THE OFFICIAL PATIENT'S SOURCEBOOK *on*

PERIPHERAL NEUROPATHY

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

Printed in the United States of America.

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

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

Cataloging-in-Publication Data

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

The Official Patient's Sourcebook on Peripheral Neuropathy: A Revised and Updated Directory for the Internet Age/James N. Parker and Philip M. Parker, editors
p. cm.
Includes bibliographical references, glossary and index.
ISBN: 0-597-83097-5
1. Peripheral Neuropathy-Popular works. I. Title.

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Dedication

To the healthcare professionals dedicating their time and efforts to the study of peripheral neuropathy.

Acknowledgements

The collective knowledge generated from academic and applied research summarized in various references has been critical in the creation of this sourcebook which is best viewed as a comprehensive compilation and collection of information prepared by various official agencies which directly or indirectly are dedicated to the study of peripheral neuropathy. All of the *Official Patient's Sourcebooks* 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 sourcebook. 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 LaRochelle for her excellent editorial support.

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- The Official Patient's Sourcebook on Brachial Plexus Injuries
- The Official Patient's Sourcebook on Brown Sequard
- The Official Patient's Sourcebook on Chronic Inflammatory Demyelinating Polyneuropathy
- The Official Patient's Sourcebook on Orthostatic Hypotension
- The Official Patient's Sourcebook on Paresthesia
- The Official Patient's Sourcebook on Primary Lateral Sclerosis
- The Official Patient's Sourcebook on Reflex Sympathetic Dystrophy Syndrome
- The Official Patient's Sourcebook on Shy Drager
- The Official Patient's Sourcebook on Spinal Cord Injury
- The Official Patient's Sourcebook on Syringomyelia
- The Official Patient's Sourcebook on Tethered Spinal Cord Syndrome
- The Official Patient's Sourcebook on Thoracic Outlet Syndrome
- The Official Patient's Sourcebook on Transverse Myelitis
- The Official Patient's Sourcebook on Trigeminal Neuralgia
- The Official Patient's Sourcebook on Whiplash

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INTRODUCTION

Overview

Dr. C. Everett Koop, former U.S. Surgeon General, once said, "The best prescription is knowledge."[1] The Agency for Healthcare Research and Quality (AHRQ) of the National Institutes of Health (NIH) echoes this view and recommends that every patient incorporate education into the treatment process. According to the AHRQ:

> Finding out more about your condition is a good place to start. By contacting groups that support your condition, visiting your local library, and searching on the Internet, you can find good information to help guide your treatment decisions. Some information may be hard to find—especially if you don't know where to look.[2]

As the AHRQ mentions, finding the right information is not an obvious task. Though many physicians and public officials had thought that the emergence of the Internet would do much to assist patients in obtaining reliable information, 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.[3]

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[1] Quotation from http://www.drkoop.com.
[2] The Agency for Healthcare Research and Quality (AHRQ): http://www.ahcpr.gov/consumer/diaginfo.htm.
[3] From the NIH, National Cancer Institute (NCI): **http://cancertrials.nci.nih.gov/beyond/evaluating.html**.

Since the late 1990s, physicians have seen a general increase in patient Internet usage rates. Patients frequently enter their doctor's offices with printed Web pages of home remedies in the guise of latest medical research. This scenario is so common that doctors often spend more time dispelling misleading information than guiding patients through sound therapies. *The Official Patient's Sourcebook on Peripheral Neuropathy* has been created for patients who have decided to make education and research an integral part of the treatment process. The pages that follow will tell you where and how to look for information covering virtually all topics related to peripheral neuropathy, from the essentials to the most advanced areas of research.

The title of this book includes the word "official." This reflects the fact that the sourcebook draws from public, academic, government, and peer-reviewed research. Selected readings from various agencies are reproduced to give you some of the latest official information available to date on peripheral neuropathy.

Given patients' increasing sophistication in using the Internet, abundant references to reliable Internet-based resources are provided throughout this sourcebook. Where possible, guidance is provided on how to obtain free-of-charge, primary research results as well as more detailed information via the Internet. E-book and electronic versions of this sourcebook are fully interactive with each of the Internet sites mentioned (clicking on a hyperlink automatically opens your browser to the site indicated). Hard copy users of this sourcebook can type cited Web addresses directly into their browsers to obtain access to the corresponding sites. Since we are working with ICON Health Publications, hard copy *Sourcebooks* are frequently updated and printed on demand to ensure that the information provided is current.

In addition to extensive references accessible via the Internet, every chapter presents a "Vocabulary Builder." Many health guides offer glossaries of technical or uncommon terms in an appendix. In editing this sourcebook, we have decided to place a smaller glossary within each chapter that covers terms used in that chapter. Given the technical nature of some chapters, you may need to revisit many sections. Building one's vocabulary of medical terms in such a gradual manner has been shown to improve the learning process.

We must emphasize that no sourcebook on peripheral neuropathy should affirm that a specific diagnostic procedure or treatment discussed in a research study, patent, or doctoral dissertation is "correct" or your best option. This sourcebook is no exception. Each patient is unique. Deciding on

appropriate options is always up to the patient in consultation with their physician and healthcare providers.

Organization

This sourcebook is organized into three parts. Part I explores basic techniques to researching peripheral neuropathy (e.g. finding guidelines on diagnosis, treatments, and prognosis), followed by a number of topics, including information on how to get in touch with organizations, associations, or other patient networks dedicated to peripheral neuropathy. It also gives you sources of information that can help you find a doctor in your local area specializing in diagnosing and treating peripheral neuropathy. Collectively, the material presented in Part I is a complete primer on basic research topics for patients with peripheral neuropathy.

Part II moves on to advanced research dedicated to peripheral neuropathy. Part II is intended for those willing to invest many hours of hard work and study. It is here that we direct you to the latest scientific and applied research on peripheral neuropathy. When possible, contact names, links via the Internet, and summaries are provided. It is in Part II where the vocabulary process becomes important as authors publishing advanced research frequently use highly specialized language. In general, every attempt is made to recommend "free-to-use" options.

Part III provides appendices of useful background reading for all patients with peripheral neuropathy or related disorders. The appendices are dedicated to more pragmatic issues faced by many patients with peripheral neuropathy. Accessing materials via medical libraries may be the only option for some readers, so a guide is provided for finding local medical libraries which are open to the public. Part III, therefore, focuses on advice that goes beyond the biological and scientific issues facing patients with peripheral neuropathy.

Scope

While this sourcebook covers peripheral neuropathy, your doctor, research publications, and specialists may refer to your condition using a variety of terms. Therefore, you should understand that peripheral neuropathy is often considered a synonym or a condition closely related to the following:

- Mononeuritis Multiplex

- Mononeuritis, Peripheral
- Mononeuropathym Peripheral
- Multiple Neuritis
- Multiple Peripheral Neuritis
- Neuritis - Peripheral
- Neuropathy - Peripheral
- Peripheral Neuritis
- Peripheral Neuropathy
- Polyneuritis
- Polyneuritis, Peripheral
- Polyneuropathy, Peripheral

In addition to synonyms and related conditions, physicians may refer to peripheral neuropathy using certain coding systems. The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) is the most commonly used system of classification for the world's illnesses. Your physician may use this coding system as an administrative or tracking tool. The following classification is commonly used for peripheral neuropathy:[4]

- 729.2 neuritis/neuralgia

For the purposes of this sourcebook, we have attempted to be as inclusive as possible, looking for official information for all of the synonyms relevant to peripheral neuropathy. You may find it useful to refer to synonyms when accessing databases or interacting with healthcare professionals and medical librarians.

Moving Forward

Since the 1980s, the world has seen a proliferation of healthcare guides covering most illnesses and conditions. Some are written by patients or their family members. These generally take a layperson's approach to

[4] This list is based on the official version of the World Health Organization's 9th Revision, International Classification of Diseases (ICD-9). According to the National Technical Information Service, "ICD-9CM extensions, interpretations, modifications, addenda, or errata other than those approved by the U.S. Public Health Service and the Health Care Financing Administration are not to be considered official and should not be utilized. Continuous maintenance of the ICD-9-CM is the responsibility of the federal government."

understanding and coping with an illness or disorder. They can be uplifting, encouraging, and highly supportive. Other guides are authored by physicians or other healthcare providers who have a more clinical outlook. Each of these two styles of guide has its purpose and can be quite useful.

As editors, we have chosen a third route. We have chosen to expose you to as many sources of official and peer-reviewed information as practical, for the purpose of educating you about basic and advanced knowledge as recognized by medical science today. You can think of this sourcebook as your personal Internet age reference librarian.

Why "Internet age"? All too often, patients with peripheral neuropathy will log on to the Internet, type words into a search engine, and receive several Web site listings which are mostly irrelevant or redundant. These patients are left to wonder where the relevant information is, and how to obtain it. Since only the smallest fraction of information dealing with peripheral neuropathy is even indexed in search engines, a non-systematic approach often leads to frustration and disappointment. With this sourcebook, we hope to direct you to the information you need that you would not likely find using popular Web directories. Beyond Web listings, in many cases we will reproduce brief summaries or abstracts of available reference materials. These abstracts often contain distilled information on topics of discussion.

While we focus on the more scientific aspects of peripheral neuropathy, there is, of course, the emotional side to consider. Later in the sourcebook, we provide a chapter dedicated to helping you find peer groups and associations that can provide additional support beyond research produced by medical science. We hope that the choices we have made give you the most options available in moving forward. In this way, we wish you the best in your efforts to incorporate this educational approach into your treatment plan.

The Editors

PART I: THE ESSENTIALS

ABOUT PART I

Part I has been edited to give you access to what we feel are "the essentials" on peripheral neuropathy. The essentials of a symptom typically include the definition or description of the symptom, a discussion of who it affects, the diseases that are associated with a given symptom, tests or diagnostic procedures that might be specific to the symptom, and treatments for the symptom. Your doctor or healthcare provider may have already explained the essentials of peripheral neuropathy to you or even given you a pamphlet or brochure describing peripheral neuropathy. Now you are searching for more in-depth information. As editors, we have decided, nevertheless, to include a discussion on where to find essential information that can complement what your doctor has already told you. In this section we recommend a process, not a particular Web site or reference book. The process ensures that, as you search the Web, you gain background information in such a way as to maximize your understanding.

CHAPTER 1. THE ESSENTIALS ON PERIPHERAL NEUROPATHY: GUIDELINES

Overview

Official agencies, as well as federally-funded institutions supported by national grants, frequently publish a variety of guidelines on peripheral neuropathy. 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. The great advantage of guidelines over other sources is that they are often written with the patient in mind. Since new guidelines on peripheral 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.

The National Institutes of Health (NIH)[5]

The National Institutes of Health (NIH) is the first place to search for relatively current patient guidelines and fact sheets on peripheral neuropathy. Originally founded in 1887, the NIH is one of the world's foremost medical research centers and the federal focal point for medical research in the United States. At any given time, the NIH supports some 35,000 research grants at universities, medical schools, and other research and training institutions, both nationally and internationally. The rosters of those who have conducted research or who have received NIH support over the years include the world's most illustrious scientists and physicians. Among them are 97 scientists who have won the Nobel Prize for achievement in medicine.

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[5] Adapted from the NIH: **http://www.nih.gov/about/NIHoverview.html**.

There is no guarantee that any one Institute will have a guideline on a specific condition or disease, though the National Institutes of Health collectively publish over 600 guidelines for both common and rare conditions and disorders. The best way to access NIH guidelines is via the Internet. Although the NIH is organized into many different Institutes and Offices, the following is a list of key Web sites where you are most likely to find NIH clinical guidelines and publications dealing with peripheral neuropathy and associated conditions:

- Office of the Director (OD); guidelines consolidated across agencies available at **http://www.nih.gov/health/consumer/conkey.htm**
- National Library of Medicine (NLM); extensive encyclopedia (A.D.A.M., Inc.) with guidelines available at **http://www.nlm.nih.gov/medlineplus/healthtopics.html**
- National Institute of Neurological Disorders and Stroke (NINDS); **http://www.ninds.nih.gov/health_and_medical/disorder_index.htm**

Among the above, the National Institute of Neurological Disorders and Stroke (NINDS) is particularly noteworthy. The mission of the NINDS is to reduce the burden of neurological disease—a burden borne by every age group, by every segment of society, by people all over the world.[6] To support this mission, the NINDS conducts, fosters, coordinates, and guides research on the causes, prevention, diagnosis, and treatment of neurological disorders and stroke, and supports basic research in related scientific areas. The following patient guideline was recently published by the NINDS on peripheral neuropathy.

What Is Peripheral Neuropathy?[7]

Peripheral neuropathy is a common neurological disorder resulting from damage to the peripheral nerves. It may be caused by diseases of the nerves or as the result of systemic illnesses. Many neuropathies have well-defined causes such as diabetes, uremia, AIDs, or nutritional deficiencies. In fact, diabetes is one of the most common causes of peripheral neuropathy. Other causes include mechanical pressure such as compression or entrapment, direct trauma, penetrating injuries, contusions, fracture or dislocated bones;

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[6] This paragraph has been adapted from the NINDS: **http://www.ninds.nih.gov/about_ninds/mission.htm**. "Adapted" signifies that a passage has been reproduced exactly or slightly edited for this book.

[7] Adapted from The National Institute of Neurological Disorders and Stroke (NINDS): **http://www.ninds.nih.gov/health_and_medical/disorders/peripheralneuropathy_doc.htm**.

pressure involving the superficial nerves (ulnar, radial, or peroneal) which can result from prolonged use of crutches or staying in one position for too long, or from a tumor; intraneural hemorrhage; exposure to cold or radiation or, rarely, certain medicines or toxic substances; and vascular or collagen disorders such as atherosclerosis, systemic lupus erythematosus, scleroderma, sarcoidosis, rheumatoid arthritis, and polyarteritis nodosa.

A common example of entrapment neuropathy is carpal tunnel syndrome, which has become more common because of the increasing use of computers. Although the causes of peripheral neuropathy are diverse, they produce common symptoms including weakness, numbness, paresthesia (abnormal sensations such as burning, tickling, pricking or tingling) and pain in the arms, hands, legs and/or feet. A large number of cases are of unknown cause.

Is There Any Treatment?

Therapy for peripheral neuropathy differs depending on the cause. For example, therapy for peripheral neuropathy caused by diabetes involves control of the diabetes. In cases where a tumor or ruptured disc is the cause, therapy may involve surgery to remove the tumor or to repair the ruptured disc. In entrapment or compression neuropathy treatment may consist of splinting or surgical decompression of the ulnar or median nerves. Peroneal and radial compression neuropathies may require avoidance of pressure. Physical therapy and/or splints may be useful in preventing contractures (a condition in which shortened muscles around joints cause abnormal and sometimes painful positioning of the joints).

What Is the Prognosis?

Recovery from peripheral neuropathy is usually slow. Depending on the type of peripheral neuropathy, the patient may fully recover without residual effects or may partially recover and have sensory, motor, and vasomotor (blood vessel) deficits. If severely affected, the patient may develop chronic muscular atrophy.

What Research Is Being Done?

The NINDS supports a broad program of research on disorders of the peripheral nervous system, including peripheral neuropathy. Much of this research is aimed at increasing the understanding of peripheral neuropathy and finding ways to prevent and cure the disorder.

For More Information

For more information, contact:

American Chronic Pain Association (ACPA)
P.O. Box 850
Rocklin, CA 95677-0850
ACPA@pacbell.net
http://www.theacpa.org
Tel: 916-632-0922
Fax: 916-632-3208

National Chronic Pain Outreach Association (NCPOA)
P.O. Box 274
Millboro, VA 24460
ncpoa@cfw.com
Tel: 540-862-9437
Fax: 540-862-9485

Neuropathy Association
60 East 42nd Street
Suite 942
New York, NY 10165-0999
info@neuropathy.org
http://www.neuropathy.org
Tel: 212-692-0662 800-247-6968
Fax: 212-692-0668

National Foundation for the Treatment of Pain
1330 Skyline Drive
#21
Monterey, CA 93940
mgordon@mbay.net
http://www.paincare.org
Tel: 831-655-8812
Fax: 831-655-2823

More Guideline Sources

The guideline above on peripheral neuropathy is only one example of the kind of material that you can find online and free of charge. The remainder of this chapter will direct you to other sources which either publish or can help you find additional guidelines on topics related to peripheral neuropathy. Many of the guidelines listed below address topics that may be of particular relevance to your specific situation or of special interest to only some patients with peripheral 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.

Topic Pages: MEDLINEplus

For patients wishing to go beyond guidelines published by specific Institutes of the NIH, 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." You can think of a health topic page as a guide to patient guides. 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.

If you do not find topics of interest when browsing health topic pages, then you can choose to use the advanced search utility of MEDLINEplus at **http://www.nlm.nih.gov/medlineplus/advancedsearch.html**. This utility is similar to the NIH Search Utility, with the exception that it only includes material 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 peripheral neuropathy and related conditions. One of the advantages of CHID over other sources is that it 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:

- **Dealing With Drug Side Effects**

  Contact: Project WISE of Project Inform, 205 13th St Ste 2001, San Francisco, CA, 94103, (415) 558-8669, http://www.projinf.org.

  Summary: This brochure, for individuals with the human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS), discusses coping techniques for dealing with the side effects of anti-HIV drugs. The brochure explains the key to coping with side effects, how side effects occur differently in women, and how individuals can care for themselves. The brochure explains the possible causes and ways HIV-positive individuals deal with side effects like fatigue, anemia, headache, nausea and vomiting, diarrhea, weight loss, dry mouth, rash, peripheral neuropathy, period problems, and hair loss. A chart is provided listing specific drugs and their possible side effects. The brochure cites studies that attempt to explain why people experience side effects differently.

- **When Your Doctor Prescribes VIDEX (didanosine)**

  Contact: Bristol Myers Squibb, Oncology/Immunology Access Program, 1800 Robert Fulton Dr Ste 300, Reston, VA, 20191, (800) 272-4878.

  Summary: Information on didanosine or Videx and its role in HIV treatment is provided in this brochure, which urges the patient to take an active role in therapy. The usual dosing schedule is described with special precautions noted. Possible contraindications detailed are pancreatitis and peripheral neuropathy. The brochure urges the reader to report any adverse effects immediately.

- **What is Neuropathy?**

  Source: Hollywood, FL: Diabetes Research Institute. 1992. 4 p.

  Contact: Available from Diabetes Research Institute. 3440 Hollywood Boulevard, Suite 100, Hollywood, FL 33021. (305) 964-4040 or (800) 321-3437. Price: Single copy free (donations accepted).

  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.

- **Understanding Neuropathy**

  Source: Ann Arbor, MI: University of Michigan, Media Library. 1991. 45 p.

  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.

- **Diabetic Foot Care**

  Source: McLean, VA: American Diabetes Association. 1990. 13 p.

  Contact: Available from American Diabetes Association. Order Department, 1970 Chain Bridge Road, McLean, VA 22109. (800) 232-3472. Price: $3.50 ($3 for ADA members). ISBN: 0945448139.

  Summary: Diabetic foot problems are a major chronic complication of diabetes. The early detection and prompt treatment of developing foot

lesions can significantly impact on this problem. This brochure presents guidelines to help health professionals educate their patients about proper foot care and routinely evaluate the condition of their feet. Specific topics include low-risk patients; evaluation of high-risk patients without active ulcers; treatment of diabetic foot ulcers; and neuroarthropathic joints. Three tables list the signs and symptoms of peripheral neuropathy; the signs and symptoms of peripheral vascular disease; and the criteria for therapeutic shoe design. A list of patient instructions for diabetic foot care, in a format suitable for photocopying and distribution, is appended. 10 references.

