU]

Involuntary: Reaction occurring without intention or volition. [NIH]

Ion Channels: Gated, ion-selective glycoproteins that traverse membranes. The stimulus for channel gating can be a membrane potential, drug, transmitter, cytoplasmic messenger, or a mechanical deformation. Ion channels which are integral parts of ionotropic neurotransmitter receptors are not included. [NIH]

Ions: An atom or group of atoms that have a positive or negative electric charge due to a gain (negative charge) or loss (positive charge) of one or more electrons. Atoms with a positive charge are known as cations; those with a negative charge are anions. [NIH]

Iris: The most anterior portion of the uveal layer, separating the anterior chamber from the posterior. It consists of two layers - the stroma and the pigmented epithelium. Color of the iris depends on the amount of melanin in the stroma on reflection from the pigmented epithelium. [NIH]

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

Islet: Cell producing insulin in pancreas. [NIH]
**Isoproterenol:** Isopropyl analog of epinephrine; beta-sympathomimetic that acts on the heart, bronchi, skeletal muscle, alimentary tract, etc. It is used mainly as bronchodilator and heart stimulant. [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]

**Ketone Bodies:** Chemicals that the body makes when there is not enough insulin in the blood and it must break down fat for its energy. Ketone bodies can poison and even kill body cells. When the body does not have the help of insulin, the ketones build up in the blood and then "spill" over into the urine so that the body can get rid of them. The body can also rid itself of one type of ketone, called acetone, through the lungs. This gives the breath a fruity odor. Ketones that build up in the body for a long time lead to serious illness and coma. [NIH]

**Ketosis:** A condition of having ketone bodies build up in body tissues and fluids. The signs of ketosis are nausea, vomiting, and stomach pain. Ketosis can lead to ketoacidosis. [NIH]

**Kidney Disease:** Any one of several chronic conditions that are caused by damage to the cells of the kidney. People who have had diabetes for a long time may have kidney damage. Also called nephropathy. [NIH]

**Kidney Failure:** The inability of a kidney to excrete metabolites at normal plasma levels under conditions of normal loading, or the inability to retain electrolytes under conditions of normal intake. In the acute form (kidney failure, acute), it is marked by uremia and usually by oliguria or anuria, with hyperkalemia and pulmonary edema. The chronic form (kidney failure, chronic) is irreversible and requires hemodialysis. [NIH]

**Kidney Transplantation:** The transference of a kidney from one human or animal to another. [NIH]

**Kinetics:** The study of rate dynamics in chemical or physical systems. [NIH]

**Lactate Dehydrogenase:** A tetrameric enzyme that, along with the coenzyme NAD+, catalyzes the interconversion of lactate and pyruvate. In vertebrates, genes for three different subunits (LDH-A, LDH-B and LDH-C) exist. [NIH]

**Laminin:** Large, noncollagenous glycoprotein with antigenic properties. It is localized in the basement membrane lamina lucida and functions to bind epithelial cells to the basement membrane. Evidence suggests that the protein plays a role in tumor invasion. [NIH]

**Large Intestine:** The part of the intestine that goes from the cecum to the rectum. The large intestine absorbs water from stool and changes it from a liquid to a solid form. The large intestine is 5 feet long and includes the appendix, cecum, colon, and rectum. Also called colon. [NIH]

**Lens:** The transparent, double convex (outward curve on both sides) structure suspended between the aqueous and vitreous; helps to focus light on the retina. [NIH]

**Leprosy:** A chronic granulomatous infection caused by Mycobacterium leprae. The granulomatous lesions are manifested in the skin, the mucous membranes, and the peripheral nerves. Two polar or principal types are lepromatous and tuberculoid. [NIH]

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

**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]

**Leukopenia:** A condition in which the number of leukocytes (white blood cells) in the blood is reduced. [NIH]
**Ligaments**: Shiny, flexible bands of fibrous tissue connecting together articular extremities of bones. They are pliant, tough, and inextensile. [NIH]

**Liminal**: The main auxiliary method for diagnosing impairment of hearing and determining its localization. Routine tests are carried out within the register of frequencies 125 to 800 Hz. [NIH]

**Linkage**: The tendency of two or more genes in the same chromosome to remain together from one generation to the next more frequently than expected according to the law of independent assortment. [NIH]

**Lipid**: Fat. [NIH]

**Lipid Peroxidation**: Peroxidase catalyzed oxidation of lipids using hydrogen peroxide as an electron acceptor. [NIH]

**Lipoprotein**: Any of the lipid-protein complexes in which lipids are transported in the blood; lipoprotein particles consist of a spherical hydrophobic core of triglycerides or cholesterol esters surrounded by an amphipathic monolayer of phospholipids, cholesterol, and apolipoproteins; the four principal classes are high-density, low-density, and very-low-density lipoproteins and chylomicrons. [EU]

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

**Liver 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]

**Loop**: A wire usually of platinum bent at one end into a small loop (usually 4 mm inside diameter) and used in transferring microorganisms. [NIH]

**Low-density lipoprotein**: Lipoprotein that contains most of the cholesterol in the blood. LDL carries cholesterol to the tissues of the body, including the arteries. A high level of LDL increases the risk of heart disease. LDL typically contains 60 to 70 percent of the total serum cholesterol and both are directly correlated with CHD risk. [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]

**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]

**Lymphocyte Depletion**: Immunosuppression by reduction of circulating lymphocytes or by T-cell depletion of bone marrow. The former may be accomplished in vivo by thoracic duct drainage or administration of antilymphocyte serum. The latter is performed ex vivo on bone marrow before its transplantation. [NIH]

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

**Lytic**: 1. Pertaining to lysis or to a lysin. 2. Producing lysis. [EU]

**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]

**Malabsorption**: Impaired intestinal absorption of nutrients. [EU]

**Malignant**: Cancerous; a growth with a tendency to invade and destroy nearby tissue and spread to other parts of the body. [NIH]

**Malnutrition**: A condition caused by not eating enough food or not eating a balanced diet. [NIH]

**Mammogram**: An x-ray of the breast. [NIH]

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

**Median Nerve**: A major nerve of the upper extremity. In humans, the fibers of the median nerve originate in the lower cervical and upper thoracic spinal cord (usually C6 to T1), travel via the brachial plexus, and supply sensory and motor innervation to parts of the forearm and hand. [NIH]

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

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

**Meiosis**: A special method of cell division, occurring in maturation of the germ cells, by means of which each daughter nucleus receives half the number of chromosomes characteristic of the somatic cells of the species. [NIH]

**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]

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

**Mental Retardation**: Refers to sub-average general intellectual functioning which originated during the developmental period and is associated with impairment in adaptive behavior. [NIH]

**Mentors**: Senior professionals who provide guidance, direction and support to those persons desirous of improvement in academic positions, administrative positions or other career development situations. [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]

**Meta-Analysis**: A quantitative method of combining the results of independent studies (usually drawn from the published literature) and synthesizing summaries and conclusions which may be used to evaluate therapeutic effectiveness, plan new studies, etc., with application chiefly in the areas of research and medicine. [NIH]

**Metabolic acidosis**: (met-a-BOL-ik as-id-O-sis): A condition in which the blood is too acidic. It may be caused by severe illness or sepsis (bacteria in the bloodstream). [NIH]

**Metabolic disorder**: A condition in which normal metabolic processes are disrupted, usually because of a missing enzyme. [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]

**Metoclopramide:** A dopamine D2 antagonist that is used as an antiemetic. [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]

**Microcalcifications:** Tiny deposits of calcium in the breast that cannot be felt but can be detected on a mammogram. A cluster of these very small specks of calcium may indicate that cancer is present. [NIH]

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

**Migration:** The systematic movement of genes between populations of the same species, geographic race, or variety. [NIH]

**Mineralocorticoids:** A group of corticosteroids primarily associated with the regulation of water and electrolyte balance. This is accomplished through the effect on ion transport in renal tubules, resulting in retention of sodium and loss of potassium. Mineralocorticoid secretion is itself regulated by plasma volume, serum potassium, and angiotensin II. [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]

**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]

**Mononeuropathies:** Disease or trauma involving a single peripheral nerve in isolation, or out of proportion to evidence of diffuse peripheral nerve dysfunction. Mononeuropathy multiplex refers to a condition characterized by multiple isolated nerve injuries. Mononeuropathies may result from a wide variety of causes, including ischemia; traumatic injury; compression; connective tissue diseases; cumulative trauma disorders; and other conditions. [NIH]
Morphology: The science of the form and structure of organisms (plants, animals, and other forms of life). [NIH]

Motilin: A 22-amino acid polypeptide (molecular weight 2700) isolated from the duodenum. At low pH it inhibits gastric motor activity, whereas at high pH it has a stimulating effect. [NIH]

Motility: The ability to move spontaneously. [EU]

Motor Activity: The physical activity of an organism as a behavioral phenomenon. [NIH]

Mucinous: Containing or resembling mucin, the main compound in mucus. [NIH]

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

Multicenter study: A clinical trial that is carried out at more than one medical institution. [NIH]

Muscle relaxant: An agent that specifically aids in reducing muscle tension, as those acting at the polysynaptic neurons of motor nerves (e.g. meprobamate) or at the myoneural junction (curare and related compounds). [EU]

Muscular Dystrophies: A general term for a group of inherited disorders which are characterized by progressive degeneration of skeletal muscles. [NIH]

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

Myelin: The fatty substance that covers and protects nerves. [NIH]

Myenteric: On stimulation of an intestinal segment, the segment above contracts and that below relaxes. [NIH]

Myocardial infarction: Gross necrosis of the myocardium as a result of interruption of the blood supply to the area; it is almost always caused by atherosclerosis of the coronary arteries, upon which coronary thrombosis is usually superimposed. [NIH]

Myocardial Ischemia: A disorder of cardiac function caused by insufficient blood flow to the muscle tissue of the heart. The decreased blood flow may be due to narrowing of the coronary arteries (coronary arteriosclerosis), to obstruction by a thrombus (coronary thrombosis), or less commonly, to diffuse narrowing of arterioles and other small vessels within the heart. Severe interruption of the blood supply to the myocardial tissue may result in necrosis of cardiac muscle (myocardial infarction). [NIH]

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

Narcolepsy: A condition of unknown cause characterized by a periodic uncontrollable tendency to fall asleep. [NIH]

Nausea: An unpleasant sensation in the stomach usually accompanied by the urge to vomit. Common causes are early pregnancy, sea and motion sickness, emotional stress, intense pain, food poisoning, and various enteroviruses. [NIH]

Necrobiosis Lipoidica: A degenerative disease of the dermal connective tissue characterized by the development of erythematous papules or nodules in the pretibial area. The papules form plaques covered with telangiectatic vessels. More than half of the affected patients have diabetes. [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]

Neoplasms: New abnormal growth of tissue. Malignant neoplasms show a greater degree of anaplasia and have the properties of invasion and metastasis, compared to benign neoplasms. [NIH]
Neostigmine: A cholinesterase inhibitor used in the treatment of myasthenia gravis and to reverse the effects of muscle relaxants such as gallamine and tubocurarine. Neostigmine, unlike physostigmine, does not cross the blood-brain barrier. [NIH]

Nephropathy: Disease of the kidneys. [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]

Nerve Growth Factor: Nerve growth factor is the first of a series of neurotrophic factors that were found to influence the growth and differentiation of sympathetic and sensory neurons. It is comprised of alpha, beta, and gamma subunits. The beta subunit is responsible for its growth stimulating activity. [NIH]

Nervous System: The entire nerve apparatus composed of the brain, spinal cord, nerves and ganglia. [NIH]

Networks: Pertaining to a nerve or to the nerves, a meshlike structure of interlocking fibers or strands. [NIH]

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

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

Neurologist: A doctor who specializes in the diagnosis and treatment of disorders of the nervous system. [NIH]

Neurology: A medical specialty concerned with the study of the structures, functions, and diseases of the nervous system. [NIH]

Neuromuscular: Pertaining to muscles and nerves. [EU]

Neuromuscular Junction: The synapse between a neuron and a muscle. [NIH]

Neuronal: Pertaining to a neuron or neurons (= conducting cells of the nervous system). [EU]

Neurons: The basic cellular units of nervous tissue. Each neuron consists of a body, an axon, and dendrites. Their purpose is to receive, conduct, and transmit impulses in the nervous system. [NIH]

Neuropathy: A problem in any part of the nervous system except the brain and spinal cord. Neuropathies can be caused by infection, toxic substances, or disease. [NIH]

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

Neurosyphilis: A late form of syphilis that affects the brain and may lead to dementia and death. [NIH]

Neurotoxic: Poisonous or destructive to nerve tissue. [EU]

Neurotoxicity: The tendency of some treatments to cause damage to the nervous system. [NIH]

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

Nitrogen: An element with the atomic symbol N, atomic number 7, and atomic weight 14. Nitrogen exists as a diatomic gas and makes up about 78% of the earth's atmosphere by
volume. It is a constituent of proteins and nucleic acids and found in all living cells. [NIH]

**Non-small cell lung cancer**: A group of lung cancers that includes squamous cell carcinoma, adenocarcinoma, and large cell carcinoma. [NIH]

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

**Normotensive**: 1. Characterized by normal tone, tension, or pressure, as by normal blood pressure. 2. A person with normal blood pressure. [EU]

**Nuclear**: A test of the structure, blood flow, and function of the kidneys. The doctor injects a mildly radioactive solution into an arm vein and uses x-rays to monitor its progress through the kidneys. [NIH]

**Nuclei**: A body of specialized protoplasm found in nearly all cells and containing the chromosomes. [NIH]

**Nucleic acid**: Either of two types of macromolecule (DNA or RNA) formed by polymerization of nucleotides. Nucleic acids are found in all living cells and contain the information (genetic code) for the transfer of genetic information from one generation to the next. [NIH]

**Nucleus**: A body of specialized protoplasm found in nearly all cells and containing the chromosomes. [NIH]

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

**Ocular**: 1. Of, pertaining to, or affecting the eye. 2. Eyepiece. [EU]

**Opacity**: Degree of density (area most dense taken for reading). [NIH]

**Ophthalmic**: Pertaining to the eye. [EU]

**Ophthalmic Artery**: Artery originating from the internal carotid artery and distributing to the eye, orbit and adjacent facial structures. [NIH]

**Opiate**: A remedy containing or derived from opium; also any drug that induces sleep. [EU]

**Orbit**: One of the two cavities in the skull which contains an eyeball. Each eye is located in a bony socket or orbit. [NIH]

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

**Osmosis**: Tendency of fluids (e.g., water) to move from the less concentrated to the more concentrated side of a semipermeable membrane. [NIH]

**Osmotic**: Pertaining to or of the nature of osmosis (= the passage of pure solvent from a solution of lesser to one of greater solute concentration when the two solutions are separated by a membrane which selectively prevents the passage of solute molecules, but is permeable to the solvent). [EU]

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

**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]

**Ovaries:** The pair of female reproductive glands in which the ova, or eggs, are formed. The ovaries are located in the pelvis, one on each side of the uterus. [NIH]

**Overweight:** An excess of body weight but not necessarily body fat; a body mass index of 25 to 29.9 kg/m2. [NIH]

**Oxidation:** The act of oxidizing or state of being oxidized. Chemically it consists in the increase of positive charges on an atom or the loss of negative charges. Most biological oxidations are accomplished by the removal of a pair of hydrogen atoms (dehydrogenation) from a molecule. Such oxidations must be accompanied by reduction of an acceptor molecule. Univalent o. indicates loss of one electron; divalent o., the loss of two electrons. [EU]

**Oxidative Stress:** A disturbance in the prooxidant-antioxidant balance in favor of the former, leading to potential damage. Indicators of oxidative stress include damaged DNA bases, protein oxidation products, and lipid peroxidation products (Sies, Oxidative Stress, 1991, pxv-xvi). [NIH]

**Oxygenase:** Enzyme which breaks down heme, the iron-containing oxygen-carrying constituent of the red blood cells. [NIH]

**Pacemaker:** An object or substance that influences the rate at which a certain phenomenon occurs; often used alone to indicate the natural cardiac pacemaker or an artificial cardiac pacemaker. In biochemistry, a substance whose rate of reaction sets the pace for a series of interrelated reactions. [EU]

**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]

**Pancreas Transplant:** A surgical procedure that involves replacing the pancreas of a person who has diabetes with a healthy pancreas that can make insulin. The healthy pancreas comes from a donor who has just died or from a living relative. A person can donate half a pancreas and still live normally. [NIH]

**Pancreas Transplantation:** The transference of a pancreas from one human or animal to another. [NIH]

**Pancreatic:** Having to do with the pancreas. [NIH]

**Pancreatic Polypeptide:** A 36-amino acid polypeptide with physiological regulatory functions. It is secreted by pancreatic tissue. Plasma pancreatic polypeptide increases after ingestion of food, with age, and in disease states. A lack of pancreatic polypeptide in the islets of Langerhans has been associated with the obese syndrome in rats and mice. [NIH]