The National Guideline Clearinghouse™

The National Guideline Clearinghouse™ offers hundreds of evidence-based clinical practice guidelines published in the United States and other countries. You can search their site located at **http://www.guideline.gov** by using the keyword "peripheral neuropathy" or synonyms. The following was recently posted:

- **ASHP therapeutic guidelines for nonsurgical antimicrobial prophylaxis.**

  Source: American Society of Health-System Pharmacists.; 1999 June 15; 50 pages

  http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=001185&sSearch_string=Peripheral+Neuropathy

- **Benefits and risks of controlling blood glucose levels in patients with type 2 diabetes mellitus.**

  Source: American Academy of Family Physicians/American Diabetes Association.; 1999 April; 39 pages

  http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=001603&sSearch_string=Peripheral+Neuropathy

- **Care of the patient with diabetes mellitus. 2nd edition.**

  Source: American Optometric Association.; 1998 (Second Edition); 69 pages

  http://www.guideline.gov/FRAMESETS/guideline_fs.asp?guideline=001212&sSearch_string=Peripheral+Neuropathy

The NIH Search Utility

After browsing the references listed at the beginning of this chapter, you may want to explore the NIH Search Utility. This 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 peripheral 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 conditions or 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 that often link to government sites are available to the public. 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**
- drkoop.com®: **http://www.drkoop.com/conditions/ency/index.html**
- Family Village: **http://www.familyvillage.wisc.edu/specific.htm**
- Google: **http://directory.google.com/Top/Health/Conditions_and_Diseases/**
- Med Help International: **http://www.medhelp.org/HealthTopics/A.html**
- Open Directory Project: **http://dmoz.org/Health/Conditions_and_Diseases/**
- Yahoo.com: **http://dir.yahoo.com/Health/Diseases_and_Conditions/**
- WebMD®Health: **http://my.webmd.com/health_topics**

Vocabulary Builder

The material in this chapter may have contained a number of unfamiliar words. The following Vocabulary Builder introduces you to terms used in this chapter that have not been covered in the previous chapter:

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

Antimicrobial: Killing microorganisms, or suppressing their multiplication or growth. [EU]

Atrial: Pertaining to an atrium. [EU]

Atrophy: A wasting away; a diminution in the size of a cell, tissue, organ, or part. [EU]

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

Cardiology: The study of the heart, its physiology, and its functions. [NIH]

Chronic: Persisting over a long period of time. [EU]

Collagen: The protein substance of the white fibres (collagenous fibres) of skin, tendon, bone, cartilage, and all other connective tissue; composed of molecules of tropocollagen (q.v.), it is converted into gelatin by boiling. collagenous pertaining to collagen; forming or producing collagen. [EU]

Contracture: A condition of fixed high resistance to passive stretch of a muscle, resulting from fibrosis of the tissues supporting the muscles or the joints, or from disorders of the muscle fibres. [EU]

Contusion: A bruise; an injury of a part without a break in the skin. [EU]

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

Didanosine: A dideoxynucleoside compound in which the 3'-hydroxy group on the sugar moiety has been replaced by a hydrogen. This modification prevents the formation of phosphodiester linkages which are needed for the completion of nucleic acid chains. Didanosine is a potent inhibitor of HIV replication, acting as a chain-terminator of viral DNA by binding to reverse transcriptase; ddI is then metabolized to dideoxyadenosine triphosphate, its putative active metabolite. [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]

Fibrillation: A small, local, involuntary contraction of muscle, invisible under the skin, resulting from spontaneous activation of single muscle cells or muscle fibres. [EU]

Glucose: D-glucose, a monosaccharide (hexose), C6H12O6, also known as dextrose (q.v.), found in certain foodstuffs, especially fruits, and in the normal blood of all animals. It is the end product of carbohydrate metabolism and is the chief source of energy for living organisms, its utilization being controlled by insulin. Excess glucose is converted to glycogen and stored in the liver and muscles for use as needed and, beyond that, is converted to fat and stored as adipose tissue. Glucose appears in the

urine in diabetes mellitus. [EU]

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

Hypotension: Abnormally low blood pressure; seen in shock but not necessarily indicative of it. [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]

Lesion: Any pathological or traumatic discontinuity of tissue or loss of function of a part. [EU]

Lupus: A form of cutaneous tuberculosis. It is seen predominantly in women and typically involves the nasal, buccal, and conjunctival mucosa. [NIH]

Nausea: An unpleasant sensation, vaguely referred to the epigastrium and abdomen, and often culminating in vomiting. [EU]

Neuropathy: A general term denoting functional disturbances and/or pathological changes in the peripheral nervous system. The etiology may be known e.g. arsenical n., diabetic n., ischemic n., traumatic n.) or unknown. Encephalopathy and myelopathy are corresponding terms relating to involvement of the brain and spinal cord, respectively. The term is also used to designate noninflammatory lesions in the peripheral nervous system, in contrast to inflammatory lesions (neuritis). [EU]

Pancreatitis: Acute or chronic inflammation of the pancreas, which may be asymptomatic or symptomatic, and which is due to autodigestion of a pancreatic tissue by its own enzymes. It is caused most often by alcoholism or biliary tract disease; less commonly it may be associated with hyperlipaemia, hyperparathyroidism, abdominal trauma (accidental or operative injury), vasculitis, or uraemia. [EU]

Pharmacists: Those persons legally qualified by education and training to engage in the practice of pharmacy. [NIH]

Postural: Pertaining to posture or position. [EU]

Prophylaxis: The prevention of disease; preventive treatment. [EU]

Protease: Proteinase (= any enzyme that catalyses the splitting of interior peptide bonds in a protein). [EU]

Pyrazinamide: A pyrazine that is used therapeutically as an antitubercular agent. [NIH]

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

Rheumatoid: Resembling rheumatism. [EU]

Rifabutin: A broad-spectrum antibiotic that is being used as prophylaxis against disseminated Mycobacterium avium complex infection in HIV-positive patients. [NIH]

Sarcoidosis: An idiopathic systemic inflammatory granulomatous disorder comprised of epithelioid and multinucleated giant cells with little necrosis. It usually invades the lungs with fibrosis and may also involve lymph nodes, skin, liver, spleen, eyes, phalangeal bones, and parotid glands. [NIH]

Systemic: Pertaining to or affecting the body as a whole. [EU]

Thoracic: Pertaining to or affecting the chest. [EU]

Toxic: Pertaining to, due to, or of the nature of a poison or toxin; manifesting the symptoms of severe infection. [EU]

Tuberculosis: Any of the infectious diseases of man and other animals caused by species of mycobacterium. [NIH]

Ulcer: A local defect, or excavation, of the surface of an organ or tissue; which is produced by the sloughing of inflammatory necrotic tissue. [EU]

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

Vasomotor: 1. affecting the calibre of a vessel, especially of a blood vessel. 2. any element or agent that effects the calibre of a blood vessel. [EU]

CHAPTER 2. SEEKING GUIDANCE

Overview

Some patients are comforted by the knowledge that a number of organizations dedicate their resources to helping people with peripheral neuropathy. These associations can become invaluable sources of information and advice. Many associations offer aftercare support, financial assistance, and other important services. Furthermore, healthcare research has shown that support groups often help people to better cope with their conditions.[8] In addition to support groups, your physician can be a valuable source of guidance and support. Therefore, finding a physician that can work with your unique situation is a very important aspect of your care.

In this chapter, we direct you to resources that can help you find patient organizations and medical specialists. We begin by describing how to find associations and peer groups that can help you better understand and cope with peripheral neuropathy. The chapter ends with a discussion on how to find a doctor that is right for you.

Associations and Peripheral Neuropathy

As mentioned by the Agency for Healthcare Research and Quality, sometimes the emotional side of a condition or disorder can be as taxing as the physical side.[9] You may have fears or feel overwhelmed by your situation. Everyone has different ways of dealing with disease or physical injury. Your attitude, your expectations, and how well you cope with your

[8] Churches, synagogues, and other houses of worship might also have groups that can offer you the social support you need.
[9] This section has been adapted from http://www.ahcpr.gov/consumer/diaginf5.htm.

condition can all influence your well-being. This is true for both minor conditions and serious illnesses. For example, a study on female breast cancer survivors revealed that women who participated in support groups lived longer and experienced better quality of life when compared with women who did not participate. In the support group, women learned coping skills and had the opportunity to share their feelings with other women in the same situation.

In addition to associations or groups that your doctor might recommend, we suggest that you consider the following list (if there is a fee for an association, you may want to check with your insurance provider to find out if the cost will be covered):

- **CDG Society (Sweden)**

  Address: CDG Society (Sweden) Web Site on the Internet,

  Telephone: 01529 304615

  Email: Rolf.Odselius@emu.lu.se

  Web Site: http://www.emu.lu.se/cdg/indexeng.html

  Background: The CDG Society (Sweden) provides this World Wide Web site for health care professionals, researchers, and families with children diagnosed with Carbohydrate-Deficient Glycoprotein (CDG) Syndromes. CDG Syndromes are a group of newly discovered, extremely rare inherited metabolic disorders. Although four variants of the disorder have been identified, it is suspected that more variants exist. These disorders affect most systems of the body, particularly the function of the central nervous system (i.e., the brain and spinal cord) and the peripheral nervous system (i.e., motor and sensory nerves outside the central nervous system). The most common form of CDG Syndrome is Carbohydrate- Deficient Glycoprotein Syndrome Type I (CDG1). Although symptoms may vary from case to case, individuals with CDG1 may exhibit impaired coordination and balance (cerebellar ataxia) due to underdevelopment (hypoplasia) of certain portions of the brain (e.g., cerebellum); severe muscle thinning and weakness in the legs (peripheral neuropathy); skeletal malformations; visual and/or hearing impairment; mild to severe mental retardation; and severe delays in the acquisition of skills that require the coordination of mental and muscular activity (psychomotor retardation). The purpose of this home page is to provide current information on CDGS; offer specialist resources in Sweden; provide international parent contacts through e-mail; and offer links to other patient organizations, specialist laboratories, and clinics; etc.

- **National Dysautonomia Research Foundation**

  Address:

  Telephone: (651) 267-0525

  Fax: (651) 267-0524

  Email: ndrf@ndrf.org

  Web Site: http://www.ndrf.org

  Background: The National Dysautonomia Research Foundation (NDRF) is a national not-for-profit voluntary organization dedicated to providing information and support to individuals affected by dysfunction of the autonomic nervous system (dysautonomia). The autonomic nervous system controls involuntary (automatic or reflex) activities of the organs, blood vessels, glands, and a variety of tissues in the body. The autonomic nervous system is divided into two parts: the sympathetic nervous system, which, in general, heightens activity in the body (e.g., accelerating the heart beat and breathing rate) and the parasympathetic nervous system, which, in general, lessens activity in the body (e.g., decreasing the heart rate). Many disorders may be associated with dysautonomia including Shy-Drager Syndrome (Multiple System Atrophy), Postural Orthostatic Tachycardia Syndrome (POTS), Familial Dysautonomia, and Neurocardiogenic Syncope. The NDRF strives to provide contacts to additional organizations that may be of assistance to individuals with dysautonomia; advocate on behalf of affected individuals in support of ongoing research efforts to determine the causes of and treatments for dysautonomia; supply news organizations with timely and accurate information on dysautonomia; and raise funds for the purpose of ongoing medical and scientific research concerning dysautonomia. The Foundation provides a variety of educational materials including a regular newsletter that contains information on ongoing efforts to find cures and treatments for those affected by any of the various forms of dysautonomia. In addition, the Foundation maintains a web site at http://www.ndrf.org that provides general information on autonomic dysfunction as well as specific information on the various forms of dysautonomia; references to physicians and medical facilities that specialize in the research and treatment of dysautonomia; a Frequently Asked Questions (FAQ) and answers area; and more.

- **Neuropathy Association**

  Address: Neuropathy Association 60 East 42nd Street, Suite 942, New York, NY 10165

  Telephone: (212) 692-0662 Toll-free: (800) 247-6968

Fax: (212) 692- 0668

Email: info@neuropathy.org

Web Site: http://www.neuropathy.org/neuropathy

Background: The Neuropathy Association is a national not-for-profit organization established to help people with disorders that affect the peripheral nervous system (peripheral neuropathy). The peripheral nervous system consists of all the motor and sensory nerves that connect the brain and spinal cord to the rest of the body (i.e., the nerves outside the central nervous system). The organization is dedicated to providing patient support and education to individuals affected by peripheral neuropathy; advocating for patients' interests; and promoting research into the causes and cure of peripheral neuropathy. The objectives of the Association are to provide support through programs of education and the sharing of information and experiences related to peripheral neuropathy; enhance physician awareness through programs of education to help identify, evaluate, and treat peripheral neuropathy; increase public awareness of the nature and extent of peripheral neuropathy and the need for early intervention and research; encourage pharmaceutical and biotechnology companies to develop new therapies and devices for treatment of peripheral neuropathy; and encourage government support for research into the causes and treatments of peripheral neuropathy and the need for special accommodations and facilities for people with peripheral neuropathy. The organization publishes several brochures and a periodic newsletter entitled 'Neuropathy News.'.

- **Neuropathy Trust (UK)**

  Address: Neuropathy Trust (UK) PO Box 26, Nantwich, Cheshire, CW5 5FP, United Kingdom

  Telephone: (212) 692-0662 Toll-free: (800) 247-6968

  Web Site: http://www.neuropathy- trust.org

  Background: The Neuropathy Trust is a not-for-profit organization in the United Kingdom dedicated to providing support and information to people affected by peripheral neuropathy, which is a general term referring to inflammation, disease, or injury of peripheral nerves. The peripheral nerves extend from the brain and spinal cord (central nervous system) to all areas of the body. Although the symptoms associated with peripheral neuropathy may vary, they often include tingling, numbness, muscle weakness, or pain. The Neuropathy Trust was established and is managed by individuals affected by peripheral neuropathy and includes members from countries around the world. The Trust's immediate aims

include offering emotional support to people with peripheral neuropathy and their families, providing networking opportunities, and increasing public awareness of the nature of peripheral neuropathy and the need for early intervention. The organization is also committed to promoting and supporting research into the causes and treatment of peripheral neuropathy, encouraging biotechnology and pharmaceutical companies to develop new therapies and devices for the treatment and management of neuropathy, and increasing awareness of the need for special accommodations and facilities for affected individuals. The Neuropathy Trust also offers educational materials including a booklet entitled 'Peripheral Neuropathy: Under the Spotlight' and a regular newsletter called 'Relay.' The Trust's web site discusses the organization's mission, goals, and services; has a guestbook area; and provides understandable information on peripheral neuropathy.

Finding More Associations

There are a number of directories that list additional medical associations that you may find useful. While not all of these directories will provide different information than what is listed above, by consulting all of them, you will have nearly exhausted all sources for patient associations.

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 peripheral neuropathy. For more information, see the NHIC's Web site at **http://www.health.gov/NHIC/** or contact an information specialist by calling 1-800-336-4797.

DIRLINE

A comprehensive source of information on associations is the DIRLINE database maintained by the National Library of Medicine. The database comprises some 10,000 records of organizations, research centers, and government institutes and associations which primarily focus on health and biomedicine. DIRLINE is available via the Internet at the following Web site: **http://dirline.nlm.nih.gov/**. Simply type in "peripheral neuropathy" (or a synonym) or the name of a topic, and the site will list information contained in the database on all relevant organizations.

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 "peripheral neuropathy". Type the following hyperlink into your Web browser: **http://chid.nih.gov/detail/detail.html**. To find associations, use the drop boxes at the bottom of the search page where "You may refine your search by." For publication date, select "All Years." Then, select your preferred language and the format option "Organization Resource Sheet." By making these selections and typing in "peripheral neuropathy" (or synonyms) into the "For these words:" box, you will only receive results on organizations dealing with peripheral neuropathy. You should check back periodically with this database since it is updated every 3 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 specific conditions and diseases. You can access this database at the following Web site: **http://www.rarediseases.org/cgi-bin/nord/searchpage**. Select the option called "Organizational Database (ODB)" and type "peripheral neuropathy" (or a synonym) in the search box.

Online Support Groups

In addition to support groups, commercial Internet service providers offer forums and chat rooms for people with different illnesses and conditions. WebMD®, for example, offers such a service at their Web site: **http://boards.webmd.com/roundtable**. These online self-help communities can help you connect with a network of people whose concerns are similar to yours. Online support groups are places where people can talk informally. If you read about a novel approach, consult with your doctor or other healthcare providers, as the treatments or discoveries you hear about may not be scientifically proven to be safe and effective.

Finding Doctors

One of the most important aspects of your treatment will be the relationship between you and your doctor or specialist. All patients with peripheral

neuropathy must go through the process of selecting a physician. While this process will vary from person to person, the Agency for Healthcare Research and Quality makes a number of suggestions, including the following:[10]

- If you are in a managed care plan, check the plan's list of doctors first.
- Ask doctors or other health professionals who work with doctors, such as hospital nurses, for referrals.
- Call a hospital's doctor referral service, but keep in mind that these services usually refer you to doctors on staff at that particular hospital. The services do not have information on the quality of care that these doctors provide.
- Some local medical societies offer lists of member doctors. Again, these lists do not have information on the quality of care that these doctors provide.

Additional steps you can take to locate doctors include the following:

- Check with the associations listed earlier in this chapter.
- Information on doctors in some states is available on the Internet at **http://www.docboard.org**. This Web site is run by "Administrators in Medicine," a group of state medical board directors.
- The American Board of Medical Specialties can tell you if your doctor is board certified. "Certified" means that the doctor has completed a training program in a specialty and has passed an exam, or "board," to assess his or her knowledge, skills, and experience to provide quality patient care in that specialty. Primary care doctors may also be certified as specialists. The AMBS Web site is located at **http://www.abms.org/newsearch.asp**.[11] You can also contact the ABMS by phone at 1-866-ASK-ABMS.
- You can call the American Medical Association (AMA) at 800-665-2882 for information on training, specialties, and board certification for many licensed doctors in the United States. This information also can be found in "Physician Select" at the AMA's Web site: **http://www.ama-assn.org/aps/amahg.htm**.

[10] This section is adapted from the AHRQ: www.ahrq.gov/consumer/qntascii/qntdr.htm.
[11] While board certification is a good measure of a doctor's knowledge, it is possible to receive quality care from doctors who are not board certified.

Finding a Neurologist

The American Academy of Neurology allows you to search for member neurologists by name or location. To use this service, go to **http://www.aan.com/**, select "Find a Neurologist" from the toolbar. Enter your search criteria, and click "Search." To find out more information on a particular neurologist, click on the physician's name.

If the previous sources did not meet your needs, you may want to log on to the Web site of the National Organization for Rare Disorders (NORD) at **http://www.rarediseases.org/**. NORD maintains a database of doctors with expertise in various rare conditions and diseases. The Metabolic Information Network (MIN), 800-945-2188, also maintains a database of physicians with expertise in various metabolic diseases.

Selecting Your Doctor[12]

When you have compiled a list of prospective doctors, call each of their offices. First, ask if the doctor accepts your health insurance plan and if he or she is taking new patients. If the doctor is not covered by your plan, ask yourself if you are prepared to pay the extra costs. The next step is to schedule a visit with your chosen physician. During the first visit you will have the opportunity to evaluate your doctor and to find out if you feel comfortable with him or her. Ask yourself, did the doctor:

- Give me a chance to ask questions about peripheral neuropathy?
- Really listen to my questions?
- Answer in terms I understood?
- Show respect for me?
- Ask me questions?
- Make me feel comfortable?
- Address the health problem(s) I came with?
- Ask me my preferences about different kinds of treatments for peripheral neuropathy?
- Spend enough time with me?

[12] This section has been adapted from the AHRQ: www.ahrq.gov/consumer/qntascii/qntdr.htm.

Trust your instincts when deciding if the doctor is right for you. But remember, it might take time for the relationship to develop. It takes more than one visit for you and your doctor to get to know each other.

Working with Your Doctor[13]

Research has shown that patients who have good relationships with their doctors tend to be more satisfied with their care and have better results. Here are some tips to help you and your doctor become partners:

- You know important things about your symptoms and your health history. Tell your doctor what you think he or she needs to know.
- It is important to tell your doctor personal information, even if it makes you feel embarrassed or uncomfortable.
- Bring a "health history" list with you (and keep it up to date).
- Always bring any medications you are currently taking with you to the appointment, or you can bring a list of your medications including dosage and frequency information. Talk about any allergies or reactions you have had to your medications.
- Tell your doctor about any natural or alternative medicines you are taking.
- Bring other medical information, such as x-ray films, test results, and medical records.
- Ask questions. If you don't, your doctor will assume that you understood everything that was said.
- Write down your questions before your visit. List the most important ones first to make sure that they are addressed.
- Consider bringing a friend with you to the appointment to help you ask questions. This person can also help you understand and/or remember the answers.
- Ask your doctor to draw pictures if you think that this would help you understand.
- Take notes. Some doctors do not mind if you bring a tape recorder to help you remember things, but always ask first.

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[13] This section has been adapted from the AHRQ: www.ahrq.gov/consumer/qntascii/qntdr.htm.

- Let your doctor know if you need more time. If there is not time that day, perhaps you can speak to a nurse or physician assistant on staff or schedule a telephone appointment.
- Take information home. Ask for written instructions. Your doctor may also have brochures and audio and videotapes that can help you.
- After leaving the doctor's office, take responsibility for your care. If you have questions, call. If your symptoms get worse or if you have problems with your medication, call. If you had tests and do not hear from your doctor, call for your test results. If your doctor recommended that you have certain tests, schedule an appointment to get them done. If your doctor said you should see an additional specialist, make an appointment.

By following these steps, you will enhance the relationship you will have with your physician.

Broader Health-Related Resources

In addition to the references above, the NIH has set up guidance Web sites that can help patients find healthcare professionals. These include:[14]

- Caregivers:
  http://www.nlm.nih.gov/medlineplus/caregivers.html
- Choosing a Doctor or Healthcare Service:
  http://www.nlm.nih.gov/medlineplus/choosingadoctororhealthcareservice.html
- Hospitals and Health Facilities:
  http://www.nlm.nih.gov/medlineplus/healthfacilities.html

Vocabulary Builder

The following vocabulary builder provides definitions of words used in this chapter that have not been defined in previous chapters:

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

[14] You can access this information at:
http://www.nlm.nih.gov/medlineplus/healthsystem.html.

Ataxia: Failure of muscular coordination; irregularity of muscular action. [EU]

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

Cerebellar: Pertaining to the cerebellum. [EU]

Cerebellum: Part of the metencephalon that lies in the posterior cranial fossa behind the brain stem. It is concerned with the coordination of movement. [NIH]

Gastrointestinal: Pertaining to or communicating with the stomach and intestine, as a gastrointestinal fistula. [EU]

Hypoplasia: Incomplete development or underdevelopment of an organ or tissue. [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]

Malformation: A morphologic defect resulting from an intrinsically abnormal developmental process. [EU]

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

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

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

Paralysis: Loss or impairment of motor function in a part due to lesion of the neural or muscular mechanism; also by analogy, impairment of sensory function (sensory paralysis). In addition to the types named below, paralysis is further distinguished as traumatic, syphilitic, toxic, etc., according to its cause; or as obturator, ulnar, etc., according to the nerve part, or muscle specially affected. [EU]

Polyneuritis: Inflammation of many nerves at once; multiple or disseminated, neuritis. [EU]

Progressive: Advancing; going forward; going from bad to worse; increasing in scope or severity. [EU]

Psychomotor: Pertaining to motor effects of cerebral or psychic activity. [EU]

Reflex: 1; reflected. 2. a reflected action or movement; the sum total of any

particular involuntary activity. [EU]

Skeletal: Pertaining to the skeleton. [EU]

Syncope: A temporary suspension of consciousness due to generalized cerebral schemia, a faint or swoon. [EU]

Tachycardia: Excessive rapidity in the action of the heart; the term is usually applied to a heart rate above 100 per minute and may be qualified as atrial, junctional (nodal), or ventricular, and as paroxysmal. [EU]

CHAPTER 3. CLINICAL TRIALS AND PERIPHERAL NEUROPATHY

Overview

Very few medical conditions have a single treatment. The basic treatment guidelines that your physician has discussed with you, or those that you have found using the techniques discussed in Chapter 1, may provide you with all that you will require. For some patients, current treatments can be enhanced with new or innovative techniques currently under investigation. In this chapter, we will describe how clinical trials work and show you how to keep informed of trials concerning peripheral neuropathy.

What Is a Clinical Trial?[15]

Clinical trials involve the participation of people in medical research. Most medical research begins with studies in test tubes and on animals. Treatments that show promise in these early studies may then be tried with people. The only sure way to find out whether a new treatment is safe, effective, and better than other treatments for peripheral neuropathy is to try it on patients in a clinical trial.

[15] The discussion in this chapter has been adapted from the NIH and the NEI: www.nei.nih.gov/netrials/ctivr.htm.

What Kinds of Clinical Trials Are There?

Clinical trials are carried out in three phases:

- **Phase I.** Researchers first conduct Phase I trials with small numbers of patients and healthy volunteers. If the new treatment is a medication, researchers also try to determine how much of it can be given safely.
- **Phase II.** Researchers conduct Phase II trials in small numbers of patients to find out the effect of a new treatment on peripheral neuropathy.
- **Phase III.** Finally, researchers conduct Phase III trials to find out how new treatments for peripheral neuropathy compare with standard treatments already being used. Phase III trials also help to determine if new treatments have any side effects. These trials--which may involve hundreds, perhaps thousands, of people--can also compare new treatments with no treatment.

How Is a Clinical Trial Conducted?

Various organizations support clinical trials at medical centers, hospitals, universities, and doctors' offices across the United States. The "principal investigator" is the researcher in charge of the study at each facility participating in the clinical trial. Most clinical trial researchers are medical doctors, academic researchers, and specialists. The "clinic coordinator" knows all about how the study works and makes all the arrangements for your visits.

All doctors and researchers who take part in the study on peripheral neuropathy carefully follow a detailed treatment plan called a protocol. This plan fully explains how the doctors will treat you in the study. The "protocol" ensures that all patients are treated in the same way, no matter where they receive care.

Clinical trials are controlled. This means that researchers compare the effects of the new treatment with those of the standard treatment. In some cases, when no standard treatment exists, the new treatment is compared with no treatment. Patients who receive the new treatment are in the treatment group. Patients who receive a standard treatment or no treatment are in the "control" group. In some clinical trials, patients in the treatment group get a new medication while those in the control group get a placebo. A placebo is a harmless substance, a "dummy" pill, that has no effect on peripheral neuropathy. In other clinical trials, where a new surgery or device (not a medicine) is being tested, patients in the control group may receive a "sham

treatment." This treatment, like a placebo, has no effect on peripheral neuropathy and does not harm patients.

Researchers assign patients "randomly" to the treatment or control group. This is like flipping a coin to decide which patients are in each group. If you choose to participate in a clinical trial, you will not know which group you will be appointed to. The chance of any patient getting the new treatment is about 50 percent. You cannot request to receive the new treatment instead of the placebo or sham treatment. Often, you will not know until the study is over whether you have been in the treatment group or the control group. This is called a "masked" study. In some trials, neither doctors nor patients know who is getting which treatment. This is called a "double masked" study. These types of trials help to ensure that the perceptions of the patients or doctors will not affect the study results.

Natural History Studies

Unlike clinical trials in which patient volunteers may receive new treatments, natural history studies provide important information to researchers on how peripheral neuropathy develops over time. A natural history study follows patient volunteers to see how factors such as age, sex, race, or family history might make some people more or less at risk for peripheral neuropathy. A natural history study may also tell researchers if diet, lifestyle, or occupation affects how a disease or disorder develops and progresses. Results from these studies provide information that helps answer questions such as: How fast will a condition or disorder usually progress? How bad will the condition become? Will treatment be needed?

What Is Expected of Patients in a Clinical Trial?

Not everyone can take part in a clinical trial for a specific condition or disorder. Each study enrolls patients with certain features or eligibility criteria. These criteria may include the type and stage of a condition or disorder, as well as, the age and previous treatment history of the patient. You or your doctor can contact the sponsoring organization to find out more about specific clinical trials and their eligibility criteria. If you are interested in joining a clinical trial, your doctor must contact one of the trial's investigators and provide details about your diagnosis and medical history.

If you participate in a clinical trial, you may be required to have a number of medical tests. You may also need to take medications and/or undergo surgery. Depending upon the treatment and the examination procedure, you

may be required to receive inpatient hospital care. Or, you may have to return to the medical facility for follow-up examinations. These exams help find out how well the treatment is working. Follow-up studies can take months or years. However, the success of the clinical trial often depends on learning what happens to patients over a long period of time. Only patients who continue to return for follow-up examinations can provide this important long-term information.

Recent Trials on Peripheral Neuropathy

The National Institutes of Health and other organizations sponsor trials on various conditions and disorders. Because funding for research goes to the medical areas that show promising research opportunities, it is not possible for the NIH or others to sponsor clinical trials for every disease and disorder at all times. The following lists recent trials dedicated to peripheral neuropathy.[16] If the trial listed by the NIH is still recruiting, you may be eligible. If it is no longer recruiting or has been completed, then you can contact the sponsors to learn more about the study and, if published, the results. Further information on the trial is available at the Web site indicated. Please note that some trials may no longer be recruiting patients or are otherwise closed. Before contacting sponsors of a clinical trial, consult with your physician who can help you determine if you might benefit from participation.

- **Achilles Tendon Lengthening in Patients with Diabetes to Prevent Foot Ulcers**

  Condition(s): Diabetes Mellitus; Foot Ulcer; Peripheral Neuropathy

  Study Status: This study is currently recruiting patients.

  Sponsor(s): National Institute of Child Health and Human Development (NICHD)

  Purpose - Excerpt: People with diabetes often develop severe skin problems (ulcers) on their feet. Sometimes these are treated with surgery and other times by temporarily immobilizing the foot in a cast. This study compares the effect of surgery to lengthen the Achilles tendon and put the foot in a cast, to using a cast alone. The study will also examine how foot strength, joint movement, and overall ability to walk, balance and climb stairs is affected.

  Phase(s): Phase I

  Study Type: Interventional

[16] These are listed at www.ClinicalTrials.gov.

Contact(s): Jennifer Henry 1-314-286-1439 henryj@msnotes.wustl.edu; Missouri; Barnes-Jewish Hospital, Orthopedic Surgery, St. Louis, Missouri, 63110, United States; Recruiting; Shannon Clouse, Medical Assistant 314-747-2584 Clouses@msnotes.wustl.edu. Study chairs or principal investigators: Michael J. Mueller, Ph.D., P.T., Principal Investigator; Program in Physical Therapy, Washington University

Web Site:
http://clinicaltrials.gov/ct/gui/show/NCT00006426;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **Gabapentin in Treating Peripheral Neuropathy in Cancer Patients Undergoing Chemotherapy**

  Condition(s): pain; neurotoxicity; quality of life

  Study Status: This study is currently recruiting patients.

  Sponsor(s): National Cancer Institute (NCI); North Central Cancer Treatment Group

  Purpose - Excerpt: RATIONALE: Gabapentin may be effective in relieving pain and other symptoms of peripheral neuropathy. It is not yet known if gabapentin is effective in treating peripheral neuropathy in cancer patients undergoing chemotherapy. PURPOSE: Randomized phase III trial to determine the effectiveness of gabapentin in treating pain and other symptoms of peripheral neuropathy in cancer patients undergoing chemotherapy.

  Phase(s): Phase III

  Study Type: Supportive Care

  Contact(s): see Web site below

  Web Site:
  http://clinicaltrials.gov/ct/gui/show/NCT00027963;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **Lidorestat (IDD 676) for the Treatment of Diabetic Neuropathy**

  Condition(s): Diabetic Polyneuropathy

  Study Status: This study is currently recruiting patients.

  Sponsor(s): The Institute for Diabetes Discovery, LLC

  Purpose - Excerpt: This clinical trial is to determine an effective dosage and to study the safety of an investigational drug -lidorestat (IDD-676)- which is intended to stop or slow the progression of diabetic peripheral neuropathy.

Phase(s): Phase II

Study Type: Interventional

Contact(s): see Web site below

Web Site:
http://clinicaltrials.gov/ct/gui/show/NCT00043797;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **LY333531 Treatment of Peripheral Neuropathy in Patients with Diabetes.**

  Condition(s): Diabetic Neuropathies; Diabetes Mellitus, Insulin-Dependent; Diabetes Mellitus, Non-Insulin-Dependent

  Study Status: This study is currently recruiting patients.

  Sponsor(s): Eli Lilly and Company

  Purpose - Excerpt: The purpose of this protocol is to determine if an investigational drug known as LY333531 is effective in treating nerve malfunction in diabetes.

  Phase(s): Phase III

  Study Type: Interventional

  Contact(s): see Web site below

  Web Site:
  http://clinicaltrials.gov/ct/gui/show/NCT00044421;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **Neotrofin for treatment of chemotherapy-induced peripheral neuropathy**

  Condition(s): Peripheral Nervous System Diseases; Chemotherapy-Induced Peripheral Neuropathy

  Study Status: This study is currently recruiting patients.

  Sponsor(s): NeoTherapeutics

  Purpose - Excerpt: This study will assess the safety and efficacy of Neotrofin in treating the peripheral neuropathy that results from chemotherapy for cancer.

  Phase(s): Phase II

  Study Type: Interventional

  Contact(s): see Web site below

Web Site:
http://clinicaltrials.gov/ct/gui/show/NCT00041795;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **Nerve Stimulation to Modify a Spinal Reflex**

  Condition(s): Healthy

  Study Status: This study is currently recruiting patients.

  Sponsor(s): National Institute of Neurological Disorders and Stroke (NINDS)

  Purpose - Excerpt: This study will determine whether stimulating the nerves or the brain can modify the spinal reflex that controls the muscles that flex and extend the ankle. Training spinal nerve networks with sensory input may provide a way of re-establishing movements, such as walking, in patients with spinal injury. Healthy normal volunteers with no history of peripheral neuropathy or radiculopathy, ankle contractures or tendon surgery may be eligible for this study. Participants will undergo three stimulation procedures, each in a different session, to measure leg muscle reflexes. The procedures are: - Reflex testing - Metal electrodes are taped to the skin over the leg muscles. A small electrical pulse is delivered through the electrodes to stimulate two nerves to the muscles. This evokes a reflex between the ankle flexor and extensor muscles. The responses to several dozen stimuli are averaged. - Nerve stimulation - The nerve to the muscle that flexes the leg is electrically stimulated near the knee through electrodes taped to the skin. The strength of the stimulus is adjusted to produce little or no muscle movement. The stimulation is repeated every few seconds for 45 minutes. - Transcranial magnetic stimulation - An insulated wire coil is placed on the subject's scalp. A brief electrical current passes through the coil, creating a magnetic pulse that travels through the scalp and skull and causes small electrical currents in the outer part of the brain. There may be twitching in the muscles of the arm or leg. During the stimulation, the subject may be asked to tense certain muscles slightly or perform other simple actions to help determine the best position for the coil over the part of the brain that controls the leg. The leg is then stimulated once every 10 seconds, combined with nerve stimulation every 1 to 2 seconds.

  Study Type: Observational

  Contact(s): Maryland; National Institute of Neurological Disorders and Stroke (NINDS), 9000 Rockville Pike Bethesda, Maryland, 20892, United States; Recruiting; Patient Recruitment and Public Liaison Office 1-800-411-1222 prpl@mail.cc.nih.gov; TTY 1-866-411-1010

Web Site:
http://clinicaltrials.gov/ct/gui/show/NCT00039819;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **A Study of ddC in Patients with AIDS or Advanced AIDS-Related Complex (ARC) Who Have Not Had Success with Zidovudine (AZT)**

  Condition(s): HIV Infections

  Study Status: This study is no longer recruiting patients.

  Sponsor(s): Hoffmann-La Roche Ltd

  Purpose - Excerpt: AMENDED: To provide ddC for patients with AIDS or advanced ARC who have failed treatment with, are intolerant to or are ineligible to receive zidovudine (AZT) and to demonstrate that ddC monotherapy is safe, and tolerable in this patient population. Original design: To provide zalcitabine (dideoxycytidine; ddC) for patients with AIDS or advanced AIDS-related complex (ARC) who have failed treatment with or are intolerant to zidovudine (AZT) and who are also intolerant to dideoxyinosine (ddI); to demonstrate that ddC monotherapy is safe and tolerable in the treatment of patients who previously experienced either treatment failure, hematologic intolerance or myositis with AZT treatment and pancreatitis or other toxicities (except peripheral neuropathy with ddI).

  Study Type: Interventional

  Contact(s): New Jersey; Hoffmann - La Roche Inc, Nutley, New Jersey, 071101199, United States

  Web Site:
  http://clinicaltrials.gov/ct/gui/show/NCT00002279;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **A study of Rituxan in the treatment of polyneuropathies associated with serum IgM autoantibodies**

  Condition(s): Peripheral Neuropathy

  Study Status: This study is no longer recruiting patients.

  Sponsor(s): National Center for Research Resources (NCRR); Genentech

  Purpose - Excerpt: Peripheral neuropathies cause weakness and sensory loss that can produce severe disability. Some neuropathies are immune-mediated and associated with antibodies. It has been postulated that Rituxan treatment may reduce the level of antibody production limiting the loss of muscle strength and hence improve activities of daily living. The purpose of this open-label study (all participants get Rituxan and not

placebo) is to determine the safety and effectiveness of Rituxan in the treatment of polyneuropathies associated with serum IgM autoantibodies in those who have already been treated with one course of Rituxan. Subjects will be treated on the in-patient Clinical Research Center with Rituxan for two treatments one week a part and then individual treatments every 10 weeks for one year. The effectiveness of Rituxan will be followed by looking for increases in muscle strength and decreases in the serum IgM autoantibodies.

Phase(s): Phase II

Study Type: Interventional

Contact(s): Alan Pestronk, M.D. 1-314-362-6981 harpere@neuro.wustl.edu

Web Site: http://clinicaltrials.gov/ct/gui/show/NCT00006072;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **An Open-Label, Multicenter Study to Evaluate the Safety and Tolerability of Dideoxycytidine (ddC) in Patients With AIDS or Advanced ARC Who Previously Demonstrated Intolerance to Zidovudine (AZT) in Protocol N3300 or N3492**

  Condition(s): HIV Infections

  Study Status: This study is no longer recruiting patients.

  Sponsor(s): Hoffmann-La Roche Ltd

  Purpose - Excerpt: To demonstrate that zalcitabine (dideoxycytidine; ddC) monotherapy is safe and tolerable in the treatment of patients with AIDS or advanced AIDS related complex (ARC) who previously demonstrated intolerance to zidovudine (AZT) treatment while in Protocol N3300 (NIAID ACTG 114) or N3492 (NIAID ACTG 119). Note Of Caution For Concomitant Medications On Study: Patients on amphotericin, pyrimethamine, sulfadiazine, trimethoprim/sulfamethoxazole, ganciclovir, intravenous pentamidine, intravenous acyclovir or oral acyclovir or other bone marrow or renal toxic drugs may not tolerate concomitant ddC. If these drugs are given concomitantly with ddC, patients should have frequent clinical and laboratory assessments, as appropriate. Drugs that are nephrotoxic or have the potential to cause peripheral neuropathy might be expected to cause increased toxicity when co-administered with ddC. Drugs that could cause serious additive toxicity when co-administered with study medication will be allowed for treatment of an acute intercurrent illness or opportunistic infection at the discretion of the investigator. Their use

may be allowed with interruption of study drug for up to 35 days per episode, for a total of 90 days for the study. If the patient's condition requires chronic administration of these medications, the patient will be discontinued from study medication and followed.

Phase(s): Phase II

Study Type: Interventional

Contact(s): see Web site below

Web Site:
http://clinicaltrials.gov/ct/gui/show/NCT00002265;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **Intranasal Peptide T in the Treatment of Painful Peripheral Neuropathy of AIDS**

  Condition(s): HIV Infections; Peripheral Nervous System Disease

  Study Status: This study is no longer recruiting patients.

  Sponsor(s): Advanced Peptides

  Purpose - Excerpt: To compare the effects of intranasal peptide T and placebo in the treatment of painful peripheral neuropathy associated with human immunodeficiency virus (HIV) infection.

  Study Type: Interventional

  Contact(s): Florida; Univ of Miami School of Medicine, Miami, Florida, 33136, United States; New York; Columbia Presbyterian Med Ctr, New York, New York, 10032, United States; Saint Luke's - Roosevelt Hosp Ctr, New York, New York, 10019, United States; Mount Sinai Med Ctr / Klingenstein Clinical Ctr, New York, New York, 10029, United States

  Web Site:
  http://clinicaltrials.gov/ct/gui/show/NCT00002083;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **The Efficacy of a Standardized Acupuncture Regimen and Amitriptyline Compared With Placebo as a Treatment for Pain Caused by Peripheral Neuropathy in HIV-Infected Patients**

  Condition(s): HIV Infections; Peripheral Nervous System Disease

  Study Status: This study is no longer recruiting patients.

  Sponsor(s): National Institute of Allergy and Infectious Diseases (NIAID)

  Purpose - Excerpt: To evaluate the separate and combined efficacy of a standardized acupuncture regimen and amitriptyline on the relief of pain due to peripheral neuropathy and on the quality of life of HIV-infected

patients. Both amitriptyline, an antidepressant, and acupuncture, a Chinese medical approach that uses needles to relieve pain, have been used successfully to reduce pain in some people. It is not known how effectively these approaches relieve or reduce pain in patients with peripheral neuropathy secondary to HIV infection.

Study Type: Interventional

Contact(s): see Web site below

Web Site:
http://clinicaltrials.gov/ct/gui/show/NCT00000817;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **A Phase II/III Double-Blind Study of Amitriptyline and Mexiletine for Painful Neuropathy in HIV Infection**

  Condition(s): HIV Infections; Peripheral Nervous System Disease

  Study Status: This study is completed.

  Sponsor(s): National Institute of Allergy and Infectious Diseases (NIAID); Boehringer Ingelheim Pharmaceuticals

  Purpose - Excerpt: To assess the efficacy, safety, and tolerability of amitriptyline hydrochloride versus mexiletine hydrochloride in reducing pain intensity in patients with HIV-related painful peripheral neuropathy. No large-scale controlled clinical trials of symptomatic therapy for painful HIV-related neuropathy have been attempted. Both amitriptyline and mexiletine have been useful in the management of painful neuropathies; however, both are associated with certain toxicities. In this comparative study of amitriptyline and mexiletine, benztropine mesylate also will be included as an active placebo to mimic the side effects of the study drugs.