**Paralysis:** Loss of ability to move all or part of the body. [NIH]

**Paraparesis:** Mild to moderate loss of bilateral lower extremity motor function, which may be a manifestation of spinal cord diseases; peripheral nervous system diseases; muscular diseases; intracranial hypertension; parasagittal brain lesions; and other conditions. [NIH]

**Paresis:** A general term referring to a mild to moderate degree of muscular weakness, occasionally used as a synonym for paralysis (severe or complete loss of motor function). In the older literature, paresis often referred specifically to paretic neurosyphilis. "General paresis" and "general paralysis" may still carry that connotation. Bilateral lower extremity paresis is referred to as paraparesis. [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]

**Patient Education:** The teaching or training of patients concerning their own health needs. [NIH]

**Penis:** The external reproductive organ of males. It is composed of a mass of erectile tissue enclosed in three cylindrical fibrous compartments. Two of the three compartments, the corpus cavernosa, are placed side-by-side along the upper part of the organ. The third compartment below, the corpus spongiosum, houses the urethra. [NIH]

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

**Perception:** The ability quickly and accurately to recognize similarities and differences among presented objects, whether these be pairs of words, pairs of number series, or multiple sets of these or other symbols such as geometric figures. [NIH]

**Perfusion:** Bathing an organ or tissue with a fluid. In regional perfusion, a specific area of the body (usually an arm or a leg) receives high doses of anticancer drugs through a blood vessel. Such a procedure is performed to treat cancer that has not spread. [NIH]

**Perioperative:** Around the time of surgery; usually lasts from the time of going into the hospital or doctor’s office for surgery until the time the patient goes home. [NIH]

**Peripheral 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 Neuropathy:** Nerve damage, usually affecting the feet and legs; causing pain, numbness, or a tingling feeling. Also called "somatic neuropathy" or "distal sensory polyneuropathy." [NIH]

**Peripheral Vascular Disease:** Disease in the large blood vessels of the arms, legs, and feet. People who have had diabetes for a long time may get this because major blood vessels in their arms, legs, and feet are blocked and these limbs do not receive enough blood. The signs of PVD are aching pains in the arms, legs, and feet (especially when walking) and foot sores that heal slowly. Although people with diabetes cannot always avoid PVD, doctors say they have a better chance of avoiding it if they take good care of their feet, do not smoke, and keep both their blood pressure and diabetes under good control. [NIH]

**Peristalsis:** The rippling motion of muscles in the intestine or other tubular organs characterized by the alternate contraction and relaxation of the muscles that propel the contents onward. [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]

**Peritoneal Dialysis:** Dialysis fluid being introduced into and removed from the peritoneal cavity as either a continuous or an intermittent procedure. [NIH]

**Peritoneum:** Endothelial lining of the abdominal cavity, the parietal peritoneum covering the inside of the abdominal wall and the visceral peritoneum covering the bowel, the mesentery, and certain of the organs. The portion that covers the bowel becomes the serosal layer of the bowel wall. [NIH]

**Perivascular:** Situated around a vessel. [EU]

**Peroneal Nerve:** The lateral of the two terminal branches of the sciatic nerve. The peroneal (or fibular) nerve provides motor and sensory innervation to parts of the leg and foot. [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]

**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]

**Physostigmine:** A cholinesterase inhibitor that is rapidly absorbed through membranes. It can be applied topically to the conjunctiva. It also can cross the blood-brain barrier and is used when central nervous system effects are desired, as in the treatment of severe anticholinergic toxicity. [NIH]

**Piloerection:** Involuntary erection or bristling of hairs. [NIH]

**Pilot study:** The initial study examining a new method or treatment. [NIH]

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

**Plasma protein:** One of the hundreds of different proteins present in blood plasma, including carrier proteins (such albumin, transferrin, and haptoglobin), fibrinogen and other coagulation factors, complement components, immunoglobulins, enzyme inhibitors, precursors of substances such as angiotension and bradykinin, and many other types of
proteins. [EU]

**Plasma Volume:** Volume of plasma in the circulation. It is usually measured by indicator dilution techniques. [NIH]

**Plasticity:** In an individual or a population, the capacity for adaptation: a) through gene changes (genetic plasticity) or b) through internal physiological modifications in response to changes of environment (physiological plasticity). [NIH]

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

**Pneumonia:** Inflammation of the lungs. [NIH]

**Podophyllin:** Caustic extract from the roots of Podophyllum peltatum and P. emodi. It contains podophyllotoxin and its congeners and is very irritating to mucous membranes and skin. Podophyllin is a violent purgative that may cause CNS damage and teratogenesis. It is used as a paint for warts, skin neoplasms, and senile keratoses. [NIH]

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

**Poisoning:** A condition or physical state produced by the ingestion, injection or inhalation of, or exposure to a deleterious agent. [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]

**Polyradiculopathy:** Disease or injury involving multiple spinal nerve roots. Polyradiculitis refers to inflammation of multiple spinal nerve roots. [NIH]

**Posterior:** Situated in back of, or in the back part of, or affecting the back or dorsal surface of the body. In lower animals, it refers to the caudal end of the body. [EU]

**Postmenopausal:** Refers to the time after menopause. Menopause is the time in a woman's life when menstrual periods stop permanently; also called "change of life." [NIH]

**Postprandial:** Occurring after dinner, or after a meal; postcibal. [EU]

**Postprandial Blood Glucose:** Blood taken 1-2 hours after eating to see the amount of glucose (sugar) in the blood. [NIH]

**Postsynaptic:** Nerve potential generated by an inhibitory hyperpolarizing stimulation. [NIH]

**Postural:** Pertaining to posture or position. [EU]

**Potassium:** An element that is in the alkali group of metals. It has an atomic symbol K, atomic number 19, and atomic weight 39.10. It is the chief cation in the intracellular fluid of muscle and other cells. Potassium ion is a strong electrolyte and it plays a significant role in the regulation of fluid volume and maintenance of the water-electrolyte balance. [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]
**Precursor**: Something that precedes. In biological processes, a substance from which another, usually more active or mature substance is formed. In clinical medicine, a sign or symptom that heralds another. [EU]

**Prednisolone**: A glucocorticoid with the general properties of the corticosteroids. It is the drug of choice for all conditions in which routine systemic corticosteroid therapy is indicated, except adrenal deficiency states. [NIH]

**Prednisone**: A synthetic anti-inflammatory glucocorticoid derived from cortisone. It is biologically inert and converted to prednisolone in the liver. [NIH]

**Presynaptic**: Situated proximal to a synapse, or occurring before the synapse is crossed. [EU]

**Prevalence**: The total number of cases of a given disease in a specified population at a designated time. It is differentiated from incidence, which refers to the number of new cases in the population at a given time. [NIH]

**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]

**Proinsulin**: The substance made first in the pancreas that is then made into insulin. When insulin is purified from the pancreas of pork or beef, all the proinsulin is not fully removed. When some people use these insulins, the proinsulin can cause the body to react with a rash, to resist the insulin, or even to make dents or lumps in the skin at the place where the insulin is injected. The purified insulins have less proinsulin and other impurities than the other types of insulins. [NIH]

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

**Prolactin**: Pituitary lactogenic hormone. A polypeptide hormone with a molecular weight of about 23,000. It is essential in the induction of lactation in mammals at parturition and is synergistic with estrogen. The hormone also brings about the release of progesterone from lutein cells, which renders the uterine mucosa suited for the embedding of the ovum should fertilization occur. [NIH]

**Prone**: Having the front portion of the body downwards. [NIH]

**Prophase**: The first phase of cell division, in which the chromosomes become visible, the nucleus starts to lose its identity, the spindle appears, and the centrioles migrate toward opposite poles. [NIH]

**Prospective Studies**: Observation of a population for a sufficient number of persons over a sufficient number of years to generate incidence or mortality rates subsequent to the selection of the study group. [NIH]

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

**Prostate**: A gland in males that surrounds the neck of the bladder and the urethra. It secretes a substance that liquifies coagulated semen. It is situated in the pelvic cavity behind the lower part of the pubic symphysis, above the deep layer of the triangular ligament, and rests upon the rectum. [NIH]

**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]

**Proteoglycans**: Glycoproteins which have a very high polysaccharide content. [NIH]

**Protocol**: The detailed plan for a clinical trial that states the trial’s rationale, purpose, drug or vaccine dosages, length of study, routes of administration, who may participate, and other aspects of trial design. [NIH]

**Pruritus**: An intense itching sensation that produces the urge to rub or scratch the skin to obtain relief. [NIH]

**Psychic**: Pertaining to the psyche or to the mind; mental. [EU]

**Psychoactive**: Those drugs which alter sensation, mood, consciousness or other psychological or behavioral functions. [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]

**Pulmonary**: Relating to the lungs. [NIH]

**Pulmonary Artery**: The short wide vessel arising from the conus arteriosus of the right ventricle and conveying unaerated blood to the lungs. [NIH]

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

**Pulmonary Ventilation**: The total volume of gas per minute inspired or expired measured in liters per minute. [NIH]

**Pulse**: The rhythmic expansion and contraction of an artery produced by waves of pressure caused by the ejection of blood from the left ventricle of the heart as it contracts. [NIH]

**Pupil**: The aperture in the iris through which light passes. [NIH]

**Purgative**: 1. Cathartic (def. 1); causing evacuation of the bowels. 2. A cathartic, particularly one that stimulates peristaltic action. [EU]

**Purified Insulins**: Insulins with much less of the impure proinsulin. It is thought that the use of purified insulins may help avoid or reduce some of the problems of people with diabetes such as allergic reactions. [NIH]

**Putrefaction**: The process of decomposition of animal and vegetable matter by living organisms. [NIH]

**Quality of Life**: A generic concept reflecting concern with the modification and enhancement of life attributes, e.g., physical, political, moral and social environment. [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]

**Radiation therapy**: The use of high-energy radiation from x-rays, gamma rays, neutrons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a
machine outside the body (external-beam radiation therapy), or it may come from radioactive material placed in the body in the area near cancer cells (internal radiation therapy, implant radiation, or brachytherapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body.

Also called radiotherapy. [NIH]

**Radioactive**: Giving off radiation. [NIH]

**Radionuclide Imaging**: Process whereby a radionuclide is injected or measured (through tissue) from an external source, and a display is obtained from any one of several rectilinear scanner or gamma camera systems. The image obtained from a moving detector is called a scan, while the image obtained from a stationary camera device is called a scintiphoto graph. [NIH]

**Radionuclide Ventriculography**: Imaging of a ventricle of the heart after the injection of a radioactive contrast medium. The technique is less invasive than cardiac catheterization and is used to assess ventricular function. [NIH]

**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]

**Recessive gene**: A gene that is phenotypically expressed only when homozygous. [NIH]

**Recombinant**: A cell or an individual with a new combination of genes not found together in either parent; usually applied to linked genes. [EU]

**Recombination**: The formation of new combinations of genes as a result of segregation in crosses between genetically different parents; also the rearrangement of linked genes due to crossing-over. [NIH]

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

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

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

**Red Nucleus**: A pinkish-yellow portion of the midbrain situated in the rostral mesencephalic tegmentum. It receives a large projection from the contralateral half of the cerebellum via the superior cerebellar peduncle and a projection from the ipsilateral motor cortex. [NIH]

**Reductase**: Enzyme converting testosterone to dihydrotestosterone. [NIH]

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

**Reflex**: An involuntary movement or exercise of function in a part, excited in response to a stimulus applied to the periphery and transmitted to the brain or spinal cord. [NIH]

**Reflux**: The term used when liquid backs up into the esophagus from the stomach. [NIH]

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

**Renal failure**: Progressive renal insufficiency and uremia, due to irreversible and progressive renal glomerular tubular or interstitial disease. [NIH]

**Renin**: An enzyme which is secreted by the kidney and is formed from prorenin in plasma and kidney. The enzyme cleaves the Leu-Leu bond in angiotensinogen to generate angiotensin I. EC 3.4.23.15. (Formerly EC 3.4.99.19). [NIH]

**Renin-Angiotensin System**: A system consisting of renin, angiotensin-converting enzyme,
and angiotensin II. Renin, an enzyme produced in the kidney, acts on angiotensinogen, an alpha-2 globulin produced by the liver, forming angiotensin I. The converting enzyme contained in the lung acts on angiotensin I in the plasma converting it to angiotensin II, the most powerful directly pressor substance known. It causes contraction of the arteriolar smooth muscle and has other indirect actions mediated through the adrenal cortex. [NIH]

**Respiration**: The act of breathing with the lungs, consisting of inspiration, or the taking into the lungs of the ambient air, and of expiration, or the expelling of the modified air which contains more carbon dioxide than the air taken in (Blakiston's Gould Medical Dictionary, 4th ed.). This does not include tissue respiration (= oxygen consumption) or cell respiration (= cell respiration). [NIH]

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

**Retina**: The ten-layered nervous tissue membrane of the eye. It is continuous with the optic nerve and receives images of external objects and transmits visual impulses to the brain. Its outer surface is in contact with the choroid and the inner surface with the vitreous body. The outer-most layer is pigmented, whereas the inner nine layers are transparent. [NIH]

**Retinal**: 1. Pertaining to the retina. 2. The aldehyde of retinol, derived by the oxidative enzymatic splitting of absorbed dietary carotene, and having vitamin A activity. In the retina, retinal combines with opsins to form visual pigments. One isomer, 11-cis retinal combines with opsin in the rods (scotopsin) to form rhodopsin, or visual purple. Another, all-trans retinal (trans-r.); visual yellow; xanthopsin) results from the bleaching of rhodopsin by light, in which the 11-cis form is converted to the all-trans form. Retinal also combines with opsins in the cones (photopsins) to form the three pigments responsible for colour vision. Called also retinal, and retinene1. [EU]

**Retinopathy**: 1. Retinitis (= inflammation of the retina). 2. Retinosis (= degenerative, noninflammatory condition of the retina). [EU]

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

**Rhinitis**: Inflammation of the mucous membrane of the nose. [NIH]

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

**Saliva**: The clear, viscous fluid secreted by the salivary glands and mucous glands of the mouth. It contains mucins, water, organic salts, and ptylin. [NIH]

**Salivary**: The duct that convey saliva to the mouth. [NIH]

**Salivary glands**: Glands in the mouth that produce saliva. [NIH]

**Schizoid**: Having qualities resembling those found in greater degree in schizophrenics; a person of schizoid personality. [NIH]

**Schizophrenia**: A mental disorder characterized by a special type of disintegration of the personality. [NIH]

**Schizotypal Personality Disorder**: A personality disorder in which there are oddities of thought (magical thinking, paranoid ideation, suspiciousness), perception (illusions, depersonalization), speech (digressive, vague, overelaborate), and behavior (inappropriate affect in social interactions, frequently social isolation) that are not severe enough to characterize schizophrenia. [NIH]

**Sciatic Nerve**: A nerve which originates in the lumbar and sacral spinal cord (L4 to S3) and supplies motor and sensory innervation to the lower extremity. The sciatic nerve, which is the main continuation of the sacral plexus, is the largest nerve in the body. It has two major
branches, the tibial nerve and the peroneal nerve. [NIH]

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

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

**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]

**Secretory:** Secreting; relating to or influencing secretion or the secretions. [NIH]

**Selection Bias:** The introduction of error due to systematic differences in the characteristics between those selected and those not selected for a given study. In sampling bias, error is the result of failure to ensure that all members of the reference population have a known chance of selection in the sample. [NIH]

**Seminal vesicles:** Glands that help produce semen. [NIH]

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

**Senile:** Relating or belonging to old age; characteristic of old age; resulting from infirmity of old age. [NIH]

**Sensory loss:** A disease of the nerves whereby the myelin or insulating sheath of myelin on the nerves does not stay intact and the messages from the brain to the muscles through the nerves are not carried properly. [NIH]

**Serologic:** Analysis of a person's serum, especially specific immune or lytic serums. [NIH]

**Serotonin:** A biochemical messenger and regulator, synthesized from the essential amino acid L-tryptophan. In humans it is found primarily in the central nervous system, gastrointestinal tract, and blood platelets. Serotonin mediates several important physiological functions including neurotransmission, gastrointestinal motility, hemostasis, and cardiovascular integrity. Multiple receptor families (receptors, serotonin) explain the broad physiological actions and distribution of this biochemical mediator. [NIH]

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

**Sexual Partners:** Married or single individuals who share sexual relations. [NIH]

**Sharpness:** The apparent blurring of the border between two adjacent areas of a radiograph having different optical densities. [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]

**Skeletal:** Having to do with the skeleton (boney part of the body). [NIH]

**Skin Neoplasms:** Tumors or cancer of the skin. [NIH]

**Small cell lung cancer:** A type of lung cancer in which the cells appear small and round when viewed under the microscope. Also called oat cell lung cancer. [NIH]

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

**Smooth muscle:** Muscle that performs automatic tasks, such as constricting blood vessels.
Social Environment: The aggregate of social and cultural institutions, forms, patterns, and processes that influence the life of an individual or community. [NIH]