  Phase(s): Phase II

  Study Type: Interventional

  Contact(s): see Web site below

  Web Site:
  http://clinicaltrials.gov/ct/gui/show/NCT00000793;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **Compare the medical conditions of Gulf War Veterans to non-deployed veterans.**

  Condition(s): Chronic Fatigue Syndrome; Fibromyalgia; Post-Traumatic Stress Disorder; neurologic abnormalities; general health status

  Study Status: This study is completed.

Sponsor(s): Department of Veterans Affairs; Department of Veterans Affairs Cooperative Studies Program

Purpose - Excerpt: Primary Hypothesis: Gulf War veterans will have an equal prevalence or mean level of the following medical and psychological conditions frequently reported in the literature compared to a control group of nondeployed veterans: (1) chronic fatigue syndrome, (2) fibromyalgia, (3) post-traumatic stress disorder, (4) neurologic abnormalities, including peripheral neuropathy and cognitive dysfunction, and (5) general health status.

Study Type: Observational

Contact(s): see Web site below

Web Site:
http://clinicaltrials.gov/ct/gui/show/NCT00032461;jsessionid=8EA54AA7CA537119FF386303E9CF016A

- **Randomized, Double-Blind, Placebo-Controlled Trial of Nimodipine for the Neurological Manifestations of HIV-1**

  Condition(s): AIDS Dementia Complex; HIV Infections

  Study Status: This study is completed.

  Sponsor(s): National Institute of Allergy and Infectious Diseases (NIAID); Miles; Glaxo Wellcome

  Purpose - Excerpt: PRIMARY: To assess the safety of nimodipine in the treatment of HIV-Associated Motor / Cognitive Complex (formerly AIDS dementia complex). To assess the systemic or central nervous system toxicities (e.g., rash, headache, gastrointestinal symptoms, nausea, dyspnea, muscle pain or cramp, acne) of nimodipine. SECONDARY: To assess the efficacy of nimodipine in stabilizing the progression of HIV-Associated Motor / Cognitive Complex by improvement in neuropsychological test performance, peripheral neuropathy, or other neurologic manifestations. HIV-infected patients may develop a condition known as HIV-Associated Motor / Cognitive Complex (also known as AIDS dementia complex) that causes damage to the nervous system, particularly the brain and spinal cord. Evidence exists that nimodipine protects nerve cells in culture from injury by HIV. Although nimodipine has been used in patients with other neurological problems, its safety and effectiveness in halting the progression of HIV-Associated Motor / Cognitive Complex is not yet known.

  Phase(s): Phase I

  Study Type: Interventional

  Contact(s): see Web site below

Web Site:
http://clinicaltrials.gov/ct/gui/show/NCT00000738;jsessionid=8EA54AA7CA537119FF386303E9CF016A

Benefits and Risks[17]

What Are the Benefits of Participating in a Clinical Trial?

If you are interested in a clinical trial, it is important to realize that your participation can bring many benefits to you and society at large:

- A new treatment could be more effective than the current treatment for peripheral neuropathy. Although only half of the participants in a clinical trial receive the experimental treatment, if the new treatment is proved to be more effective and safer than the current treatment, then those patients who did not receive the new treatment during the clinical trial may be among the first to benefit from it when the study is over.
- If the treatment is effective, then it may improve health or prevent diseases or disorders.
- Clinical trial patients receive the highest quality of medical care. Experts watch them closely during the study and may continue to follow them after the study is over.
- People who take part in trials contribute to scientific discoveries that may help other people with peripheral neuropathy. In cases where certain conditions or disorders run in families, your participation may lead to better care or prevention for your family members.

The Informed Consent

Once you agree to take part in a clinical trial, you will be asked to sign an "informed consent." This document explains a clinical trial's risks and benefits, the researcher's expectations of you, and your rights as a patient.

[17] This section has been adapted from ClinicalTrials.gov, a service of the National Institutes of Health:
http://www.clinicaltrials.gov/ct/gui/c/a1r/info/whatis?JServSessionIdzone_ct=9jmun6f291.

What Are the Risks?

Clinical trials may involve risks as well as benefits. Whether or not a new treatment will work cannot be known ahead of time. There is always a chance that a new treatment may not work better than a standard treatment. There is also the possibility that it may be harmful. The treatment you receive may cause side effects that are serious enough to require medical attention.

How Is Patient Safety Protected?

Clinical trials can raise fears of the unknown. Understanding the safeguards that protect patients can ease some of these fears. Before a clinical trial begins, researchers must get approval from their hospital's Institutional Review Board (IRB), an advisory group that makes sure a clinical trial is designed to protect patient safety. During a clinical trial, doctors will closely watch you to see if the treatment is working and if you are experiencing any side effects. All the results are carefully recorded and reviewed. In many cases, experts from the Data and Safety Monitoring Committee carefully monitor each clinical trial and can recommend that a study be stopped at any time. You will only be asked to take part in a clinical trial as a volunteer giving informed consent.

What Are a Patient's Rights in a Clinical Trial?

If you are eligible for a clinical trial, you will be given information to help you decide whether or not you want to participate. As a patient, you have the right to:

- Information on all known risks and benefits of the treatments in the study.
- Know how the researchers plan to carry out the study, for how long, and where.
- Know what is expected of you.
- Know any costs involved for you or your insurance provider.
- Know before any of your medical or personal information is shared with other researchers involved in the clinical trial.
- Talk openly with doctors and ask any questions.

After you join a clinical trial, you have the right to:

- Leave the study at any time. Participation is strictly voluntary. However, you should not enroll if you do not plan to complete the study.
- Receive any new information about the new treatment.
- Continue to ask questions and get answers.
- Maintain your privacy. Your name will not appear in any reports based on the study.
- Know whether you participated in the treatment group or the control group (once the study has been completed).

What about Costs?

In some clinical trials, the research facility pays for treatment costs and other associated expenses. You or your insurance provider may have to pay for costs that are considered standard care. These things may include inpatient hospital care, laboratory and other tests, and medical procedures. You also may need to pay for travel between your home and the clinic. You should find out about costs before committing to participation in the trial. If you have health insurance, find out exactly what it will cover. If you don't have health insurance, or if your insurance company will not cover your costs, talk to the clinic staff about other options for covering the cost of your care.

What Should You Ask before Deciding to Join a Clinical Trial?

Questions you should ask when thinking about joining a clinical trial include the following:

- What is the purpose of the clinical trial?
- What are the standard treatments for peripheral neuropathy? Why do researchers think the new treatment may be better? What is likely to happen to me with or without the new treatment?
- What tests and treatments will I need? Will I need surgery? Medication? Hospitalization?
- How long will the treatment last? How often will I have to come back for follow-up exams?
- What are the treatment's possible benefits to my condition? What are the short- and long-term risks? What are the possible side effects?

- Will the treatment be uncomfortable? Will it make me feel sick? If so, for how long?
- How will my health be monitored?
- Where will I need to go for the clinical trial? How will I get there?
- How much will it cost to be in the study? What costs are covered by the study? How much will my health insurance cover?
- Will I be able to see my own doctor? Who will be in charge of my care?
- Will taking part in the study affect my daily life? Do I have time to participate?
- How do I feel about taking part in a clinical trial? Are there family members or friends who may benefit from my contributions to new medical knowledge?

Keeping Current on Clinical Trials

Various government agencies maintain databases on trials. The U.S. National Institutes of Health, through the National Library of Medicine, has developed ClinicalTrials.gov to provide patients, family members, and physicians with current information about clinical research across the broadest number of diseases and conditions.

The site was launched in February 2000 and currently contains approximately 5,700 clinical studies in over 59,000 locations worldwide, with most studies being conducted in the United States. ClinicalTrials.gov receives about 2 million hits per month and hosts approximately 5,400 visitors daily. To access this database, simply go to their Web site (**www.clinicaltrials.gov**) and search by "peripheral neuropathy" (or synonyms).

While ClinicalTrials.gov is the most comprehensive listing of NIH-supported clinical trials available, not all trials are in the database. The database is updated regularly, so clinical trials are continually being added. The following is a list of specialty databases affiliated with the National Institutes of Health that offer additional information on trials:

- For clinical studies at the Warren Grant Magnuson Clinical Center located in Bethesda, Maryland, visit their Web site: **http://clinicalstudies.info.nih.gov/**

- For clinical studies conducted at the Bayview Campus in Baltimore, Maryland, visit their Web site: **http://www.jhbmc.jhu.edu/studies/index.html**
- For trials on neurological disorders and stroke, visit and search the Web site sponsored by the National Institute of Neurological Disorders and Stroke of the NIH: **http://www.ninds.nih.gov/funding/funding_opportunities.htm#Clinical_Trials**

General References

The following references describe clinical trials and experimental medical research. They have been selected to ensure that they are likely to be available from your local or online bookseller or university medical library. These references are usually written for healthcare professionals, so you may consider consulting with a librarian or bookseller who might recommend a particular reference. The following includes some of the most readily available references (sorted alphabetically by title; hyperlinks provide rankings, information and reviews at Amazon.com):

- **A Guide to Patient Recruitment : Today's Best Practices & Proven Strategies** by Diana L. Anderson; Paperback - 350 pages (2001), CenterWatch, Inc.; ISBN: 1930624115; **http://www.amazon.com/exec/obidos/ASIN/1930624115/icongroupinterna**
- **A Step-By-Step Guide to Clinical Trials** by Marilyn Mulay, R.N., M.S., OCN; Spiral-bound - 143 pages Spiral edition (2001), Jones & Bartlett Pub; ISBN: 0763715697; **http://www.amazon.com/exec/obidos/ASIN/0763715697/icongroupinterna**
- **The CenterWatch Directory of Drugs in Clinical Trials** by CenterWatch; Paperback - 656 pages (2000), CenterWatch, Inc.; ISBN: 0967302935; **http://www.amazon.com/exec/obidos/ASIN/0967302935/icongroupinterna**
- **The Complete Guide to Informed Consent in Clinical Trials** by Terry Hartnett (Editor); Paperback - 164 pages (2000), PharmSource Information Services, Inc.; ISBN: 0970153309; **http://www.amazon.com/exec/obidos/ASIN/0970153309/icongroupinterna**
- **Dictionary for Clinical Trials** by Simon Day; Paperback - 228 pages (1999), John Wiley & Sons; ISBN: 0471985961; **http://www.amazon.com/exec/obidos/ASIN/0471985961/icongroupinterna**
- **Extending Medicare Reimbursement in Clinical Trials** by Institute of Medicine Staff (Editor), et al; Paperback 1st edition (2000), National

Academy Press; ISBN: 0309068886;
http://www.amazon.com/exec/obidos/ASIN/0309068886/icongroupinterna

- **Handbook of Clinical Trials** by Marcus Flather (Editor); Paperback (2001), Remedica Pub Ltd; ISBN: 1901346293;
http://www.amazon.com/exec/obidos/ASIN/1901346293/icongroupinterna

Vocabulary Builder

The following vocabulary builder gives definitions of words used in this chapter that have not been defined in previous chapters:

Acne: An inflammatory disease of the pilosebaceous unit, the specific type usually being indicated by a modifying term; frequently used alone to designate common acne, or acne vulgaris. [EU]

Acyclovir: Functional analog of the nucleoside guanosine. It acts as an antimetabolite, especially in viruses. It is used as an antiviral agent, especially in herpes infections. [NIH]

Amitriptyline: Tricyclic antidepressant with anticholinergic and sedative properties. It appears to prevent the re-uptake of norepinephrine and serotonin at nerve terminals, thus potentiating the action of these neurotransmitters. Amitriptyline also appears to antaganize cholinergic and alpha-1 adrenergic responses to bioactive amines. [NIH]

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

Antibody: An immunoglobulin molecule that has a specific amino acid sequence by virtue of which it interacts only with the antigen that induced its synthesis in cells of the lymphoid series (especially plasma cells), or with antigen closely related to it. Antibodies are classified according to their ode of action as agglutinins, bacteriolysins, haemolysins, opsonins, precipitins, etc. [EU]

Antidepressant: An agent that stimulates the mood of a depressed patient, including tricyclic antidepressants and monoamine oxidase inhibitors. [EU]

Benztropine: A centrally active muscarinic antagonist that has been used in the symptomatic treatment of parkinson disease. Benztropine also inhibits the uptake of dopamine. [NIH]

Chemotherapy: The treatment of disease by means of chemicals that have a specific toxic effect upon the disease - producing microorganisms or that selectively destroy cancerous tissue. [EU]

Concomitant: Accompanying; accessory; joined with another. [EU]

Dementia: An acquired organic mental disorder with loss of intellectual

abilities of sufficient severity to interfere with social or occupational functioning. The dysfunction is multifaceted and involves memory, behavior, personality, judgment, attention, spatial relations, language, abstract thought, and other executive functions. The intellectual decline is usually progressive, and initially spares the level of consciousness. [NIH]

Dyspnea: Difficult or labored breathing. [NIH]

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

Intravenous: Within a vein or veins. [EU]

Mexiletine: Antiarrhythmic agent pharmacologically similar to lidocaine. It may have some anticonvulsant properties. [NIH]

Monotherapy: A therapy which uses only one drug. [EU]

Myositis: Inflammation of a voluntary muscle. [EU]

Nephrotoxic: Toxic or destructive to kidney cells. [EU]

Nimodipine: A calcium channel blockader with preferential cerebrovascular activity. It has marked cerebrovascular dilating effects and lowers blood pressure. [NIH]

Oral: Pertaining to the mouth, taken through or applied in the mouth, as an oral medication or an oral thermometer. [EU]

Pentamidine: Antiprotozoal agent effective in trypanosomiasis, leishmaniasis, and some fungal infections; used in treatment of Pneumocystis carinii pneumonia in HIV-infected patients. It may cause diabetes mellitus, central nervous system damage, and other toxic effects. [NIH]

Prevalence: The total number of cases of a given disease in a specified population at a designated time. It is differentiated from incidence, which refers to the number of new cases in the population at a given time. [NIH]

Pulse: The rhythmical expansion and contraction of an artery produced by waves of pressure caused by the ejection of blood from the left ventricle of the heart as it contracts. [NIH]

Serum: The clear portion of any body fluid; the clear fluid moistening serous membranes. 2. blood serum; the clear liquid that separates from blood on clotting. 3. immune serum; blood serum from an immunized animal used for passive immunization; an antiserum; antitoxin, or antivenin. [EU]

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

Sulfadiazine: A short-acting sulfonamide used in combination with pyrimethamine to treat toxoplasmosis in patients with acquired

immunodeficiency syndrome and in newborns with congenital infections. [NIH]

Symptomatic: 1. pertaining to or of the nature of a symptom. 2. indicative (of a particular disease or disorder). 3. exhibiting the symptoms of a particular disease but having a different cause. 4. directed at the allying of symptoms, as symptomatic treatment. [EU]

Zalcitabine: A dideoxynucleoside compound in which the 3'-hydroxy group on the sugar moiety has been replaced by a hydrogen. 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 at low concentrations, acting as a chain-terminator of viral DNA by binding to reverse transcriptase. Its principal toxic side effect is axonal degeneration resulting in peripheral neuropathy. [NIH]

PART II: ADDITIONAL RESOURCES AND ADVANCED MATERIAL

ABOUT PART II

In Part II, we introduce you to additional resources and advanced research on peripheral neuropathy. All too often, patients who conduct their own research are overwhelmed by the difficulty in finding and organizing information. The purpose of the following chapters is to provide you an organized and structured format to help you find additional information resources on peripheral neuropathy. In Part II, as in Part I, our objective is not to interpret the latest advances on peripheral neuropathy or render an opinion. Rather, our goal is to give you access to original research and to increase your awareness of sources you may not have already considered. In this way, you will come across the advanced materials often referred to in pamphlets, books, or other general works. Once again, some of this material is technical in nature, so consultation with a professional familiar with peripheral neuropathy is suggested.

CHAPTER 4. STUDIES ON PERIPHERAL NEUROPATHY

Overview

Every year, academic studies are published on peripheral neuropathy or related conditions. Broadly speaking, there are two types of studies. The first are peer reviewed. Generally, the content of these studies has been reviewed by scientists or physicians. Peer-reviewed studies are typically published in scientific journals and are usually available at medical libraries. The second type of studies is non-peer reviewed. These works include summary articles that do not use or report scientific results. These often appear in the popular press, newsletters, or similar periodicals.

In this chapter, we will show you how to locate peer-reviewed references and studies on peripheral neuropathy. We will begin by discussing research that has been summarized and is free to view by the public via the Internet. We then show you how to generate a bibliography on peripheral neuropathy and teach you how to keep current on new studies as they are published or undertaken by the scientific community.

The Combined Health Information Database

The Combined Health Information Database summarizes studies across numerous federal agencies. To limit your investigation to research studies and peripheral 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 in "peripheral 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 a sample of what you can expect from this type of search:

- **Simple Screening Tests for Peripheral Neuropathy in the Diabetes Clinic**

  Source: Diabetes Care. 24(2): 250-256. February 2001.

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

  Summary: This article describes a study that assessed the operating characteristics of four simple sensory screening maneuvers as compared with standardized electrophysiological tests in the diagnosis of distal symmetrical polyneuropathy. The screening maneuvers were the 10 gram Semmes Weinstein monofilament examination (SWME), superficial pain, vibration testing by the on off method, and vibration testing by the timed method. The study population consisted of 478 subjects who were assessed by at least seven different examiners during a 4 to 5 hour stay in a diabetic neuropathy research clinic located in Toronto, Canada. The study found that the four simple screening maneuvers reveal similar operating characteristics. Cutoff points by receiver operating characteristic (ROC) curve analyses reveal that a positive or abnormal test is represented by five incorrect responses of eight stimuli applied. A negative or normal test is represented by one or fewer incorrect responses of sight stimuli applied. By these criteria, the point estimates of the positive likelihood ratios for vibration testing by the on off method, vibration testing by the timed method, the SWME, and superficial pain sensation test were 26.6, 18.5, 10.2, and 9.2, respectively. The point estimates of the negative likelihood ratios were 0.33, 0.51, 0.34, and 0.50, respectively. The screening tests showed comparable sensitivity and specificity results. The article concludes that the SWME, superficial pain test, and vibration testing by the on off method are rapid, with each requiring approximately 60 seconds to administer. The timed vibration test takes longer, and the interpretation is more complicated. The combination of two testing modalities does not improve the operating

characteristics of screening from the data in this study. 1 figure. 5 tables. 36 references. (AA-M).

- **Psychological Aspects of Diabetic Peripheral Neuropathy**

  Source: Diabetes Reviews. 7(4): 387-394. 1999.

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

  Summary: This review article summarizes the data on the psychosocial aspects of diabetic peripheral neuropathy (DPN), focusing on quality of life (QoL) and related issues and psychosocial determinants of adherence or nonadherence to preventive foot care. Despite a proliferation of psychosocial and behavioral studies in diabetes, complications, including DPN, have to date been largely neglected. The few reports that have assessed the effects of complications on the well being of patients, their physical functioning, and their QoL rarely addressed neuropathy in isolation. When DPN was addressed, several problems existed. First, the neuropathy itself was poorly defined. Second, studies predominantly used generic approaches and rarely offered any clinically meaningful data on the impact of DPN on psychosocial functioning. Third, researchers tended to focus on extreme manifestations of DPN such as severe pain, foot ulcers, and amputations, whereas the majority of neuropathic patients do not fall into these categories. Until recently, research into the psychosocial variables that might influence adherence or nonadherence to preventive foot care was not driven by any integrated theory and, therefore, lacked explanatory power as to how behavioral decisions were made. There is now some progress in this area. A new generation of measures, that is, condition specific measures, are in development, such as NeuroQo9L, a neuropathy specific measures. Current research that is guided by the Illness Perception Approach appears promising in explaining adherence or nonadherence to preventive foot care. Newly emerging patient centered, neuropathy focused, theoretically based approaches to adherence behaviors and QoL should increase clinicians' understanding as to how patients who have diabetes experience and deal with their neuropathy. This research should improve the ability to empower patients to manage their neuropathy more efficiently, ultimately leading to better physical and psychosocial outcomes. 1 figure. 60 references. (AA-M).

- **Recognizing Peripheral Neuropathy: How to Read the Clues to an Underlying Cause**

  Source: Postgraduate Medicine. 102(2): 71-72, 75, 80. September 1997.

Contact: Available from McGraw-Hill, Inc. 1221 Avenue of the Americas, New York, NY 10020. (612) 832-7869.