Sodium: An element that is a member of the alkali group of metals. It has the atomic symbol Na, atomic number 11, and atomic weight 23. With a valence of 1, it has a strong affinity for oxygen and other nonmetallic elements. Sodium provides the chief cation of the extracellular body fluids. Its salts are the most widely used in medicine. (From Dorland, 27th ed) Physiologically the sodium ion plays a major role in blood pressure regulation, maintenance of fluid volume, and electrolyte balance. [NIH]

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

Solitary Nucleus: Gray matter located in the dorsomedial part of the medulla oblongata associated with the solitary tract. The solitary nucleus receives inputs from most organ systems including the terminations of the facial, glossopharyngeal, and vagus nerves. It is a major coordinator of autonomic nervous system regulation of cardiovascular, respiratory, gustatory, gastrointestinal, and chemoreceptive aspects of homeostasis. The solitary nucleus is also notable for the large number of neurotransmitters which are found therein. [NIH]

Solvent: 1. Dissolving; effecting a solution. 2. A liquid that dissolves or that is capable of dissolving; the component of a solution that is present in greater amount. [EU]

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

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

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

Specialist: In medicine, one who concentrates on 1 special branch of medical science. [NIH]

Species: A taxonomic category subordinate to a genus (or subgenus) and superior to a subspecies or variety, composed of individuals possessing common characters distinguishing them from other categories of individuals of the same taxonomic level. In taxonomic nomenclature, species are designated by the genus name followed by a Latin or Latinized adjective or noun. [EU]

Spectrogram: The record or display of a spectrum. [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]

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

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

Spinal Nerve Roots: The paired bundles of nerve fibers entering and leaving the spinal cord at each segment. The dorsal and ventral nerve roots join to form the mixed segmental spinal nerves. The dorsal roots are generally afferent, formed by the central projections of the spinal (dorsal root) ganglia sensory cells, and the ventral roots efferent, comprising the
axons of spinal motor and autonomic preganglionic neurons. There are, however, some exceptions to this afferent/efferent rule. [NIH]

**Spinal Nerves:** The 31 paired peripheral nerves formed by the union of the dorsal and ventral spinal roots from each spinal cord segment. The spinal nerve plexuses and the spinal roots are also included. [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]

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

**Squamous:** Scaly, or platelike. [EU]

**Squamous cell carcinoma:** Cancer that begins in squamous cells, which are thin, flat cells resembling fish scales. Squamous cells are found in the tissue that forms the surface of the skin, the lining of the hollow organs of the body, and the passages of the respiratory and digestive tracts. Also called epidermoid carcinoma. [NIH]

**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]

**Stenosis:** Narrowing or stricture of a duct or canal. [EU]

**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]

**Stool:** The waste matter discharged in a bowel movement; feces. [NIH]

**Streptozocin:** An antibiotic that is produced by Stretomyces achromogenes. It is used as an antineoplastic agent and to induce diabetes in experimental animals. [NIH]

**Stress:** Forcibly exerted influence; pressure. Any condition or situation that causes strain or tension. Stress may be either physical or psychologic, or both. [NIH]

**Stricture:** The abnormal narrowing of a body opening. Also called stenosis. [NIH]

**Stroke:** Sudden loss of function of part of the brain because of loss of blood flow. Stroke may be caused by a clot (thrombosis) or rupture (hemorrhage) of a blood vessel to the brain. [NIH]

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

**Subclinical:** Without clinical manifestations; said of the early stage(s) of an infection or other disease or abnormality before symptoms and signs become apparent or detectable by clinical examination or laboratory tests, or of a very mild form of an infection or other disease or abnormality. [EU]

**Subcutaneous:** Beneath the skin. [NIH]
**Subspecies:** A category intermediate in rank between species and variety, based on a smaller number of correlated characters than are used to differentiate species and generally conditioned by geographical and/or ecological occurrence. [NIH]

**Substance P:** An eleven-amino acid neurotransmitter that appears in both the central and peripheral nervous systems. It is involved in transmission of pain, causes rapid contractions of the gastrointestinal smooth muscle, and modulates inflammatory and immune responses. [NIH]

**Suction:** The removal of secretions, gas or fluid from hollow or tubular organs or cavities by means of a tube and a device that acts on negative pressure. [NIH]

**Sudden cardiac death:** Cardiac arrest caused by an irregular heartbeat. [NIH]

**Sulfur:** An element that is a member of the chalcogen family. It has an atomic symbol S, atomic number 16, and atomic weight 32.066. It is found in the amino acids cysteine and methionine. [NIH]

**Supine:** Having the front portion of the body upwards. [NIH]

**Supine Position:** The posture of an individual lying face up. [NIH]

**Supplementation:** Adding nutrients to the diet. [NIH]

**Suppression:** A conscious exclusion of disapproved desire contrary with repression, in which the process of exclusion is not conscious. [NIH]

**Sweat:** The fluid excreted by the sweat glands. It consists of water containing sodium chloride, phosphate, urea, ammonia, and other waste products. [NIH]

**Sweat Glands:** Sweat-producing structures that are embedded in the dermis. Each gland consists of a single tube, a coiled body, and a superficial duct. [NIH]

**Sympathetic Nervous System:** The thoracolumbar division of the autonomic nervous system. Sympathetic preganglionic fibers originate in neurons of the intermediolateral column of the spinal cord and project to the paravertebral and prevertebral ganglia, which in turn project to target organs. The sympathetic nervous system mediates the body's response to stressful situations, i.e., the fight or flight reactions. It often acts reciprocally to the parasympathetic system. [NIH]

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

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

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

**Synaptic:** Pertaining to or affecting a synapse (= site of functional apposition between neurons, at which an impulse is transmitted from one neuron to another by electrical or chemical means); pertaining to synapsis (= pairing off in point-for-point association of homologous chromosomes from the male and female pronuclei during the early prophase of meiosis). [EU]

**Synaptic Transmission:** The communication from a neuron to a target (neuron, muscle, or secretory cell) across a synapse. In chemical synaptic transmission, the presynaptic neuron releases a neurotransmitter that diffuses across the synaptic cleft and binds to specific synaptic receptors. These activated receptors modulate ion channels and/or second-messenger systems to influence the postsynaptic cell. Electrical transmission is less common in the nervous system, and, as in other tissues, is mediated by gap junctions. [NIH]
**Syncope:** A temporary suspension of consciousness due to generalized cerebral ischemia, a faint or swoon. [EU]

**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]

**Systolic blood pressure:** The maximum pressure in the artery produced as the heart contracts and blood begins to flow. [NIH]

**Tachycardia:** Excessive rapidity in the action of the heart, usually with a heart rate above 100 beats per minute. [NIH]

**Tendon:** A discrete band of connective tissue mainly composed of parallel bundles of collagenous fibers by which muscles are attached, or two muscles bellies joined. [NIH]

**Teratogenesis:** Production of monstrous growths or fetuses. [NIH]

**Testosterone:** A hormone that promotes the development and maintenance of male sex characteristics. [NIH]

**Thalamic:** Cell that reaches the lateral nucleus of amygdala. [NIH]

**Thalamic Diseases:** Disorders of the centrally located thalamus, which integrates a wide range of cortical and subcortical information. Manifestations include sensory loss, movement disorders; ataxia, pain syndromes, visual disorders, a variety of neuropsychological conditions, and coma. Relatively common etiologies include cerebrovascular disorders; cranioencephal trauma; brain neoplasms; brain hypoxia; intracranial hemorrhages; and infectious processes. [NIH]

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

**Thioctic Acid:** A vitamin-like antioxidant that acts as a free-radical scavenger. [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]

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

**Thymus:** An organ that is part of the lymphatic system, in which T lymphocytes grow and multiply. The thymus is in the chest behind the breastbone. [NIH]

**Thyroid:** A gland located near the windpipe (trachea) that produces thyroid hormone, which helps regulate growth and metabolism. [NIH]

**Thyroxine:** An amino acid of the thyroid gland which exerts a stimulating effect on thyroid metabolism. [NIH]

**Tic:** An involuntary compulsive, repetitive, stereotyped movement, resembling a purposeful movement because it is coordinated and involves muscles in their normal synergistic relationships; tics usually involve the face and shoulders. [EU]

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

**Tone:** 1. The normal degree of vigour and tension; in muscle, the resistance to passive
elongation or stretch; tonus. 2. A particular quality of sound or of voice. 3. To make permanent, or to change, the colour of silver stain by chemical treatment, usually with a heavy metal. [EU]

**Tonus**: A state of slight tension usually present in muscles even when they are not undergoing active contraction. [NIH]