Summary: This review article provides health professionals with information about recognizing peripheral neuropathy. The author notes that peripheral neuropathy, which affects sensory, motor, or autonomic nerves, is one of the most common neurologic disorders seen in primary care. Several systemic diseases, such as diabetes, rheumatoid arthritis, and thyroid disease, can cause symptoms of peripheral nerve dysfunction. Topics include physical findings, sensory nerve dysfunction, motor nerve dysfunction, autonomic nerve dysfunction, signs and symptoms, family history, exposure history, medical history, and laboratory evaluation. The author points out that the patients' descriptions of symptoms and their onset, specific deficits found on physical examination, and family and medical history can provide clues to the cause of neuropathy. Complements to clinical evaluation may include nerve-conduction studies, electromyography, and, when necessary, nerve biopsy. A sidebar provides tips for improving clinical examination for peripheral neuropathy. 1 table. 1 reference. (AA-M).

- **Endocrinologic Cause of Peripheral Neuropathy: Pins and Needles in a Stocking-and-Glove Pattern and Other Symptoms**

  Source: Postgraduate Medicine. 102(2): 81-82, 90-92, 102-106. September 1997.

  Contact: Available from McGraw-Hill, Inc. 1221 Avenue of the Americas, New York, NY 10020. (612) 832-7869.

  Summary: This article reviews the endocrinologic causes of peripheral neuropathy. The authors note that diabetes is the most common cause of peripheral neuropathy in the Western world. Topics include diabetic neuropathy and its forms, diagnostic evaluation, and treatment approaches. Forms of diabetic neuropathy include distal symmetric polyneuropathy, autonomic neuropathy, diabetic neuropathic cachexia, hyperglycemic neuropathy, treatment-induced diabetic neuropathy, Bruns-Garland syndrome, cranial neuropathy, truncal neuropathy, and entrapment neuropathy. Roughly 75 percent of diabetic neuropathies are distal symmetric polyneuropathy. Treatment approaches include controlling glucose level, improving nerve function, controlling inflammation, and relieving symptoms. In addition, treatment information specific to autonomic neuropathy, thyroid-related neuropathy, and acromegaly-related neuropathy is provided. The authors note that the treatment of underlying disease is the most successful management approach. For example, tight glucose control in people with diabetes, thyroid hormone replacement therapy in people

with hypothyroidism, and removal of the pituitary adenoma in people with acromegaly are advantageous. Two sidebars address hypotheses on the development of diabetic neuropathy and hypotheses on the causes of pain in diabetic neuropathy. 1 table. 21 references. (AA-M).

- **Diabetic Peripheral Neuropathy: New Approaches to Treatment, Classification, and Staging**

  Source: Diabetes Spectrum. 6(4): 233-257. July-August 1993.

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

  Summary: This special section of Diabetes Spectrum reviews and summarizes recent articles elucidating new approaches to the treatment, classification, and staging of diabetic neuropathy. One main article concerns strategies for using patient education to translate research findings in peripheral neuropathy; another describes a research study investigating the use of Tolrestat for mild diabetic neuropathy. Summary and commentary articles discuss the effects of uridine in the treatment of diabetic neuropathy; the relationship between sural nerve morphometric findings and measures of peripheral nerve function in mild diabetic neuropathy; the effects of pancreas transplantation on diabetic neuropathy; the peripheral neuropathy profile in various groups of people with diabetes; severe early-onset polyneuropathy in IDDM; acute and remitting painful diabetic polyneuropathy; the effect of treatment with capsaicin on daily activities of patients with painful diabetic neuropathy; the Rochester Diabetic Neuropathy Study; and hypoxic neuropathy and its relevance to human diabetic neuropathy.

- **Capsaicin for Diabetic Peripheral Neuropathy**

  Source: Practical Diabetology. 9(4): 4-5. July-August 1990.

  Summary: A new product, Axsain (capsaicin), is being actively promoted in various diabetes publications for the treatment of painful neuralgias (peripheral neuropathy). This article reviews the pharmacology, comparative efficacy, adverse reactions, and recommended uses for this product, which is available without a prescription. The authors are concerned about the product because of the lack of completed controlled clinical trials to examine the efficacy and safety of capsaicin in the treatment of diabetic peripheral neuropathy.

- **Peripheral Neuropathy in Patients with Chronic Renal Failure: A Treatable Source of Discomfort and Disability**

  Source: Postgraduate Medicine. 102(4): 249-250, 255-257, 261. October 1997.

  Contact: Available from McGraw-Hill, Inc. 1221 Avenue of the Americas, New York, NY 10020. (612) 832-7869.

  Summary: Years ago, patients with chronic renal failure (CRF) usually died early. Central nervous system manifestations (e.g., seizures, coma) attracted the most attention, and signs of neuropathy were often overlooked. After use of long term hemodialysis became widespread, patients began to live longer, and neuropathy began being reported more often. This article describes typical presentations of the most often seen types of neuropathy in these patients: uremic polyneuropathy, mononeuropathies, and associated contributory conditions. The authors summarize signs and symptoms, diagnosis, and the therapeutic approach for uremic polyneuropathy, then briefly discuss the other two conditions. Treatment options for uremic polyneuropathy include hemodialysis, renal transplantation, and symptomatic medical therapy. Hemodialysis or peritoneal dialysis halts the progress of polyneuropathy but usually does not bring improvement. However, improvement invariably occurs with successful renal transplantation. Long term followup has shown that successful renal transplantation has a less favorable effect on uremic polyneuropathy in diabetic patients, probably because diabetes is an additional contributory process. 15 references. (AA-M).

Federally-Funded Research on Peripheral Neuropathy

The U.S. Government supports a variety of research studies relating to peripheral neuropathy and associated conditions. These studies are tracked by the Office of Extramural Research at the National Institutes of Health.[18] 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. Visit the CRISP Web site at **http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket**. You can perform targeted searches by various criteria including geography, date, as well as topics related to peripheral neuropathy and related conditions.

[18] 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 peripheral neuropathy and related conditions. In some cases, therefore, it may be difficult to understand how some basic or fundamental research could eventually translate into medical practice. The following sample is typical of the type of information found when searching the CRISP database for peripheral neuropathy:

- **Project Title: CMT Peripheral Neuropathy: IV. Genes and Pathogenesis**

  Principal Investigator & Institution: Lupski, James R.; Professor; Molecular and Human Genetics; Baylor College of Medicine 1 Baylor Plaza Houston, Tx 77030

  Timing: Fiscal Year 2002; Project Start 1-JAN-1990; Project End 1-DEC-2005

  Summary: Hereditary peripheral neuropathies are common human genetic conditions. These clinically and genetically heterogeneous disorders produce progressive deterioration of the peripheral nerves with secondary muscle wasting and weakness in a distal distribution. The application of molecular genetic techniques to this group of disorders has resulted in a more comprehensive understanding of peripheral nerve biology that has important clinical implications. This proposal focuses on the identification of genes, molecular genetic bases, and pathogenic mechanisms regarding the inherited peripheral neuropathy Charcot-Marie-Tooth disease and related disorders. Human genetic and genomic approaches, informatics applications to genome databases, expression profiling coupled with mapping of peripheral nerve- specific genes, comparative genome studies between human and nonhuman primates, and molecular studies of a large cohort of patients manifesting peripheral neuropathies will be utilized to extend our understanding of the human peripheral nerve neurobiology. The major hypotheses to be tested are: (i) the identification of the genes involved in rare forms of familial neuropathy will provide insights into peripheral nerve structure/function and maintenance; (ii) genes that are downstream targets of the transcription factor EGR2 are important candidates for inherited peripheral nerve disease; (iii) structural features of the human genome may result in susceptibility to constitutional DNA rearrangements associated with disease. To address these hypotheses six specific aims are proposed. These include a continuation of the collection of rare neuropathy patients and utilizing DNA samples for such patients to identify additional "peripheral nerve disease genes" by focusing on the genes for proteins that interact with periaxin and genes which are

downstream from the peripheral nerve developmental transcription factor EGR2. In addition, a novel general strategy is proposed to identify peripheral nerve- specific genes utilizing bioinformatics procedures and information from the Human Genome Project to establish both positional candidate neuropathy disease genes and a microarray for expression profiling of the peripheral nervous system. Finally, based on some of our previous studies, which have enabled the identification of structural features of the human genome important to the DNA rearrangements responsible for peripheral neuropathy, we will examine additional features which may result in susceptibility to DNA rearrangement as well as examine these genome architectural features during primate species to gain insights into the recent evolution of mammalian genome and its implications for genomic disorders.

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Lamictal in HIV Associated Peripheral Neuropathy**

  Principal Investigator & Institution: Simpson, David M.; Professor; Mount Sinai School of Medicine of Cuny New York, Ny 10029

  Timing: Fiscal Year 2000; Project Start 1-OCT-1975; Project End 0-NOV-2000

  Summary: The purpose of this study is to evaluate the efficacy, safety, and health outcomes of Lamictal compared to placebo for the treatment of pain in subjects with peripheral neuropathy associated with human immnodeficiency virus (HIV) infection. Peripheral neuropathy is a frequent late-stage complication of HIV infection.

  Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Paclitaxel Induced Painful Peripheral Neuropathy in Rats**

  Principal Investigator & Institution: Polomano, Rosemary C.; Anesthesia; Pennsylvania State Univ Hershey Med Ctr 500 University Dr Hershey, Pa 17033

  Timing: Fiscal Year 2000; Project Start 1-MAY-2000; Project End 0-APR-2003

  Summary: The principal investigator, Rosemary C. Polomano, PhD, RN, intends to pursue a career as an independent, clinical and laboratory investigator in biobehavioral pain research in a health system with an academic appointment in a school of nursing and medicine. Intensive laboratory training combined with academic study in neuroscience will enable the principal investigator to examine and better explain the neurophysiological basis for pain associated with paclitaxel neurotoxicity. The primary aim of this investigation is to develop a

painful neurotoxicity model appropriate for human disease, and to effectively translate the findings to human experiences. Painful manifestations from paclitaxel-induced neuropathy will be measured by abnormalities in responses to thermal- (heat and cold) and mechano- (touch and pressure) stimuli in the rats' hind paws and tails that result from damage to the small primary or sensory afferent fibers. This model will advance the development and testing of possible strategies for pain prevention and control, thus increasing the usefulness of this highly effective antineoplastic drug. Graded dosing schedules of paclitaxel or a control vehicle will be administered to 280 male Sprague-Dawley rats in order to find one that produces the greatest degree of a painful peripheral neuropathy, without reaching the threshold for damage to motor fibers or systemic toxicity. Specifically, this investigation will 1) demonstrate and quantify the onset, duration and severity of painful peripheral neuropathy in rats treated with intraperitoneal paclitaxel by measuring behavioral responses (i.e., thermal- and mechano-hyperalgesia and cold- and mechano- allodynia) in the hind paw and tail and motor coordination, and electrophysiological changes in the hind leg nerves following sequential doses, 2) compare differences in the severity of pain-evoked responses for the four paclitaxel dosing schedules to determine if single-dose intensity of cumulative (total) dose produces the greatest sensory abnormalities, and 3) correlate sensory abnormalities in small myelinated (A-delta) and unmyelinated (C-) fibers to the presence and severity of anatomical changes in the nerves and serum peak levels of paclitaxel. Chemotherapy-induced peripheral neurotoxicity is a problem that will only worsen as advances in granulocyte-colony stimulating factor now permit more aggressive therapy with potentially neurotoxic agents. Greater attention has been placed on understanding peripheral sensory and motor neuropathies associated with chemotherapy because these conditions compromise quality of life. As concerns over quality of life and the long- term effects of cancer treatment among survivors grow and clinicians struggle with ways to manage these effects, animal models will become a vital line of inquiry into the scientific basis for etiologies and treatment strategies.

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Peripheral Neuropathy**

  Principal Investigator & Institution: Olney, Richard K.; Northern California Institute Res & Educ for Research and Education San Francisco, Ca 94121

  Timing: Fiscal Year 2000

Summary: Peripheral neuropathy is a frequent cause of HIV morbidity. Chronic heavy alcohol use, which itself is one of the two most prevalent causes of peripheral neuropathy, is common in populations at high risk for HIV infection. Chronic heavy alcohol use may effect the Peripheral Nervous System (PNS) morbidity of HIV infection by accelerating the development of immunodeficiency (via biological effects or via effects on treatment seeking and treatment adherence behavior), through interactions between toxic effects or through nutritional deficiency. This project will determine the effects (and mechanisms underlying these effects) of chronic heavy alcohol use on clinical and functional measures of the Peripheral Nervous System (PNS) morbidity of HIV disease in a 2-year longitudinal study of HIV+ and HIV- chronic heavy drinkers (HIV+HD) and light/non-drinkers (HIV+ L/ND). The Project will: (1) determine whether HIV+ HDs have greater PNS morbidity at baseline than HIV+ L/NDs, (2) determine whether they have a more rapid rate of progression of PNS morbidity than HIV+ L/NDs, (3) determine whether the effects of chronic heavy alcohol use and HIV infection of PNS morbidity at baseline and over the follow-up period are additive or exceed additive effects, and (4) test hypotheses concerning the mechanism(s) for interaction of chronic heavy alcohol use and HIV infection of PNS morbidity and its progression and on the impact of polyneuropathy on clinically important outcomes. Four groups will be studied: 120 HIV+ HDs, 120 HIV+ L/NDs, 60 HIV-HDs, and 60 HIV-L/NDs. PNS function will be measured by clinical exam, quantitative sensory testing, quantitative autonomic testing, and nerve conduction studies. Quantitative sensory deficits will be measured with thermal and vibratory detection thresholds. Quantitative autonomic testing will include heart rate variation to deep breathing and the Valsalva maneuver as well as postural blood pressure testing. Electrophysiological measures will include sensory and motor nerve conduction studies of bilateral lower and non-dominant upper limbs. The establishment of chronic heavy alcohol consumption as a significant co-factor in the pathogenesis of DSP would heighten awareness of health care providers and patients to the importance of this co-factor and would open new therapeutic windows.

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Trial of Lamictal in Adult HIV Peripheral Neuropathy**

  Principal Investigator & Institution: Mcarthur, Justin C.; Professor of Neurology; Johns Hopkins University 3400 N Charles St Baltimore, Md 21218

Timing: Fiscal Year 2000; Project Start 1-OCT-1975; Project End 0-NOV-2004

Summary: The purpose of this study is to evaluate the efficacy and safety of lamotrigine for the treatment of pain in subjects with HIV-peripheral neuropathy. Peripheral neuropathy is a frequent late-stage complication of HIV infection. The most common form is a symmetric, predomininately sensory, distal polyneuropathy that affects 20-35% of patients with late-stage HIV infection. The clinical signs and symptoms of HIV peripheral neuropathy (HIV-PN) include pain, numbness, and burning sensations primarily in the feet. The cause of HIV-PN remains unknown. A number of medications have been used in the treatment of HIV-PN, including antidepressants, anticonvulsants, opiate and non-opiate analgesics and local anesthetics. All of these have variable and generally incomplete efficacy. Lamotrigine is an anticonvulsant with similar efficacy in maximal electroshock models to carbamazepine and phenytoin, both with proven benefit in the treatment of painful diabetic neuropathy. The proposed mechanism of action of lamotrigine is a blocking effect on voltage-sensitive sodium channels and inhibition of glutatmate and aspartate release. An excess of these excitotoxins may play a role in AIDS neuropathy. Anecdotal reports and published data from small, uncontrolled clinical trials suggest that lamotrigine may be an effective treatment for neuropathic pain. These results suggest a larger study is warranted.

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Achilles Tendon Lengthening on Patients with Diabetes**

  Principal Investigator & Institution: Mueller, Michael J.; Associate Professor; Physical Therapy Education; Washington University Lindell and Skinker Blvd St. Louis, Mo 63130

  Timing: Fiscal Year 2000; Project Start 7-AUG-1998; Project End 1-MAY-2003

  Summary: (Adapted from the Applicant's Abstract): Patients with diabetes mellitus (DM) and peripheral neuropathy are at high risk for forefoot plantar ulcers and subsequent lower extremity amputation. Total contact casting currently is the most effective treatment for healing neuropathic plantar ulcers but ulcer recurrence is high (30-50%) when patients discontinue casting and resume walking. An equinus deformity (limited ankle dorsiflexion range-of-motion [ROM]) is associated with these recurrent ulcers. Although descriptive evidence indicates an Achilles lengthening procedure (which corrects the equinus deformity) can improve healing rates in chronic ulcers, there have been no controlled trials. The primary purpose of this study will be to conduct a randomized

prospective controlled trial to determine if percutaneous Achilles lengthening and total contact casting is more effective than total contact casting alone to heal forefoot plantar ulcers. Secondary purposes are to determine the effects of casting and percutaneous Achilles lengthening on measures of impairments, functional limitations, and disability in patients with DM and peripheral neuropathy. The specific aims of this project are to determine the effect of the Achilles lengthening procedure on patients with DM, peripheral neuropathy, a forefoot ulcer, and an equinus deformity in regards to 1) Wound healing, 2) Impairments (dorsiflexion range-of-motion, plantar flexor muscle performance), 3) Functional Limitations (Physical Performance Test, Functional Reach, walking ability), and 4) Disability (SF36). The results will have important implications for prevention of wound infection and lower extremity amputation; and improvement in impairments, functional limitations, and disability in this group of high risk patients with chronic disease.

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Lipoprotein Lipase, Nutrition and Nerve Myelination**

  Principal Investigator & Institution: Eckel, Robert H.; Professor of Medicine,; Medicine; University of Colorado Hlth Sciences Ctr 4200 E 9Th Ave Denver, Co 80262

  Timing: Fiscal Year 2000; Project Start 1-JAN-1990; Project End 0-NOV-2002

  Summary: Lipoprotein lipase (LPL) is a hydrolytic enzyme which releases fatty acids and monoacylglyerol from nutrient-dependent triglyceride-rich lipoproteins [chylomicrons and very low density lipoproteins (VLDL)] and regulates the partitioning of these lipid fuels to tissues. This process has been studied most extensively in adipose tissue and muscle. However, LPL is also made in other sites including the nervous system, where the lipase is found in the brain, spinal cord and peripheral nerve. In the peripheral nerve, in vitro experiments have suggested, but not yet proven, that function of LPL is to enhance the uptake of chylomicron and VLDL triglyceride fatty acids to Schwann cells for myelin phospholipid synthesis. The studies outlined in this proposal will further this understanding by: 1) determining the sites of LPL expression within the peripheral nerve and defining the role of LPL in myelin synthesis nd peripheral nerve regeneration; 2) assessing the expression and regulation of peripheral nerve LPL in animal models of diabetic peripheral neuropathy; and 3) evaluating the efficacy of retro- and adenovirally mediated human LPL (hLPL) gene delivery to augment myelination following peripheral nerve injury, and reverse and/or retard the neuropathy of diabetes mellitus. A combination of experiments in

rodents and cultured Schwann cells will be utilized. To more specifically determine the role of the LPL in peripheral nerve in rodents (Specific Aim #1), the cells of origin and response of LPL to crush injury will be examined in normal rats and mice, and in transgenic mice without LPL in the peripheral nerve. In Specific Aim #2, several models of diabetic mellitus with already characterize peripheral neuropathy will determine if LPL expression in the peripheral nerve injury is impaired +/- crush injury. Finally, in Specific Aim #3, an important series of experiments will determine the efficacy of the delivery of LPL to augment myelination in regenerating nerves and in rodents with diabetic peripheral neuropathy. Two viral gene delivery systems will be evaluated for their ability to deliver hLPL to rat sciatic nerve: retrovirus-mediated gene delivery, which targets dividing cells, and adenovirus-mediated gene delivery, which introduces genes into non-dividing cells. The method that better facilitates sciatic nerve recovery from crush injury will then be administered to rodent models of diabetic neuropathy in an attempt to improve peripheral nerve myelination. Overall, these studies should provide a comprehensive understanding of the role of LPL in the peripheral nerve. Moreover, we are hopeful that new insights into the treatment of peripheral neuropathies will also ensue.

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Pregabalin:safety in Patients w/ Painful Diabetic Peripheral Neuropat**

  Principal Investigator & Institution: Granda-Ayala, Ramona; Tulane University of Louisiana New Orleans, La 70118

  Timing: Fiscal Year 2000

  Summary: Diabetic peripheral neuropathy is associated with several clinical entities, including diffuse neuropathy and focal neuropathy. Resistance to treatment with simple analgesics is a characteristic feature in painful diabetic neuropathy. There is a need for new effective drugs that can relieve the painful symptoms with minimal impact on the patient's diabetes control. Drugs such as non-narcotic analgesics, tricyclic antidepressants, anticonvulsants such as phenytoin, phenothiazine, antiarrhythmics, NSAIDs, and opiates have been used to treat painful neuropathy, with little success. Pregabalin has been shown to be effective in the treatment of diabetic peripheral neuropathy. In this study, pregabalin is being evaluated with the objective of providing another therapeutic option in the treatment of painful diabetic neuropathy.

  Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Restoring Diabetic Tactile Sense with Mechanical Noise**

  Principal Investigator & Institution: Harry, Jason D.; Sensory Technologies, Inc. 194 Waterman St Providence, Ri 02906

  Timing: Fiscal Year 2001; Project Start 0-SEP-2001; Project End 1-MAR-2002

  Summary: Stochastic resonance (SR) is a counterintuitive phenomenon in which slight amounts of noise imparted to a system actually increase its sensitivity to weak stimuli. SR has been shown to produce a demonstrable effect in human sensory cells. In both healthy young and clinical subjects-elderly, diabetics, and stroke sufferers-a notable increase in tactile and proprioceptive sensitivity is seen when electrical or mechanical noise is presented at the site of the stimulus. Dysfunction in the tactile system in diabetics is known to have significant clinical sequelae including gait abnormalities, propensity to fall, and foot ulcers. Diabetic peripheral neuropathy, with its complications, costs the U.S. healthcare system many billions of dollars annually. The goal of the proposed research is to advance early laboratory results toward a therapeutic device for enhancing the tactile sense in diabetic patients. The work will demonstrate the ability of mechanical stimulation to improve sensitivity using two metrics. First, we will determine the magnitude of the SR benefit in diabetics using standard neurological examinations, specifically the Semmes-Weinstein and vibration perception threshold tests. Second, we will explore the functional benefit of mechanical stimulation in stance and sway experiments. Both experiments will give a measure of true functional benefit. PROPOSED COMMERCIAL APPLICATIONS: If successful, the proposed research will lead to medical devices that improve tactile sensitivity in people who suffer from diabetic peripheral neuropathy. This would improve quality of life for these individuals while reducing the costs of caring for them. Additional medical applications include use of technology in stroke, aging, and rehabilitation medicine.

  Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Suramin w/ Sequential Doxorubicin in Patients w/ Advanced Solid Tumor**

  Principal Investigator & Institution: Adjei, Alex A.; Mayo Clinic Rochester 200 1St St Sw Rochester, Mn 55905

  Timing: Fiscal Year 2000

  Summary: Suramin is a unique polyanionic compound which blocks a variety of growth factors involved in the proliferation of human tumors. Doxorubicin is an anthracycline antibiotic which interferes with DNA

topoisomerase II. Based on preclinical data, suramin with sequential doxorubicin possess cytotoxic synergy in a number of tumor types including prostate and breast carcinomas. It is our hypothesis that suramin with sequential doxorubicin is a potent and effective antitumor treatment. We are undertaking a phase I trial of suramin with sequential doxorubicin in patients with solid tumors refractory to standard therapy or for whom there is no standard treatment. The objectives of the trial are: 1) to determine the MTD of 4 days of short infusion suramin followed by 1 dose of ADR (varying doses) repeated every 4 weeks, 2) to describe the toxicities of suramin with sequential ADR given on this schedule, 3) to assess the development of peripheral neuropathy in patients treated with suramin-ADR on this schedule, 4) to seek preliminary evidence of the antitumor effect of suramin with sequential ADR, 5) to determine the effect of suramin on total and free IGF-1, IGF-2, and IGFBPs, 6) the pharmacokinetic studies will be performed to explore relationships between pharmacokinetic parameters and potential neurotoxicity. Those parameters will include total dose, peak and trough concentrations, total AUC and time above a threshold concentration or AUC. The eligibility criteria are >18 years of age; unavailability of another more conventional form of therapy which offers a reasonable chance to cure, performance status 0-2, adequate organ function, life expectancy of >12 weeks, grade 2. Patients meeting the eligibility criteria will receive suramin intravenously on days 1-4 followed by a bolus infusion of doxorubicin done on day 5. Treatment will be repeated every 28 days up to a maximum of 3 cycles. The starting dose of doxorubicin will be 20 mg/m2 on day 5 and will be escalated to 30, 45, and 60 mg/m2 in subsequent patient cohorts. The dose of suramin will be fixed, and is chosen to yield peak and through levels of 200 ug/ml and 150 ug/ml respectively. Dose-limiting toxicity is defined as that dose in which >2/3 or >2/6 patients experienced serum creatinine >2 times baseline or > 2 times institutional upper normal (whichever is highest) >grade 3 other nonhematologic or >grade 3 hematologic toxicities according to NCI CTC. The maximally tolerated dose is one dose level below that dose which causes dose-limiting toxicity. An exploratory analysis will be undertaken to relate the pharmacokinetic parameters of this treatment and clinical or hematologic toxicity.

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- **Project Title: Symptomatic Treatment of Peripheral Neuropathies**

  Principal Investigator & Institution: Sui, Jinliang; Cambridge Neuroscience 333 Providence Hwy Norwood, Ma 02062

Timing: Fiscal Year 2000; Project Start 0-SEP-1997; Project End 1-AUG-2002

Summary: Our overall therapeutic goal is to develop a drug treatment that reduces suffering and improves quality of life for victims of peripheral neuropathies - a diverse group of neurological disorders with genetic, metabolic or toxic etiologies. Patients who suffer from peripheral neuropathy can experience loss of voluntary or involuntary motor function and a wide range of disordered sensations, including intense chronic pain. In peripheral neuropathies, demyelination of nerve axons is associated with loss of signal propagation that directly or indirectly causes the symptoms of the neuropathy. Exposure of specific voltage-gated potassium channels on nerve axons by demyelination creates a condition where the propagation of action potentials can be terminated by a "short circuit". Our mechanistic approach is to selectively block this specific class of voltage-gated potassium channels and restore axonal conduction in demyelinated peripheral nerves. In Phase I of the project, we successfully established the basic screening technologies, developed a focused chemical library of potassium channel blockers and identified lead molecules. In Phase II, we will study compounds from an expanded chemical library using in vitro assays and animal efficacy and safety "models" with the objective of selecting candidates for preclinical and clinical development. Proposed Commercial Application: Peripheral neuropathies afflict millions of people in the United States and tens of millions worldwide. For example, the NIDDK estimates that 16 million people in the US have diabetes and that 30-40% of diabetics have symptoms of peripheral neuropathy. In addition, certain drugs used in treating cancer cause an estimated 260,000 cases each year of peripheral neuropathy that can limit the use of the chemotherapeutic agents. There is no doubt that an effective drug treatment for the symptoms of peripheral neuropathy would have a substantial medical. societal and commercial impact.

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Therapeutic Angiogenesis in Vascular Medicine II**

  Principal Investigator & Institution: Isner, Jeffrey M.; Professor; St. Elizabeth's Medical Center of Boston 736 Cambridge St, Brighton Boston, Ma 02135

  Timing: Fiscal Year 2000; Project Start 1-JAN-1995; Project End 1-JAN-2005

  Summary: Experiments performed in animal models have established that administration of angiogenic growth factors as recombinant proteins or by gene transfer promotes neovascularization of ischemic tissues.

Preliminary investigations in patients with critical limb ischemia suggest that this strategy, termed therapeutic angiogenesis, may yield potential clinical benefit, including relief of rest pain and restoration of tissue integrity. Follow-up studies of these patients and preliminary animal studies suggest that therapeutic angiogenesis may also lead to recovery of nerve function in patients and animals with ischemic peripheral neuropathy. Accordingly, this Proposal has been designed to systematically investigate the impact of therapeutic angiogenesis on ischemic peripheral neuropathy. The proposed experiments have been designed to test specific hypotheses, organized according to three Specific Aims. Specific Aim 1 will determine the impact of therapeutic angiogenesis on ischemic peripheral neuropathy, using a rabbit model of hindlimb ischemia. These experiments will evaluate what has been considered to be a relatively endothelial cell (EC)-specific cytokine, vascular endothelial growth factor (VEGF), as well as more pleiotropic angiogenic growth factors. The impact of angiogenesis inhibitors on endogenous recovery of nerves injured due to ischemia will be investigated as well. Specific Aim 2 will employ animal models with experimentally induced diabetes to determine the impact of angiogenic growth factors on peripheral neuropathy, with and without macrovascular insufficiency. The response of ischemic neuropathy to neurotrophins will also be investigated in these animal models. The third Specific Aim is to investigate the cellular basis for modulation of ischemic peripheral neuropathy by therapeutic angiogenesis. These experiments will determine whether the impact of VEGF on ischemic neuropathy is limited to indirect effects achieved by enhanced neovascularization, or whether VEGF may directly modulate non-vascular neural elements. The extent to which angiogenic growth factors and ischemia modulate expression of endogenous neurotrophins will be investigated as well. Finally, mechanisms responsible for peripheral nerve recovery in response to angiogenic cytokines will be studied for contribution of bone-marrow derived endothelial precursors to putative neovascularization of the vasa nervorum. The experiments outlined in this Proposal are anticipated to provide new insights into the fundamental relationship between vascular and peripheral nerve integrity, and suggest novel therapeutic strategies to address a clinical disorder that accounts for considerable morbidity.

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Vibrometer for Animal Testing**

  Principal Investigator & Institution: Tuckett, Robert P.; Neuroscience Research 2381 Sheridan Rd Salt Lake City, Ut 94108

Timing: Fiscal Year 2001; Project Start 1-JUL-2001; Project End 0-SEP-2002

Summary: (From the applicant's Abstract) One traditional quantitative animal assay for peripheral neuropathy involves measuring the animal's behavioral threshold to noxious thermal stimulation. A limitation of this approach is that thermally activated sensory populations are for the most part unmyelinated; hence, correlation with direct electrophysiological recording is extremely difficult and time-consuming. Alternatively, monofilament testing with hand-held probes provides a ranking of sensory threshold in large mechanosensory axons, which are relatively easy to record and identify histologically. In addition, recent evidence supports the concept that mechanoreceptor sensory pathways are involved in signaling chronic pain. The development of a stimulation procedure that is more quantitative than monofilament testing would be of benefit in behavioral studies of peripheral sensory neuropathy (e.g., diabetes, burn injury, compression, and AIDS), and development of new drugs for treatment of chronic pain, as well as basic investigations in genetics and neurobiology. Neuroscience research proposes the commercial development model system with standard procedures and instrumentation to quantify mechanosensory-related neuropathy in animal models. Phase I will test system feasibility in animal models of peripheral neuropathy that exhibit mechanical allodynia (diminished threshold to mechanically induced pain). Proposed Commercial Application: Markets for instrumentation to quantify animal peripheral neuropathy include numerous basic and applied research laboratories; e.g., those involved in genetic, neuroscience, and neurobiological studies of peripheral neural development and function; pharmaceutical companies screening for compounds to treat acute and chromic pain, as well as neurotoxicity; and laboratories studying peripheral neuropathy (e.g., AIDS, diabetic, compression, chemical neurotoxicology).

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

- **Project Title: Zenarestat in Diabetic Neuropathy**

  Principal Investigator & Institution: Fonseca, Vivian A.; Professor of Medicine and Pharmacology; Tulane University of Louisiana New Orleans, La 70118

  Timing: Fiscal Year 2000; Project Start 4-JAN-1990; Project End 0-NOV-2001

  Summary: One of the many complications associated with diabetes is peripheral neuropathy, which may affect up to 90% of diabetic patients with about 25% having clinical signs or symptoms. Diabetic peripheral neuropathy is defined as nerve damage attributable solely to diabetes mellitus; it can be either clinically evident or subclinical in nature and

may involve the somatic and/or autoimmune nervous systems. The peripheral neuropathies are generally progressive and usually irreversible and often progress to a severe loss of sensation in the lower extremities, a condition that leads to an increased incidence of foot ulcers, infections, and amputations. The purpose of this study is to determine if CI-1014 (zenarestat), an aldose reductase inhibitor, can reverse, stabilize, or slow the progression of diabetic neuropathy relative to placebo and to assess the safety of CI-1014.

Website: http://commons.cit.nih.gov/crisp3/CRISP.Generate_Ticket

E-Journals: PubMed Central[19]

PubMed Central (PMC) is a digital archive of life sciences journal literature developed and managed by the National Center for Biotechnology Information (NCBI) at the U.S. National Library of Medicine (NLM).[20] Access to this growing archive of e-journals is free and unrestricted.[21] To search, go to **http://www.pubmedcentral.nih.gov/index.html#search**, and type "peripheral neuropathy" (or synonyms) into the search box. This search gives you access to full-text articles. The following is a sample of items found for peripheral neuropathy in the PubMed Central database:

- **A case of central nervous system vasculitis related to an episode of Guillain-Barre syndrome** by Daniele Sinardi, Antonella Spada, Antonella Marino, and Epifanio Mondello; 2000
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=29044
- **Agmatine reverses pain induced by inflammation, neuropathy, and spinal cord injury** by Carolyn A. Fairbanks, Kristin L. Schreiber, Kori L. Brewer, Chen-Guang Yu, Laura S. Stone, Kelley F. Kitto, H. Oanh Nguyen, Brent M. Grocholski, Don W. Shoeman, Lois J. Kehl, Soundararajan Regunathan, Donald J. Reis, Robert P. Yezierski, and George L. Wilcox; 2000 September 12
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=27068

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

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

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

- **Altered pain responses in mice lacking [alpha]1E subunit of the voltage-dependent Ca2 + channel** by Hironao Saegusa, Takashi Kurihara, Shuqin Zong, Osamu Minowa, An-a Kazuno, Wenhua Han, Yoshihiro Matsuda, Hitomi Yamanaka, Makoto Osanai, Tetsuo Noda, and Tsutomu Tanabe; 2000 May 23
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=18570
- **Aminoguanidine Effects on Nerve Blood Flow, Vascular Permeability, Electrophysiology, and Oxygen Free Radicals** by M Kihara, JD Schmelzer, JF Poduslo, GL Curran, KK Nickander, and PA Low; 1991 July 15
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?rendertype=abstract&artid=52031
- **Amplified Fragment Length Polymorphism Analysis of Campylobacter jejuni Strains Isolated from Chickens and from Patients with Gastroenteritis or Guillain-Barre or Miller Fisher Syndrome** by Birgitta Duim, C. Wim Ang, Alex van Belkum, Alan Rigter, Nan W. J. van Leeuwen, Hubert P. Endtz, and Jaap A. Wagenaar; 2000 September
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=92239
- **Antigen therapy eliminates T cell inflammation by apoptosis: Effective treatment of experimental autoimmune neuritis with recombinant myelin protein P2** by Andreas Weishaupt, Ralf Gold, Stefanie Gaupp, Gerhard Giegerich, Hans-Peter Hartung, and Klaus V. Toyka; 1997 February 18
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=19792
- **Campylobacter Species and Guillain-Barre Syndrome** by Irving Nachamkin, Ban Mishu Allos, and Tony Ho; 1998 July
  http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=88896

The National Library of Medicine: PubMed

One of the quickest and most comprehensive ways to find academic studies in both English and other languages is to use PubMed, maintained by the National Library of Medicine. The advantage of PubMed over previously mentioned sources is that it covers a greater number of domestic and foreign references. It is also free to the public.[22] If the publisher has a Web site that

[22] 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.

offers full text of its journals, PubMed will provide links to that site, as well as to sites offering other related data. User registration, a subscription fee, or some other type of fee may be required to access the full text of articles in some journals.

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

- **The WldS protein protects against axonal degeneration: a model of gene therapy for peripheral neuropathy.**
  Author(s): Wang MS, Fang G, Culver DG, Davis AA, Rich MM, Glass JD.
  Source: Annals of Neurology. 2001 December; 50(6): 773-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11761475&dopt=Abstract

- **Use of noninvasive electroacupuncture for the treatment of HIV-related peripheral neuropathy: a pilot study.**
  Author(s): Galantino ML, Eke-Okoro ST, Findley TW, Condoluci D.
  Source: Journal of Alternative and Complementary Medicine (New York, N.Y.). 1999 April; 5(2): 135-42.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10328635&dopt=Abstract

Vocabulary Builder

Adenoma: A benign epithelial tumour in which the cells form recognizable glandular structures or in which the cells are clearly derived from glandular epithelium. [EU]

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

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

Anesthesia: A state characterized by loss of feeling or sensation. This depression of nerve function is usually the result of pharmacologic action and is induced to allow performance of surgery or other painful procedures. [NIH]

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]

Antiarrhythmic: An agent that prevents or alleviates cardiac arrhythmia. [EU]

Antibiotic: A chemical substance produced by a microorganism which has the capacity, in dilute solutions, to inhibit the growth of or to kill other microorganisms. Antibiotics that are sufficiently nontoxic to the host are used as chemotherapeutic agents in the treatment of infectious diseases of man, animals and plants. [EU]

Anticonvulsant: An agent that prevents or relieves convulsions. [EU]

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

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

Axons: Nerve fibers that are capable of rapidly conducting impulses away from the neuron cell body. [NIH]

Bilateral: Having two sides, or pertaining to both sides. [EU]

Biopsy: The removal and examination, usually microscopic, of tissue from the living body, performed to establish precise diagnosis. [EU]

Cachexia: A profound and marked state of constitutional disorder; general ill health and malnutrition. [EU]

Campylobacter: A genus of bacteria found in the reproductive organs, intestinal tract, and oral cavity of animals and man. Some species are pathogenic. [NIH]

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

Carbamazepine: An anticonvulsant used to control grand mal and psychomotor or focal seizures. Its mode of action is not fully understood, but some of its actions resemble those of phenytoin; although there is little chemical resemblance between the two compounds, their three-dimensional structure is similar. [NIH]

Carcinoma: A malignant new growth made up of epithelial cells tending to infiltrate the surrounding tissues and give rise to metastases. [EU]

Cardiovascular: Pertaining to the heart and blood vessels. [EU]

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

Conduction: The transfer of sound waves, heat, nervous impulses, or electricity. [EU]

Constitutional: 1. affecting the whole constitution of the body; not local. 2. pertaining to the constitution. [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]

Cytoskeleton: The network of filaments, tubules, and interconnecting filamentous bridges which give shape, structure, and organization to the cytoplasm. [NIH]

Cytotoxic: Pertaining to or exhibiting cytotoxicity. [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]

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

Electroacupuncture: A form of acupuncture using low frequency electrically stimulated needles to produce analgesia and anesthesia and to treat disease. [NIH]

Electromyography: Recording of the changes in electric potential of muscle by means of surface or needle electrodes. [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]

Electroshock: Induction of a stress reaction in experimental subjects by means of an electrical shock; applies to either convulsive or non-convulsive states. [NIH]

Endogenous: Developing or originating within the organisms or arising from causes within the organism. [EU]

Enzyme: A protein molecule that catalyses chemical reactions of other substances without itself being destroyed or altered upon completion of the reactions. Enzymes are classified according to the recommendations of the Nomenclature Committee of the International Union of Biochemistry. Each enzyme is assigned a recommended name and an Enzyme Commission (EC) number. They are divided into six main groups; oxidoreductases,

transferases, hydrolases, lyases, isomerases, and ligases. [EU]

Epirubicin: An anthracycline antibiotic which is the 4'-epi-isomer of doxorubicin. The compound exerts its antitumor effects by interference with the synthesis and function of DNA. Clinical studies indicate activity in breast cancer, non-Hodgkin's lymphomas, ovarian cancer, soft-tissue sarcomas, pancreatic cancer, gastric cancer, small-cell lung cancer and acute leukemia. It is equal in activity to doxorubicin but exhibits less acute toxicities and less cardiotoxicity. [NIH]

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

Gait: Manner or style of walking. [NIH]

Gastroenteritis: An acute inflammation of the lining of the stomach and intestines, characterized by anorexia, nausea, diarrhoea, abdominal pain, and weakness, which has various causes, including food poisoning due to infection with such organisms as Escherichia coli, Staphylococcus aureus, and Salmonella species; consumption of irritating food or drink; or psychological factors such as anger, stress, and fear. Called also enterogastritis. [EU]

Glutamine: A non-essential amino acid present abundantly throught the body and is involved in many metabolic processes. It is synthesized from glutamic acid and ammonia. It is the principal carrier of nitrogen in the body and is an important energy source for many cells. [NIH]

Hyperalgesia: Excessive sensitiveness or sensibility to pain. [EU]

Hypothyroidism: Deficiency of thyroid activity. In adults, it is most common in women and is characterized by decrease in basal metabolic rate, tiredness and lethargy, sensitivity to cold, and menstrual disturbances. If untreated, it progresses to full-blown myxoedema. In infants, severe hypothyroidism leads to cretinism. In juveniles, the manifestations are intermediate, with less severe mental and developmental retardation and only mild symptoms of the adult form. When due to pituitary deficiency of thyrotropin secretion it is called secondary hypothyroidism. [EU]

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

Infusion: The therapeutic introduction of a fluid other than blood, as saline solution, solution, into a vein. [EU]

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

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

Lipid: Any of a heterogeneous group of flats and fatlike substances characterized by being water-insoluble and being extractable by nonpolar (or

fat) solvents such as alcohol, ether, chloroform, benzene, etc. All contain as a major constituent aliphatic hydrocarbons. The lipids, which are easily stored in the body, serve as a source of fuel, are an important constituent of cell structure, and serve other biological functions. Lipids may be considered to include fatty acids, neutral fats, waxes, and steroids. Compound lipids comprise the glycolipids, lipoproteins, and phospholipids. [EU]