**Tooth Preparation**: Procedures carried out with regard to the teeth or tooth structures preparatory to specified dental therapeutic and surgical measures. [NIH]

**Torsion**: A twisting or rotation of a bodily part or member on its axis. [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]

**Transcutaneous**: Transdermal. [EU]

**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]

**Transfer Factor**: Factor derived from leukocyte lysates of immune donors which can transfer both local and systemic cellular immunity to nonimmune recipients. [NIH]

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

**Translation**: The process whereby the genetic information present in the linear sequence of ribonucleotides in mRNA is converted into a corresponding sequence of amino acids in a protein. It occurs on the ribosome and is unidirectional. [NIH]

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

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

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

**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]

**Tricuspid Atresia**: Absence of the orifice between the right atrium and ventricle, with the presence of an atrial defect through which all the systemic venous return reaches the left heart. As a result, there is left ventricular hypertrophy because the right ventricle is absent or not functional. [NIH]
**Tubocurarine**: A neuromuscular blocker and active ingredient in curare; plant based alkaloid of Menispermaceae. [NIH]

**Tumour**: 1. Swelling, one of the cardinal signs of inflammations; morbid enlargement. 2. A new growth of tissue in which the multiplication of cells is uncontrolled and progressive; called also neoplasm. [EU]

**Type 2 diabetes**: Usually characterized by a gradual onset with minimal or no symptoms of metabolic disturbance and no requirement for exogenous insulin. The peak age of onset is 50 to 60 years. Obesity and possibly a genetic factor are usually present. [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]

**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]

**Urea**: A compound (CO(NH2)2), formed in the liver from ammonia produced by the deamination of amino acids. It is the principal end product of protein catabolism and constitutes about one half of the total urinary solids. [NIH]

**Uremia**: The illness associated with the buildup of urea in the blood because the kidneys are not working effectively. Symptoms include nausea, vomiting, loss of appetite, weakness, and mental confusion. [NIH]

**Ureter**: Tubes that carry urine from the kidneys to the bladder. [NIH]

**Urethra**: The tube through which urine leaves the body. It empties urine from the bladder. [NIH]

**Urinary**: Having to do with urine or the organs of the body that produce and get rid of urine. [NIH]

**Urinary tract**: The organs of the body that produce and discharge urine. These include the kidneys, ureters, bladder, and urethra. [NIH]

**Urinary tract infection**: An illness caused by harmful bacteria growing in the urinary tract. [NIH]

**Urinate**: To release urine from the bladder to the outside. [NIH]

**Urine**: Fluid containing water and waste products. Urine is made by the kidneys, stored in the bladder, and leaves the body through the urethra. [NIH]

**Urogenital**: Pertaining to the urinary and genital apparatus; genitourinary. [EU]

**Urogenital System**: All the organs involved in reproduction and the formation and release of urine. It includes the kidneys, ureters, bladder, urethra, and the organs of reproduction - ovaries, uterus, fallopian tubes, vagina, and clitoris in women and the testes, seminal vesicles, prostate, seminal ducts, and penis in men. [NIH]

**Uterus**: The small, hollow, pear-shaped organ in a woman's pelvis. This is the organ in which a fetus develops. Also called the womb. [NIH]

**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]

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

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

**Vascular Resistance**: An expression of the resistance offered by the systemic arterioles, and
to a lesser extent by the capillaries, to the flow of blood. [NIH]

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

**Vasoconstriction:** Narrowing of the blood vessels without anatomic change, for which constriction, pathologic is used. [NIH]

**Vasodilatation:** A state of increased calibre of the blood vessels. [EU]

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

**Vasomotor:** 1. Affecting the calibre of a vessel, especially of a blood vessel. 2. Any element or agent that affects the calibre of a blood vessel. [EU]

**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]

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

**Ventricle:** One of the two pumping chambers of the heart. The right ventricle receives oxygen-poor blood from the right atrium and pumps it to the lungs through the pulmonary artery. The left ventricle receives oxygen-rich blood from the left atrium and pumps it to the body through the aorta. [NIH]

**Ventricular:** Pertaining to a ventricle. [EU]

**Ventricular Dysfunction:** A condition in which the ventricles of the heart exhibit a decreased functionality. [NIH]

**Ventricular Function:** The hemodynamic and electrophysiological action of the ventricles. [NIH]

**Vertebræ:** A bony unit of the segmented spinal column. [NIH]

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

**Villous:** Of a surface, covered with villi. [NIH]

**Vinblastine:** An anticancer drug that belongs to the family of plant drugs called vinca alkaloids. It is a mitotic inhibitor. [NIH]

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

**Vincentine:** An anticancer drug that belongs to the family of plant drugs called vinca alkaloids. [NIH]

**Vinorelbine:** An anticancer drug that belongs to the family of plant drugs called vinca alkaloids. [NIH]

**Viral:** Pertaining to, caused by, or of the nature of virus. [EU]

**Virulence:** The degree of pathogenicity within a group or species of microorganisms or viruses as indicated by case fatality rates and/or the ability of the organism to invade the tissues of the host. [NIH]

**Virus:** Submicroscopic organism that causes infectious disease. In cancer therapy, some viruses may be made into vaccines that help the body build an immune response to, and kill, tumor cells. [NIH]

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

**Visceral:** From viscus (a viscus) pertaining to a viscus. [EU]

**Visceral Afferents:** The sensory fibers innervating the viscera. [NIH]
**Visual Acuity:** Acuteness or clearness of vision, especially of form vision, which is dependent mainly on the sharpness of the retinal focus. [NIH]

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

**Vitreous:** Glasslike or hyaline; often used alone to designate the vitreous body of the eye (corpus vitreum). [EU]

**Vitreous Body:** The transparent, semigelatinous substance that fills the cavity behind the crystalline lens of the eye and in front of the retina. It is contained in a thin hyoid membrane and forms about four fifths of the optic globe. [NIH]

**Vitreous Hemorrhage:** Hemorrhage into the vitreous body. [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]

**Volition:** Voluntary activity without external compulsion. [NIH]

**Warts:** Benign epidermal proliferations or tumors; some are viral in origin. [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]

**Withdrawal:** 1. A pathological retreat from interpersonal contact and social involvement, as may occur in schizophrenia, depression, or schizoid avoidant and schizotypal personality disorders. 2. (DSM III-R) A substance-specific organic brain syndrome that follows the cessation of use or reduction in intake of a psychoactive substance that had been regularly used to induce a state of intoxication. [EU]

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

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

**Zidovudine:** A dideoxynucleoside compound in which the 3'-hydroxy group on the sugar moiety has been replaced by an azido group. This modification prevents the formation of phosphodiester linkages which are needed for the completion of nucleic acid chains. The compound is a potent inhibitor of HIV replication, acting as a chain-terminator of viral DNA during reverse transcription. It improves immunologic function, partially reverses the HIV-induced neurological dysfunction, and improves certain other clinical abnormalities associated with AIDS. Its principal toxic effect is dose-dependent suppression of bone marrow, resulting in anemia and leukopenia. [NIH]
INDEX