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]

Molecular: Of, pertaining to, or composed of molecules : a very small mass of matter. [EU]

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]

Morale: The prevailing temper or spirit of an individual or group in relation to the tasks or functions which are expected. [NIH]

Narcotic: 1. pertaining to or producing narcosis. 2. an agent that produces insensibility or stupor, applied especially to the opioids, i.e. to any natural or synthetic drug that has morphine-like actions. [EU]

Neuralgia: Paroxysmal pain which extends along the course of one or more nerves. Many varieties of neuralgia are distinguished according to the part affected or to the cause, as brachial, facial, occipital, supraorbital, etc., or anaemic, diabetic, gouty, malarial, syphilitic, etc. [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]

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

Paclitaxel: Antineoplastic agent isolated from the bark of the Pacific yew tree, Taxus brevifolia. Paclitaxel stabilizes microtubules in their polymerized form and thus mimics the action of the proto-oncogene proteins C-MOS. [NIH]

Pancreas: A mixed exocrine and endocrine gland situated transversely across the posterior abdominal wall in the epigastric and hypochondriac

regions. The endocrine portion is comprised of the islets of langerhans, while the exocrine portion is a compound acinar gland that secretes digestive enzymes. [NIH]

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

Phenytoin: An anticonvulsant that is used in a wide variety of seizures. It is also an anti-arrhythmic and a muscle relaxant. The mechanism of therapeutic action is not clear, although several cellular actions have been described including effects on ion channels, active transport, and general membrane stabilization. The mechanism of its muscle relaxant effect appears to involve a reduction in the sensitivity of muscle spindles to stretch. Phenytoin has been proposed for several other therapeutic uses, but its use has been limited by its many adverse effects and interactions with other drugs. [NIH]

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]

Preclinical: Before a disease becomes clinically recognizable. [EU]

Precursor: Something that precedes. In biological processes, a substance from which another, usually more active or mature substance is formed. In clinical medicine, a sign or symptom that heralds another. [EU]

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]

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

Radium: Radium. A radioactive element of the alkaline earth series of metals. It has the atomic symbol Ra, atomic number 88, and atomic weight 226. Radium is the product of the disintegration of uranium and is present in pitchblende and all ores containing uranium. It is used clinically as a source of beta and gamma-rays in radiotherapy, particularly brachytherapy. [NIH]

Recombinant: 1. a cell or an individual with a new combination of genes not found together in either parent; usually applied to linked genes. [EU]

Refractory: Not readily yielding to treatment. [EU]

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

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

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

Species: A taxonomic category subordinate to a genus (or subgenus) and superior to a subspecies or variety, composed of individuals possessing common characters distinguishing them from other categories of individuals of the same taxonomic level. In taxonomic nomenclature, species are designated by the genus name followed by a Latin or Latinized adjective or noun. [EU]

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

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]

Thermal: Pertaining to or characterized by heat. [EU]

Transplantation: The grafting of tissues taken from the patient's own body or from another. [EU]

Tricyclic: Containing three fused rings or closed chains in the molecular structure. [EU]

Vasculitis: Inflammation of a vessel, angiitis. [EU]

CHAPTER 5. PATENTS ON PERIPHERAL NEUROPATHY

Overview

You can learn about innovations relating to peripheral neuropathy by reading recent patents and patent applications. Patents can be physical innovations (e.g. chemicals, pharmaceuticals, medical equipment) or processes (e.g. treatments or diagnostic procedures). The United States Patent and Trademark Office defines a patent as a grant of a property right to the inventor, issued by the Patent and Trademark Office.[23] Patents, therefore, are intellectual property. For the United States, the term of a new patent is 20 years from the date when the patent application was filed. If the inventor wishes to receive economic benefits, it is likely that the invention will become commercially available to patients with peripheral neuropathy within 20 years of the initial filing. It is important to understand, therefore, that an inventor's patent does not indicate that a product or service is or will be commercially available to patients with peripheral neuropathy. The patent implies only that the inventor has "the right to exclude others from making, using, offering for sale, or selling" the invention in the United States. While this relates to U.S. patents, similar rules govern foreign patents.

In this chapter, we show you how to locate information on patents and their inventors. If you find a patent that is particularly interesting to you, contact the inventor or the assignee for further information.

[23]Adapted from The U. S. Patent and Trademark Office:
http://www.uspto.gov/web/offices/pac/doc/general/whatis.htm.

Patents on Peripheral Neuropathy

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

- **Prevention and treatment of peripheral neuropathy**

  Inventor(s): Lewis; Michael E. (West Chester, PA), Apfel; Stuart C. (West Hempstead, NY), Kessler; John A. (New Canaan, CT)

  Assignee(s): Cephalon, Inc. (West Chester, PA), Albert Einstein College of Medicine of Yeshiva Univ. (Bronx, NY)

  Patent Number: 5,648,335

  Date filed: June 4, 1996

  Abstract: The invention features a method of using insulin-like growth factor-I (IGF-I) or insulin-like growth factor-III (IGF-III) to prevent or treat peripheral neuropathy in a mammal.

  Excerpt(s): This invention relates to using an insulin-like growth factor-I to prevent or treat peripheral neuropathy. ... Peripheral neuropathy generally refers to a disorder that affects the peripheral nerves, most often manifested as one or a combination of motor, sensory, sensorimotor, or autonomic neural dysfunction. The wide variety of morphologies exhibited by peripheral neuropathies can each be uniquely attributed to an equally wide variety of causes. For instance, peripheral neuropathies can be genetically acquired, can result from a systemic disease, or can be induced by a toxic agent. Some toxic agents that cause neurotoxicities are therapeutic drugs, antineoplastic agents, contaminants in foods or medicinals, and environmental and industrial pollutants. ... In particular, chemotherapeutic agents known to cause sensory and/or motor neuropathies include vincristine, an antineoplastic drug used to treat haematological malignancies and sarcomas. The neurotoxicity is dose-related, and exhibits as reduced intestinal motility and peripheral neuropathy, especially in the distal muscles of the hands and feet, postural hypotension, and atony of the urinary bladder. Similar problems

have been documented with taxol and cisplatin (Mollman, J. E., 1990, New Eng Jour Med. 322:126-127), although cisplatin-related neurotoxicity can be alleviated with nerve growth factor (NGF) (Apfel, S. C. et al, 1992, Annals of Neurology 31:76-80). Although the neurotoxicity is sometimes reversible after removal of the neurotoxic agent, recovery can be a very slow process (Legha, S., 1986, Medical Toxicology 1:421-427; Olesen, et al., 1991, Drug Safety 6:302-314).

Web site: http://www.delphion.com/details?pn=US05648335__

Patent Applications on Peripheral Neuropathy

As of December 2000, U.S. patent applications are open to public viewing.[24] Applications are patent requests which have yet to be granted (the process to achieve a patent can take several years). The following patent applications have been filed since December 2000 relating to peripheral neuropathy:

- **Methods for treatment of disease-induced peripheral neuropathy and related conditions**

  Inventor(s): Diamond, Jack ; (Hamilton, CA), Glasky, Alvin J. ; (Tustin, CA)

  Correspondence: Oppenheimer Wolff & Donnelly LLP; Suite 3800; 2029 Century Park East; Los Angeles; CA; 90067; US

  Patent Application Number: 20020055506

  Date filed: July 6, 2001

  Abstract: A method of treating disease-induced peripheral neuropathy comprises administering to a patient with disease-induced peripheral neuropathy an effective quantity of a purine derivative or analogue, a tetrahydroindolone derivative or analogue, or a pyrimidine derivative or analogue. If the compound is a purine derivative, the purine moiety can be guanine or hypoxanthine. The compound can induce peripheral nerve sprouting through the action of a neurotrophic factor such as nerve growth factor (NGF) without the occurrence of hyperalgesia. The peripheral nerve sprouting can be nociceptive nerve sprouting. The disease-induced peripheral neuropathy can be diabetic neuropathy or disease-induced peripheral neuropathy with another basis.

  Excerpt(s): This application claims priority from Provisional Application Ser. No. 60/216,844, filed Jul. 7, 2000 by Jack Diamond and Alvin J. Glasky, and entitled "Methods for Treatment of Peripheral Neuropathy

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

and Related Conditions with Bifunctional Purine Analogues," which is incorporated herein in its entirety by this reference. ... This invention is directed to methods for treatment of disease-induced peripheral neuropathy and related conditions, particularly with purine derivatives or analogues, tetrahydroindolone derivatives or analogues, or pyrimidine derivatives or analogues. ... Although methods have improved for the treatment of diabetes and its consequences, diabetic neuropathy is still an extremely serious problem. Diabetic neuropathy can be defined as a demonstrable disorder, either clinically evident or subclinical, that occurs in the setting of diabetes mellitus without other causes for peripheral neuropathy. The neuropathic disorder includes manifestations in the somatic and/or autonomic parts of the peripheral nervous system. Diabetic neuropathy often is associated with damage to the nerves just under the skin leading to one or more of the following conditions: numbness and tingling of fingers, hands, toes, and feet; weakness in hands and feet; or pain and/or burning sensation in hands and feet. Nerve damage as the result of peripheral neuropathy can also lead to problems with the GI tract, heart, and sexual organs, causing indigestion, diarrhea or constipation, dizziness, bladder infections, and impotence.

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

- **Method for preventing and treating peripheral neuropathy by administering selegiline**

  Inventor(s): Bobotas, George ; (Tarpon Springs, FL)

  Correspondence: Margaret J. Sampson; Vinson & Elkins LLP; 2300 First City Tower; 1001 Fannin; Austin; TX; 77002-6760; US

  Patent Application Number: 20010023260

  Date filed: May 25, 2001

  Abstract: The present invention is directed to methods for alleviating the symptoms associated with peripheral neuropathy. The neuropathy may be the result of a genetically inherited condition, systemic disease or exposure to a toxic agent. A reduction or elimination of symptoms is obtained by administering the drug selegiline. The invention is also directed to a method for treating patients with cancer by administering a chemotherapeutic agent known to have a toxic affect on peripheral nerves together with selegiline.

  Excerpt(s): The present invention relates to a medical treatment for preventing or alleviating the symptoms associated with peripheral neuropathy caused by disease or exposure to a toxic agent, e.g., a chemotherapeutic cytotoxic agent. A reduction or elimination of

symptoms is accomplished by administering the drug selegiline. ... Peripheral neuropathy is associated with a wide variety of causes, including genetically acquired conditions, systemic disease or exposure to toxic agents. It can manifest itself as a dysfunction of motor, sensory, sensorimotor or autonomic nerves. ... Among the most important toxic agents causing peripheral neuropathy are therapeutic agents, particularly those used for the treatment of neoplastic disease. In certain cases, peripheral neuropathy is a major complication of cancer treatment and is the main factor limiting the dosage of chemotherapeutic that can be administered to a patient (Macdonald, Neurologic Clinics 9:955-967 (1991)). This is true for the commonly administered agents cisplatin, paclitaxel and vincristine (Broun, et al., Am. J. Clin. Oncol. 16:18-21 (1993); Macdonald, Neurologic Clinics 9:955-967 (1991); Casey, et al., Brain 96:69-86 (1973)). The identification of methods for preventing or alleviating dose-limiting peripheral neuropathologic side effects would allow higher, and more therapeutically effective doses of these chemotherapeutics to be administered to patients, i.e., the therapeutic efficacy of such chemotherapeutics is typically a function of dose and therefore, increasing dosage provides increased patient survival (Macdonald, Neurologic Clinics 9:955-967 (1991); Oxols, Seminars in Oncology 16, suppl. 6:22-30 (1989)).

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

Keeping Current

In order to stay informed about patents and patent applications dealing with peripheral neuropathy, you can access the U.S. Patent Office archive via the Internet at no cost to you. This archive is available at the following Web address: **http://www.uspto.gov/main/patents.htm**. Under "Services," click on "Search Patents." You will see two broad options: (1) Patent Grants, and (2) Patent Applications. To see a list of granted patents, perform the following steps: Under "Patent Grants," click "Quick Search." Then, type "peripheral neuropathy" (or synonyms) into the "Term 1" box. After clicking on the search button, scroll down to see the various patents which have been granted to date on peripheral neuropathy. You can also use this procedure to view pending patent applications concerning peripheral neuropathy. Simply go back to the following Web address: **http://www.uspto.gov/main/patents.htm**. Under "Services," click on "Search Patents." Select "Quick Search" under "Patent Applications." Then proceed with the steps listed above.

Vocabulary Builder

Alkaloid: One of a large group of nitrogenous basis substances found in plants. They are usually very bitter and many are pharmacologically active. Examples are atropine, caffeine, coniine, morphine, nicotine, quinine, strychnine. The term is also applied to synthetic substances (artificial a's) which have structures similar to plant alkaloids, such as procaine. [EU]

Altretamine: An alkylating agent proposed as an antineoplastic. It also acts as a chemosterilant for male houseflies and other insects. [NIH]

Atony: Lack of normal tone or strength. [EU]

Carboplatin: An organoplatinum compound that possesses antineoplastic activity. [NIH]

Chemotherapeutics: Noun plural but singular or plural in constructions : chemotherapy. [EU]

Constipation: Infrequent or difficult evacuation of the faeces. [EU]

Dizziness: An imprecise term which may refer to a sense of spatial disorientation, motion of the environment, or lightheadedness. [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]

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

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

Hypoxanthine: A purine and a reaction intermediate in the metabolism of adenosine and in the formation of nucleic acids by the salvage pathway. [NIH]

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

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

Motility: The ability to move spontaneously. [EU]

Oncolytic: Pertaining to, characterized by, or causing oncolysis (= the lysis or destruction of tumour cells). [EU]

Sarcoma: A tumour made up of a substance like the embryonic connective tissue; tissue composed of closely packed cells embedded in a fibrillar or homogeneous substance. Sarcomas are often highly malignant. [EU]

Teniposide: A semisynthetic derivative of podophyllotoxin that exhibits antitumor activity. Teniposide 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 cells from entering into the mitotic phase of the cell cycle, and lead to cell death. Teniposide acts primarily in the G2 and S phases of the cycle. [NIH]

Thioguanine: An antineoplastic compound which also has antimetabolite action. The drug is used in the therapy of acute leukemia. [NIH]

Urinary: Pertaining to the urine; containing or secreting urine. [EU]

CHAPTER 6. BOOKS ON PERIPHERAL NEUROPATHY

Overview

This chapter provides bibliographic book references relating to peripheral neuropathy. You have many options to locate books on peripheral neuropathy. The simplest method is to go to your local bookseller and inquire about titles that they have in stock or can special order for you. Some patients, however, feel uncomfortable approaching their local booksellers and prefer online sources (e.g. **www.amazon.com** and **www.bn.com**). In addition to online booksellers, excellent sources for book titles on peripheral neuropathy include the Combined Health Information Database and the National Library of Medicine. Once you have found a title that interests you, visit your local public or medical library to see if it is 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 to **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 "peripheral neuropathy" (or synonyms) into the "For these words:" box. You will only receive results on books. You should check back periodically with this database which is updated every 3 months. The following is a typical result when searching for books on peripheral neuropathy:

- **Podiatry Sourcebook**

  Source: Detroit, MI: Omnigraphics, Inc. 2001. 392 p.

  Contact: Available from Omnigraphics, Inc. 615 Griswold Street, Detroit, MI. (800) 234-1340. Fax (800) 875-1340. Website: www.omnigraphics.com. Price: $78.00 plus shipping. ISBN 0780802152.

  Summary: This book provides the general public and the layperson who has been diagnosed with a serious disease or disorder with general information about the practice of podiatry and health information about foot conditions, diseases, and injuries. Part 1 offers general information about foot care, including tips on selecting a podiatrist, facts about problems associated with shoe fit, and an overview of treatments for foot problems. The chapters in part 1 also provide information for special populations, such as pregnant women, the elderly, people who have diabetes, children, and athletes. Part 2 discusses the etiology, diagnosis, and treatment of common foot conditions, including athlete's foot, ingrown toenail, onychomycosis, skin disorders, foot odor, clawtoes, hammertoes, bunions, burning feet, peripheral neuropathy, Morton's neuroma, tarsal tunnel syndrome, clubfoot, pigeon toes, genetic foot disorders, and structural deformities. Part 3 presents information about foot-related problems caused by diseases such as diabetes, neuropathic arthropathy, gout, arthritis, Parkinson's disease, and AIDS. Part 4 offers facts about the etiology, diagnosis, and treatment of foot injuries, including heel pain, Sever's disease, overuse injuries, foot and ankle fractures, ankle sprains, great toe and midfoot injuries, tendinitis, bursitis, and sports-related injuries. The final chapter in part 4 presents information for amputees. Part 5 provides a glossary of podiatry terms, lists medical resources for foot care, and offers a directory of resources specific to foot safety. 55 figures, 11 tables, and numerous references.

- **101 Foot Care Tips for People with Diabetes**

  Source: Alexandria, VA: American Diabetes Association. 2000. 120 p.

  Contact: Available from American Diabetes Association (ADA). Order Fulfillment Department, P.O. Box 930850, Atlanta, GA 31193-0850. (800) 232-6733. Fax (770) 442-9742. Website: www.diabetes.org. Price: $14.95 plus shipping and handling. ISBN: 158040040X.

  Summary: This book answers 101 of the most commonly asked questions about diabetes and foot care. Questions in chapter one provide general information about foot care, including the importance of foot care; the foot problems people with diabetes experience; the people at greatest risk for developing foot problems; the prevention of diabetic foot problems; the role of weight, blood glucose control, and meal planning in diabetic

foot problems; and health care checkups. Chapter two offers tips on washing and soaking the feet; caring for dry skin; and dealing with athlete's foot fungus, foot odor, and foot swelling. The third chapter provides tips for nail care, including trimming toenails and caring for ingrown toenails. Questions in chapter four provide information on shoe and sock selection. Topics include selecting shoes that fit properly, using insoles and orthotic devices, and seeing a pedorthist. This is followed by a chapter that explains how to treat minor foot problems, including blisters, corns, calluses, warts, bunions, minor injuries, and deformities. Chapter six provides tips for exercising. Questions in the next chapter deal with the identification of major problems, including foot ulcers and infections. This is followed by chapters that answer questions about complications such as peripheral neuropathy and poor circulation. Topics include the symptoms, diagnosis, and treatment of these complications. The final chapter answers questions about other foot problems, including arthritis, gout, Charcot's joint, osteomyelitis, gangrene, and toe amputation. The book also includes a list of resources and an index.

- **Numb Toes and Aching Soles: Coping with Peripheral Neuropathy**

  Source: San Antonio, TX: MedPress. 1999. 300 p.

  Contact: Available from MedPress. P.O. Box 691546, San Antonio, TX 78269. (888) 633-9898. Website: www.medpress.com. Price: $19.95 for soft back book; $29.95 for case bound book; plus shipping and handling. ISBN 0967110726.

  Summary: This book serves as a resource for people who experience pain related to peripheral neuropathy. About one half of peripheral neuropathies are related to complications from diabetes mellitus. The book focuses on traditional, conventional, and alternative treatments for neuropathic pain. The book begins with a chapter that defines peripheral neuropathy and discusses this condition in terms of its types, symptoms and effects, causes, and evaluation. The next chapter explains the physical and psychological aspects of peripheral neuropathic pain. The following chapter discusses medications for treating peripheral neuropathic pain, including nonopioid drugs, opioids, and topical medications. A discussion of nonopioid drug costs is included. The fourth chapter focuses on other medical therapies for treating peripheral neuropathic pain, including hematologic treatments such as plasmapheresis, immunosuppressant medications, and nerve based treatments such as nerve blocks and direct nerve stimulation. This is followed by a chapter on alternative treatments, including physical therapy; psychotherapeutic methods such as relaxation and meditation training, biofeedback, self hypnosis, and prayer; hyperbaric oxygen

therapy; acupuncture; touch therapies such as massage, reflexology, Reiki, Qigong, and therapeutic touch; magnets; and chelation. Treating peripheral neuropathic pain with various nutrients (vitamins A, B, C, and E; minerals such as selenium, magnesium, chromium, and zinc; and herbs such as ginkgo biloba, St. John's wart, bioflavonoids, and others) is the topic of the next chapter. In addition, the chapter provides information on other supplements such as alpha-lipoic acid, gamma linolenic acid, acetyl-L-carnitine, N-acetyl cysteine, glutamine, coenzyme Q10, S-adenosylmethionine, dimethyl sulfoxide, and methyl sulfonyl methane. The focus of the next chapter is on experimental or unapproved drugs, including aldose reductase inhibitors; aminoguanidine; COX-2; ABT-594; SNX-111; lamotrigine; memantine; natural pain relievers such as bimoclomol, cannabinoids, endorphins, and nocistatin/OFQ2; nerve regenerating compounds such as NGF, IGF-1, neutrophin-3, and GPI 1046; nimodipine; peptide T; and PN 401. This is followed by a chapter that examines diabetes and HIV. Diabetes classifications and diabetic neuropathy (types, risk factors, blood sugar control, and treatment approaches) are discussed. The final chapter presents ways of coping with peripheral neuropathy, including exercising, using heat or cold therapy, creating conducive conditions for sleeping, avoiding certain foods, and selecting appropriate footwear. The book concludes with an index.