A
Abdominal, 107, 111, 138, 143, 144, 145
Accommodation, 8, 111
ACE, 4, 31, 111
Acetaminophen, 33, 111
Acetylcholine, 9, 38, 111, 120, 141
Acetylcholinesterase, 13, 15, 111
Adaptation, 8, 111, 146
Adenocarcinoma, 111, 142
Adjustment, 111
Adrenal Cortex, 111, 112, 123, 150
Adrenal Glands, 111, 113
Adrenal Medulla, 19, 111, 127, 142
Adrenergic, 6, 8, 111, 125, 126, 127, 154
Adrenergic Agonists, 6, 111
Adverse Effect, 111, 151
Age of Onset, 111, 157
Agnost, 112, 125, 126
Albumin, 60, 112, 145
Albuminuria, 39, 112
Aldosterone, 55, 112
Algorithms, 17, 112, 116
Alimentary, 112, 136
Alkaloid, 67, 73, 112, 120, 157
Alleles, 11, 112
Alternative medicine, 14, 82, 112
Amino Acid Sequence, 112, 113, 128
Ammonia, 112, 154, 157
Amphetamines, 112, 121
Amputation, 6, 98, 113
Amyloid, 57, 113
Amyloidosis, 34, 52, 113
Analgesic, 111, 113
Analog, 113, 136, 142
Anatomical, 113, 115, 119, 134, 151
Androgens, 111, 113, 123
Anemia, 113, 159
Anemic, 30, 113
Anesthetics, 113, 127
Angiogenesis, 16, 113
Angiotensinogen, 113, 149, 150
Animal model, 9, 10, 14, 16, 77, 113
Anions, 112, 113, 135
Ankle, 50, 113
Anthracycin, 70, 113
Antiallergic, 113, 123
Antibacterial, 113, 152
Antibiotic, 113, 127, 152, 153
Antibodies, 6, 9, 11, 13, 34, 113, 114, 115, 133, 137, 145
Antibody, 9, 10, 12, 38, 46, 114, 121, 123, 132, 133, 134, 149
Antidiuretic, 41, 114
Antiemetic, 114, 125, 139
Antigen, 114, 121, 132, 133, 134
Anti-inflammatory, 16, 111, 114, 123, 128, 130, 147
Anti-Inflammatory Agents, 114, 123
Antineoplastic, 71, 114, 117, 123, 146, 153, 158
Antioxidant, 30, 64, 114, 143, 155
Antipyretic, 111, 114
Anus, 114, 117
Apnoea, 48, 114
Apolipoproteins, 114, 137
Aponeurosis, 114, 129
Apoptosis, 10, 16, 114
Arrhythmia, 35, 114
Arterial, 17, 43, 55, 114, 118, 120, 122, 132, 148, 155
Arteries, 114, 117, 122, 123, 137, 139, 140, 148
Arterioles, 114, 117, 118, 140, 157
Artery, 6, 10, 52, 57, 114, 115, 118, 123, 126, 142, 148, 155
Arthropathy, 32, 115
Aspiration, 10, 115
Asymptomatic, 6, 83, 115
Asystole, 50, 115
Ataxia, 36, 115, 155
Atmospheric Pressure, 115, 132
Atrial, 115, 122, 156
Atrioventricular, 115, 122
Atrium, 115, 122, 156, 158
Atrophy, 15, 115
Auricular, 29, 115
Autoantibodies, 9, 19, 31, 37, 55, 115
Autoantigens, 115
Autoimmune disease, 115
Autoimmunity, 9, 115
Autonomic Denervation, 77, 115
Autonomic Nervous System, 3, 13, 18, 49, 50, 115, 144, 152, 154
Azotemia, 51, 116
Cloning, 116, 120
Coca, 120
Cocaine, 5, 120
Coenzyme, 121, 136
Collagen, 112, 116, 121, 128
Colloidal, 112, 121
Complement, 121, 145
Complementary and alternative medicine, 67, 74, 121
Complementary medicine, 67, 121
Compliance, 15, 121
Computational Biology, 91, 121
Connective Tissue, 117, 121, 122, 124, 128, 129, 138, 139, 140, 155
Connexins, 122, 129
Consciousness, 113, 122, 148, 155
Constipation, 15, 56, 107, 122
Constitutional, 122, 140
Constriction, 122, 135, 158
Contractility, 15, 122, 125
Contraindications, ii, 122
Contrast medium, 122, 149
Controlled study, 16, 46, 122
Convulsions, 122, 133
Cor, 67, 122
Coronary, 6, 10, 23, 29, 52, 57, 118, 122, 123, 139, 140
Coronary Arteriosclerosis, 123, 140
Coronary heart disease, 23, 118, 123
Coronary Thrombosis, 123, 139, 140
Corpus, 123, 144, 159
Corticosteroid, 11, 123, 147
Cortisol, 112, 123
Cortisone, 123, 147
Cranial, 41, 98, 123, 131, 144
Cumulative Trauma Disorders, 123, 139
Curative, 123, 155
Cutaneous, 25, 72, 76, 123
Cyclic, 119, 123
Cytokines, 11, 16, 123, 134
Cytoplasm, 114, 119, 123
Cytotoxicity, 16, 120, 123
Degenerative, 96, 123, 140, 150
Deletion, 114, 124
Dendrites, 124, 141
Density, 4, 117, 124, 125, 137, 142
Dermal, 124, 140
Dermis, 124, 154
Desensitization, 124, 134
Developing Countries, 76, 124
Diabetic Foot, 42, 69, 76, 124
Diabetic Ketoacidosis, 76, 124
Diabetic Retinopathy, 76, 124
Diagnostic procedure, 82, 124
Dialyzer, 124, 131
Diarrhea, 4, 5, 107, 124
Diastole, 124
Diastolic, 6, 41, 51, 124, 133
Digestion, 112, 116, 117, 124, 125, 130, 135, 137, 153
Digestive system, 4, 124, 130
Digestive tract, 96, 115, 124, 151, 153
Dihydrotestosterone, 125, 149
Dilution, 125, 127, 146
Direct, iii, 7, 85, 119, 125, 149, 154
Distal, 10, 21, 98, 125, 144
Domperidone, 49, 125
Dopamine, 121, 125, 139, 141, 145
Dorsum, 125, 129
Dose-dependent, 125, 159
Double-blind, 13, 46, 125
Drive, ii, vi, 12, 23, 39, 63, 75, 76, 77, 79, 97, 125
Drug Interactions, 86, 125
Duct, 125, 127, 137, 150, 153, 154
Duodenum, 116, 125, 129, 140, 153
Dyes, 113, 125
Dyslipidemia, 4, 125
Dyspepsia, 47, 125
Dystrophy, 12, 47, 70, 125
Edema, 97, 124, 125, 136
Effector, 111, 121, 125
Ejection fraction, 6, 125
Elastin, 121, 126, 128
Electrocardiogram, 53, 126
Electrocardiography, 64, 126
Electrolyte, 10, 109, 112, 123, 126, 139, 146, 152
Electrons, 114, 126, 135, 143, 148
Electrophysiological, 14, 69, 72, 126, 158
Emboli, 126, 134
Encephalopathy, 67, 126
Endemic, 126, 153
Endogenous, 70, 115, 118, 125, 126
Endorphins, 126, 141
Endothelial cell, 16, 117, 126
End-stage renal, 5, 120, 126
Enkephalin, 50, 126
Environmental Health, 90, 92, 126
Enzymatic, 76, 112, 118, 121, 126, 128, 150
Kidney Transplantation, 97, 136
Kinetics, 48, 136
L
Lactate Dehydrogenase, 16, 136
Laminin, 116, 128, 136
Large Intestine, 124, 135, 136, 149, 151
Lens, 119, 136, 159
Leprosy, 129, 136
Lesion, 129, 136, 137, 157
Leukemia, 68, 130, 136
Leukocytes, 117, 123, 136
Leukopenia, 136, 159
Lipid, 71, 114, 120, 135, 137, 143
Lipid Peroxidation, 137, 143
Lipoprotein, 4, 125, 137
Liver Transplantation, 19, 20, 38, 137
Localization, 133, 137
Localized, 113, 134, 136, 137, 145, 157
Loop, 57, 137
Low-density lipoprotein, 4, 125, 137
Lymph, 120, 126, 137
Lymphatic, 134, 137, 138, 152, 153, 155
Lymphocyte, 114, 134, 137
Lymphocyte Depletion, 134, 137
Lymphoid, 114, 137
Lytic, 137, 151
M
Magnetic Resonance Imaging, 30, 137
Malabsorption, 119, 138
Malignant, 111, 114, 138, 140
Malnutrition, 10, 16, 32, 112, 115, 138
Mammogram, 117, 138, 139
Medial, 43, 55, 138
Median Nerve, 118, 138
Mediate, 70, 125, 138
MEDLINE, 91, 138
Meiosis, 138, 154
Melanin, 135, 138, 145, 157
Membrane, 119, 121, 124, 127, 135, 136, 138, 140, 142, 145, 150, 156, 159
Meninges, 119, 138
Mental, iv, 7, 36, 44, 90, 92, 119, 122, 128, 138, 148, 150, 157
Mental Retardation, 36, 138
Mentors, 9, 138
Mesenchymal, 10, 138
Mesenteric, 8, 12, 54, 70, 138
Mesentery, 138, 145
Meta-Analysis, 58, 138
Metabolic acidosis, 124, 138
Metabolic disorder, 14, 138
Metastasis, 138, 139, 140
Metastatic, 69, 139
Metoclopramide, 68, 139
MI, 20, 48, 97, 109, 139
Microbe, 139, 156
Microbiology, 111, 139
Microcalcifications, 117, 139
Microorganism, 139, 159
Migration, 16, 139
Mineralocorticoids, 111, 123, 139
Mitochondrial Swelling, 139, 140
Mitosis, 114, 139
Mitotic, 127, 139, 158
Modification, 112, 139, 148, 159
Molecular, 13, 14, 16, 34, 58, 76, 91, 93, 116, 122, 139, 140, 147
Molecule, 114, 121, 125, 127, 132, 139, 143, 149, 158
Monitor, 8, 17, 139, 142
Mononeuropathies, 77, 139
Morphology, 16, 75, 119, 140
Morphology, 16, 75, 119, 140
Motilin, 64, 140
Motility, 15, 46, 47, 70, 140, 151
Motor Activity, 52, 122, 130, 140
Mucin, 129, 140
Mucosa, 130, 140, 147
Multicenter study, 22, 140
Muscle relaxant, 140, 141
Muscular Dystrophies, 125, 140
Myasthenia, 9, 45, 140, 141
Myelin, 140, 151
Myenteric, 10, 140
Myocardial infarction, 4, 6, 7, 83, 123, 139, 140
Myocardial Ischemia, 6, 51, 57, 140
Myocardium, 139, 140
N
Narcolepsy, 126, 140
Nausea, 108, 114, 130, 136, 140, 157
Necrobiosis Lipoidica, 97, 140
Necrosis, 10, 11, 114, 134, 139, 140
Neoplasms, 114, 140, 155
Neostigmine, 15, 141
Nephropathy, 4, 5, 6, 24, 36, 42, 54, 61, 76, 97, 136, 141
Nerve Growth Factor, 34, 46, 141
Nervous System, 109, 115, 119, 141, 144, 154
Networks, 10, 141
Neural, 12, 55, 113, 117, 141
| Postprandial, 71, 146 |
| Postprandial Blood Glucose, 71, 146 |
| Postsynaptic, 146, 154 |
| Postural, 5, 7, 12, 24, 30, 46, 55, 61, 71, 77, 83, 98, 146 |
| Potassium, 13, 112, 139, 146 |
| Practice Guidelines, 92, 146 |
| Precursor, 113, 120, 125, 126, 142, 145, 147, 157 |
| Prednisolone, 147 |
| Prednisone, 10, 147 |
| Presynaptic, 141, 147, 154 |
| Prevalence, 23, 36, 37, 42, 51, 59, 72, 147 |
| Progression, 5, 7, 58, 113, 147 |
| Progressive, 11, 12, 17, 28, 120, 140, 147, 149, 157 |
| Proinsulin, 76, 147, 148 |
| Projection, 142, 147, 149 |
| Prolactin, 125, 147 |
| Prone, 17, 147 |
| Prophase, 147, 154 |
| Prospective Studies, 6, 147 |
| Prospective study, 10, 12, 52, 147 |
| Prostate, 147, 157 |
| Protein C, 112, 114, 116, 137, 147, 149, 157 |
| Protein S, 116, 127, 148 |
| Proteinuria, 5, 148 |
| Proteoglycans, 116, 128, 148 |
| Protocol, 10, 148 |
| Pruritus, 40, 148 |
| Psychic, 138, 148 |
| Psychoactive, 148, 159 |
| Public Policy, 91, 148 |
| Pulmonary, 117, 122, 136, 148, 150, 158 |
| Pulmonary Artery, 117, 148, 158 |
| Pulmonary hypertension, 122, 148 |
| Pulmonary Ventilation, 148, 150 |
| Pulse, 82, 139, 148 |
| Pupil, 4, 5, 52, 148 |
| Purgative, 146, 148 |
| Purified Insulins, 147, 148 |
| Putrefaction, 129, 148 |
| Quality of Life, 10, 11, 148 |
| Race, 139, 148 |
| Radiation, 128, 129, 132, 134, 148, 149 |
| Radiation therapy, 132, 148 |
| Radioactive, 132, 142, 149 |
| Radionuclide Imaging, 7, 149 |
| Radionuclide Ventriculography, 41, 149 |
| Randomized, 13, 30, 64, 149 |
| Receptor, 9, 34, 38, 46, 111, 114, 125, 149, 151 |
| Recessive gene, 11, 149 |
| Recombinant, 19, 149, 158 |
| Recombination, 130, 149 |
| Rectum, 114, 117, 124, 129, 134, 136, 147, 149 |
| Recurrence, 120, 149 |
| Red blood cells, 143, 149 |
| Red Nucleus, 115, 149 |
| Reductase, 28, 75, 149 |
| Prednisolone, 147 |
| Reductase, 28, 75, 149 |
| Refer, 1, 121, 126, 137, 149 |
| Reflex, 12, 28, 31, 54, 68, 149 |
| Reflux, 28, 149 |
| Refraction, 149, 152 |
| Progressive, 11, 12, 17, 28, 120, 140, 147, 149, 157 |
| Renin, 55, 113, 118, 149 |
| Renin-Angiotensin System, 118, 149 |
| Respiration, 118, 139, 150 |
| Respiratory System, 39, 150 |
| Retina, 124, 136, 150, 159 |
| Retinal, 56, 124, 150, 159 |
| Retinopathy, 5, 39, 55, 97, 124, 150 |
| Retroviral vector, 130, 150 |
| Rhinitis, 126, 150 |
| Risk factor, 4, 11, 20, 97, 147, 150 |
| Saliva, 150 |
| Salivary, 19, 124, 150 |
| Salivary glands, 124, 150 |
| Schizoid, 150, 159 |
| Schizophrenia, 150, 159 |
| Schizotypal Personality Disorder, 150, 159 |
| Sciatric Nerve, 145, 150 |
| Sclerosis, 44, 151 |
| Screening, 120, 151 |
| Secretion, 30, 41, 48, 50, 60, 61, 76, 120, 123, 130, 135, 139, 142, 151 |
| Secretory, 151, 154 |
| Selection Bias, 8, 151 |
| Seminal vesicles, 151, 157 |
| Semisynthetic, 127, 151 |
| Senile, 143, 146, 151 |
| Sensory loss, 27, 151, 155 |
| Serologic, 10, 151 |
| Serotonin, 141, 151 |
| Serum, 9, 112, 121, 133, 137, 139, 151 |
| Sexual Partners, 13, 151 |
| Sharpness, 151, 159 |
| Shock, 14, 133, 151, 156 |
| Side effect, 85, 111, 116, 151, 156 |
| Skeletal, 35, 113, 136, 140, 151 |
Transplantation, 19, 20, 28, 51, 76, 120, 133, 137, 156
Trauma, 3, 116, 127, 131, 139, 140, 155, 156
Tricuspid Atresia, 122, 156
Tubocurarine, 141, 157
Tumour, 129, 157
Type 2 diabetes, 7, 18, 19, 22, 23, 24, 40, 50, 51, 60, 157
Tyrosine, 13, 34, 46, 119, 125, 157

U
Ulcer, 47, 157
Ulceration, 6, 21, 157
Urea, 116, 154, 157
Uremia, 72, 136, 149, 157
Ureters, 157
Urethra, 144, 147, 157
Urinary, 4, 20, 60, 97, 126, 134, 157
Urinary tract, 4, 97, 157
Urinary tract infection, 97, 157
Urogenital, 14, 157
Urogenital System, 14, 157
Uterus, 123, 143, 157

V
Vaccines, 157, 158
Vagina, 157
Vascular, 17, 61, 75, 124, 134, 155, 157
Vascular Resistance, 17, 157
Vasoactive, 13, 158
Vasoconstriction, 127, 158
Vasodilatation, 118, 158
Vasodilator, 118, 125, 158
Vasomotor, 31, 53, 158
Vector, 156, 158
Vein, 16, 135, 142, 158
Venous, 42, 148, 156, 158

Ventricule, 115, 122, 133, 148, 149, 155, 156, 158
Ventricular, 6, 35, 40, 41, 51, 122, 125, 149, 156, 158
Ventricular Dysfunction, 40, 126, 158
Ventricular Function, 35, 149, 158
Vertebrae, 152, 158
Veterinary Medicine, 91, 158
Villous, 119, 158
Vinblastine, 68, 158
Vinca Alkaloids, 158
Vincristine, 67, 69, 70, 71, 72, 73, 158
Vinorelbine, 69, 158
Viral, 12, 156, 158, 159
Virulence, 156, 158
Virus, 30, 36, 37, 116, 150, 156, 158
Viscera, 138, 152, 158
Visceral, 115, 145, 158
Visceral Afferents, 115, 158
Visual Acuity, 5, 159
Vitamin A, 135, 159
Vitreous, 97, 124, 136, 150, 159
Vitreous Body, 150, 159
Vitreous Hemorrhage, 97, 124, 159
Vitro, 16, 159
Vivo, 14, 16, 137, 159
Volition, 135, 159

W
Warts, 146, 159
White blood cell, 114, 136, 137, 145, 159
Withdrawal, 29, 159
Wound Healing, 16, 159

X
Xenograft, 113, 159

Y
Yeasts, 145, 159

Z
Zidovudine, 37, 159
172  Autonomic neuropathy