- **Serving Individuals with Diabetes who are Blind or Visually Impaired: A Resource Guide for Vocational Rehabilitation Counselors**

  Source: Mississippi State, MS: Rehabilitation Research and Training Center on Blindness and Low Vision, Mississippi State University. 1997. 227 p.

  Contact: Available from Rehabilitation Research and Training Center on Blindness and Low Vision, Mississippi State University. Publications Manager, P.O. Drawer 6189, Mississippi State, MS 39762. (601) 325-2001 or (601) 325-8693. Fax (601) 325-8989. TDD (601) 325-8693. Price: $25.00 in any format.

  Summary: This resource guide is designed to help counselors better serve individuals with diabetes who are blind or visually impaired. The guide refers readers to a large collection of resources on various diabetes publications, medications, and appliances. Five sections cover an introduction to diabetes; self management; current medical issues; employment issues; and emotional aspects of diabetes. Topics include myths about diabetes; diabetic eye disease; new nutrition guidelines for diabetes management; oral diabetes medications; diabetes and medications; insulin and measurement devices and systems; maintaining

the proper temperature of insulin; blood glucose control; 'talking' blood glucose monitoring systems; and noninvasive glucose monitors. The authors also discuss diabetes and the feet; kidney failure, dialysis, and transplantation; pancreas transplantation; arthritis and diabetes; diabetes and yeast infections; hypoglycemia; diabetic peripheral neuropathy; diabetes and men's sexual health; cardiovascular health; diabetic ketoacidosis; diabetic dermopathy; diabetes and the Individualized Written Rehabilitation Program (IWRP); the use of Braille; health insurance; and scleral shells. The book's appendix includes lists of diabetes-related organizations, publications, listservs, and World Wide Web sites; sources of low-sugar products and products for the blind; and diabetes equipment and supplies, including insulin syringe magnifiers. The resource guide is available in large print, Braille, audiocassette, and computer diskette.

Book Summaries: Online Booksellers

Commercial Internet-based booksellers, such as Amazon.com and Barnes & Noble.com, offer summaries which have been supplied by each title's publisher. Some summaries also include customer reviews. Your local bookseller may have access to in-house and commercial databases that index all published books (e.g. Books in Print®).

The National Library of Medicine Book Index

The National Library of Medicine at the National Institutes of Health has a massive database of books published on healthcare and biomedicine. Go to the following Internet site, **http://locatorplus.gov/**, and then select "Search LOCATORplus." Once you are in the search area, simply type "peripheral neuropathy" (or synonyms) into the search box, and select "books only." From there, results can be sorted by publication date, author, or relevance. The following was recently catalogued by the National Library of Medicine:[25]

[25] In addition to LOCATORPlus, in collaboration with authors and publishers, the National Center for Biotechnology Information (NCBI) is adapting biomedical books for the Web. The books may be accessed in two ways: (1) by searching directly using any search term or phrase (in the same way as the bibliographic database PubMed), or (2) by following the links to PubMed abstracts. Each PubMed abstract has a "Books" button that displays a facsimile of the abstract in which some phrases are hypertext links. These phrases are also found in the books available at NCBI. Click on hyperlinked results in the list of books in which the phrase is found. Currently, the majority of the links are between the books and PubMed. In the future, more links will be created between the books and other types of

- **Acrodystrophic neuropathy; a critical review of the syndrome of trophic ulcers, sensory neuropathy, and bony erosion, together with an account of 16 cases in South Wales [by] John D. Spillane and Charles E. C. Wells.** Author: Spillane, John David; Year: 1969; London, Oxford Univ. Press, 1969
- **Biopsy diagnosis of peripheral neuropathy.** Author: Gyl Midroni, Juan M. Bilbao; with the technical assistance of Sandra M. Cohen; Year: 1995; Boston: Butterworth-Heinemann, c1995; ISBN: 0750695528 (hard cover: alk. paper)
  http://www.amazon.com/exec/obidos/ASIN/0750695528/icongroupinterna
- **Clinical electromyography; a brief review of the electrophysiology of the motor unit and its application to the diagnosis of lower motor neuron diseases, peripheral neuropathy and the myopathies.** Author: Marinacci, Alberto Antonio, 1905-; Year: 1955; Los Angeles, San Lucas Press, 1955
- **Conduction time in the terminal portion of the motor fibers of the ulnar, median and peroneal nerves in healthy subjects and in patients with neuropathy.** Author: Carpendale, M. T. F; Year: 1956; [Minneapolis] 1956
- **Integrated cardiopulmonary pharmacology.** Author: Bruce J. Colbert, Barb J. Mason; Year: 2002; Upper Saddle River, NJ: Prentice Hall, c2002; ISBN: 0130305189
  http://www.amazon.com/exec/obidos/ASIN/0130305189/icongroupinterna
- **Management of peripheral arterial disease: medical, surgical, and interventional aspects.** Author: editor, Mark Creager; Year: 2000; London: ReMEDICA Pub., 2000; ISBN: 1901346145
  http://www.amazon.com/exec/obidos/ASIN/1901346145/icongroupinterna
- **Mechanisms and mediators of neuropathic pain.** Author: Annika B. Malmberg, Sandra R. Chaplan, editors; Year: 2002; Basel; Boston: Birkhauser Verlag, c2002; ISBN: 3764362375 (alk. paper)
  http://www.amazon.com/exec/obidos/ASIN/3764362375/icongroupinterna
- **Mononeuropathies: examination, diagnosis and treatment.** Author: A. Staal, J. van Gijn, F. Spaans; drawings by D. Hasan; Year: 1999; London; New York: W.B. Saunders, c1999; ISBN: 0702017795

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information, such as gene and protein sequences and macromolecular structures. See **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Books.**

http://www.amazon.com/exec/obidos/ASIN/0702017795/icongroupinterna

- **Neuromuscular function and disease: basic, clinical, and electrodiagnostic aspects.** Author: [edited by] William F. Brown, Charles F. Bolton, Michael J. Aminoff; Year: 2002; Philadelphia: Saunders, c2002; ISBN: 0721689221 (set)
  http://www.amazon.com/exec/obidos/ASIN/0721689221/icongroupinterna
- **Nitric oxide and free radicals in peripheral neurotransmission.** Author: Stanley Kalsner, editor; Year: 2000; Boston: Birkhäuser, 2000; ISBN: 0817640703 (hard cover: alk. paper)
  http://www.amazon.com/exec/obidos/ASIN/0817640703/icongroupinterna
- **Nitric oxide and the peripheral nervous system.** Author: editors, N. Toda ...[et al.]; Year: 2000; London: Portland Press, c2000; ISBN: 1855781395
  http://www.amazon.com/exec/obidos/ASIN/1855781395/icongroupinterna
- **Numb toes and aching soles: coping with peripheral neuropathy.** Author: John A. Senneff; [foreword by Gil I. Wolfe]; Year: 1999; San Antonio, Tex.: MedPress, c1999; ISBN: 0967110726 (hrdbk.: alk. paper)
  http://www.amazon.com/exec/obidos/ASIN/0967110726/icongroupinterna
- **Occlusive dressings for chronic wound treatment.** Author: ECRI; Year: 2000; Plymouth Meeting, PA: ECRI, c2000
- **Pain in peripheral nerve diseases.** Author: volume editor, C. Sommer; Year: 2001; Basel; New York: Karger, 2001; ISBN: 3805572689 (hard cover: alk. paper)
  http://www.amazon.com/exec/obidos/ASIN/3805572689/icongroupinterna
- **Pain management in rehabilitation.** Author: Trilok N. Monga and Martin Grabois, editors; Year: 2002; New York, N.Y.: Demos Medical Pub., c2002; ISBN: 1888799633 (hardcover: alk. paper)
  http://www.amazon.com/exec/obidos/ASIN/1888799633/icongroupinterna
- **Percutaneous central venous and arterial catheterisation.** Author: Ian Peter Latto ... [et al.]; Year: 2000; London; New York: Saunders, 2000; ISBN: 0702025097
  http://www.amazon.com/exec/obidos/ASIN/0702025097/icongroupinterna

- **Peripheral arterial disease handbook.** Author: [edited by] William R. Hiatt, Alan T. Hirsch, Judith G. Regensteiner; Year: 2001; Boca Raton: CRC Press, c2001; ISBN: 0849384133 (alk. paper)
  http://www.amazon.com/exec/obidos/ASIN/0849384133/icongroupinterna
- **Peripheral nerve injuries in the athlete.** Author: Joseph H. Feinberg, Neil I. Spielholz, editors; Year: 2003; Champaign, IL: Human Kinetics, c2003; ISBN: 0736044906 (hard cover)
  http://www.amazon.com/exec/obidos/ASIN/0736044906/icongroupinterna
- **Peripheral neuropathy: a practical approach to diagnosis and management.** Author: editor, Didier Cros; Year: 2001; Philadelphia, PA: Lippincott Williams ; Wilkins, c2001; ISBN: 0397517815 (alk. paper)
  http://www.amazon.com/exec/obidos/ASIN/0397517815/icongroupinterna
- **Peripheral neuropathy: proceedings of the International Symposium on Peripheral Neuropathy, Nagoya, October 20-22, 1983.** Author: editor, Itsuro Sobue; executive committee, Itsuro Sobue ... [et al.]; Year: 1984; Amsterdam; Princeton: Excerpta Medica, 1984; ISBN: 0444806210
  http://www.amazon.com/exec/obidos/ASIN/0444806210/icongroupinterna
- **Peripheral neuropathy in childhood.** Author: R.A. Ouvrier, J.G. McLeod, J.D. Pollard; Year: 1990; New York: Raven Press, c1990; ISBN: 088167690X
  http://www.amazon.com/exec/obidos/ASIN/088167690X/icongroupinterna
- **Peripheral neuropathy.** Author: edited by Peter James Dyck ... [et al.]; Year: 1993; Philadelphia: W.B. Saunders, c1993; ISBN: 0721632424 (set)
  http://www.amazon.com/exec/obidos/ASIN/0721632424/icongroupinterna
- **Peripheral neuropathy.** Author: International Symposium on Peripheral Neuropathy (1983: Nagoya-shi, Japan); Year: 1984; Philadelphia: Saunders, 1984; ISBN: 0721632750 (set)
  http://www.amazon.com/exec/obidos/ASIN/0721632750/icongroupinterna
- **Primary care series: peripheral arterial disease and intermittent claudication.** Author: series editor, Alan T. Hirsch; Year: 2001; [Hillsborough, NJ]: Excerpta Medica, c2001; ISBN: 0444018581
- **Recent advances in peripheral nerve surgery, January 1940 - April 1944.** Author: [compiled and edited] by Frank Turnbull; Year: 1944; Ottawa: National Research Council of Canada, 1944

- **Tissue and organ regeneration in adults.** Author: Ioannis V. Yannas; Year: 2001; New York: Springer, c2001; ISBN: 0387952144 (alk. paper)
  http://www.amazon.com/exec/obidos/ASIN/0387952144/icongroupinterna
- **Treatment of nerve injury and entrapment neuropathy.** Author: Y. Hirasawa (ed.); Year: 2002; Tokyo; New York: Springer, 2002; ISBN: 4431703268 (alk. paper)
  http://www.amazon.com/exec/obidos/ASIN/4431703268/icongroupinterna
- **Tumors of the peripheral nervous system.** Author: by Bernd W. Scheithauer, James M. Woodruff, Robert A. Erlandson; Year: 1999; Washington, D.C.: Armed Forces Institute of Pathology, 1999; ISBN: 188104145X
  http://www.amazon.com/exec/obidos/ASIN/188104145X/icongroupinterna
- **Vascular and endovascular opportunities.** Author: edited by R.M. Greenhalgh, J.T. Powell, A.W. Mitchell; Year: 2000; London; New York: W.B. Saunders, 2000; ISBN: 0702026107
  http://www.amazon.com/exec/obidos/ASIN/0702026107/icongroupinterna
- **Vascular disease: nursing and management.** Author: edited by Shelagh Murray; Year: 2001; London; Philadelphia: Whurr, 2001; ISBN: 1861562195
  http://www.amazon.com/exec/obidos/ASIN/1861562195/icongroupinterna

Chapters on Peripheral Neuropathy

Frequently, peripheral neuropathy will be discussed within a book, perhaps within a specific chapter. In order to find chapters that are specifically dealing with peripheral neuropathy, an excellent source of abstracts is the Combined Health Information Database. You will need to limit your search to book chapters and peripheral 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." By making these selections and typing in "peripheral neuropathy" (or synonyms) into the "For these words:" box, you will only receive results on chapters in books. The following is a typical result when searching for book chapters on peripheral neuropathy:

- **Peripheral Neuropathy Pain**

  Source: in Senneff, J.A. Numb Toes and Aching Soles: Coping with Peripheral Neuropathy. San Antonio, TX: MedPress. 1999. p. 15-19.

  Contact: Available from MedPress. P.O. Box 691546, San Antonio, TX 78269. (888) 633-9898. Website: www.medpress.com. Price: $19.95 for soft back book; $29.95 for case bound book; plus shipping and handling. ISBN 0967110726.

  Summary: This chapter focuses on the physical and psychological aspects of peripheral neuropathy (PN) pain. Although people who have PN experience many problems, the worst have to do with pain, particularly pain resulting from sensory neuropathies. There appear to be both physical and psychological components to PN pain. The physical basis is an alteration of the electrical signals that are formed by sensors in various parts of the body and transmitted through the peripheral nervous system to the brain. Alteration of the electrical signals may be the result of degeneration of the axon of the nerve cell or of the nerve cell itself or the destruction of the myelin sheath around the nerve. A recent theory about the physical basis of neuropathic pain hypothesizes that an excessive level of proteins called cytokines is a causative factor. Theories about the psychological basis of PN pain include the gate theory. The basis of this theory is that a theoretical gate in the spinal cord transmits or blocks pain signals at the brain's discretion, with positive emotions closing the gate and negative emotions opening the gate. Other researchers believe that nerve impulses giving rise to chronic pain actually travel a different pathway than does acute pain. In addition, there is speculation that there may be a relationship between a person's psychological state and the intensity of the pain experience, with stress, depression, or anxiety increasing the intensity of pain.

- **What It Is and How You Get It [Peripheral Neuropathy]**

  Source: in Senneff, J.A. Numb Toes and Aching Soles: Coping with Peripheral Neuropathy. San Antonio, TX: MedPress. 1999. p. 1-14.

  Contact: Available from MedPress. P.O. Box 691546, San Antonio, TX 78269. (888) 633-9898. Website: www.medpress.com. Price: $19.95 for soft back book; $29.95 for case bound book; plus shipping and handling. ISBN 0967110726.

  Summary: This chapter provides people who have peripheral neuropathy (PN) with information on its types, symptoms and effects, causes, and evaluation. PN is a complex of disorders in the peripheral nervous system resulting from damage to the protective coating of nerves or to the nerves themselves. When an injury to the peripheral nerves or their

protective coating interferes with the transmission of impulses from receptors located in internal organs, muscles, and skin, either the brain acknowledges and registers the abnormal transmission as pain or some other unpleasant sensation or it prompts a response back to the site of the original impulse. Neuropathy classifications include mononeuropathy and polyneuropathy, the former indicating injury to a single nerve and the latter to multiple nerves in a symmetric manner. Other classifications are based on whether there is damage to sensory, motor, or autonomic nerve fibers. Rarer neuropathies include chronic inflammatory demyelinating polyneuropathy, Guillain-Barre syndrome, Charcot-Marie-Tooth disease, and restless legs syndrome. Symptoms of sensory neuropathies include numbness, burning, tingling sensations, electric shocks, aching pain, and extreme sensitivity to touch. Motor neuropathies may result in weakness in the feet, ankles, hands, and wrists. Possible consequences of autonomic neuropathies include diarrhea, lightheadedness, or sexual dysfunction. Diabetes is considered the most common cause of PN. Other causes include toxins, metallic poisons, certain chemicals, excessive alcohol consumption, vitamin deficiencies or excesses, nutritional imbalances, various diseases, and repetitive activities. A tendency toward peripheral neuropathy can also be inherited. Procedures for evaluating a patient with PN symptoms include reviewing the patient's medical history and conducting tests such as blood and urine tests, nerve conduction studies, electromyography, a lumbar puncture, magnetic resonance imaging, and nerve biopsies.

- **Management of Uremic Peripheral Neuropathy**

  Source: in Nissenson, A.R. and Fine, R.N., eds. Dialysis Therapy, 2nd ed. Philadelphia, PA: Hanley and Belfus, Inc. 1993. p. 277-279.

  Contact: Available from Hanley and Belfus, Inc. 210 South 13th Street, Philadelphia, PA 19107. (215) 546-7293 or (800) 426-4545. Price: $49.95. ISBN: 1560530588.

  Summary: This chapter, from a general medical text on dialysis therapy, considers the management of patients with uremic peripheral neuropathy. The authors note that polyneuropathy is one of the most common consequences of chronic renal failure, present in approximately two-thirds of patients beginning maintenance dialysis. Topics covered include the clinical presentation and course of uremic polyneuropathy, including the restless legs syndrome and slowing of nerve conduction velocity; and the management issues involved in this condition. The authors also comment on the positive effect that successful transplantation has on motor nerve conduction. 1 figure.

General Home References

In addition to references for peripheral neuropathy, you may want a general home medical guide that spans all aspects of home healthcare. The following list is a recent sample of such guides (sorted alphabetically by title; hyperlinks provide rankings, information, and reviews at Amazon.com):

- **Adams & Victor's Principles Of Neurology** by Maurice Victor, et al; Hardcover - 1692 pages; 7th edition (December 19, 2000), McGraw-Hill Professional Publishing; ISBN: 0070674973; **http://www.amazon.com/exec/obidos/ASIN/0070674973/icongroupinterna**
- **Clinical Neuroanatomy Made Ridiculously Simple (MedMaster Series, 2000 Edition)** by Stephen Goldberg; Paperback: 97 pages; 2nd edition (February 15, 2000), Medmaster; ISBN: 0940780461; **http://www.amazon.com/exec/obidos/ASIN/0940780461/icongroupinterna**
- **It's Not a Tumor!: The Patient's Guide to Common Neurological Problems** by Robert Wiedemeyer; Paperback: (January 1996), Boxweed Pub; ISBN: 0964740796; **http://www.amazon.com/exec/obidos/ASIN/0964740796/icongroupinterna**
- **Neurology for the Non-Neurologist** by William J. Weiner (Editor), Christopher G. Goetz (Editor); Paperback (May 1999), Lippincott, Williams & Wilkins Publishers; ISBN: 0781717078; **http://www.amazon.com/exec/obidos/ASIN/0781717078/icongroupinterna**

Vocabulary Builder

Anxiety: The unpleasant emotional state consisting of psychophysiological responses to anticipation of unreal or imagined danger, ostensibly resulting from unrecognized intrapsychic conflict. Physiological concomitants include increased heart rate, altered respiration rate, sweating, trembling, weakness, and fatigue; psychological concomitants include feelings of impending danger, powerlessness, apprehension, and tension. [EU]

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

Arthropathy: Any joint disease. [EU]

Blister: Visible accumulations of fluid within or beneath the epidermis. [NIH]

Bursitis: Inflammation of a bursa, occasionally accompanied by a calcific deposit in the underlying supraspinatus tendon; the most common site is the subdeltoid bursa. [EU]

Cannabinoids: Compounds extracted from Cannabis sativa L. and

metabolites having the cannabinoid structure. The most active constituents are tetrahydrocannabinol, cannabinol, and cannabidiol. [NIH]

Cardiopulmonary: Pertaining to the heart and lungs. [EU]

Carnitine: Constituent of striated muscle and liver. It is used therapeutically to stimulate gastric and pancreatic secretions and in the treatment of hyperlipoproteinemias. [NIH]

Chelation: Combination with a metal in complexes in which the metal is part of a ring. [EU]

Claudication: Limping or lameness. [EU]

Clubfoot: A deformed foot in which the foot is plantarflexed, inverted and adducted. [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]

Cysteine: A thiol-containing non-essential amino acid that is oxidized to form cystine. [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]

Fungus: A general term used to denote a group of eukaryotic protists, including mushrooms, yeasts, rusts, moulds, smuts, etc., which are characterized by the absence of chlorophyll and by the presence of a rigid cell wall composed of chitin, mannans, and sometimes cellulose. They are usually of simple morphological form or show some reversible cellular specialization, such as the formation of pseudoparenchymatous tissue in the fruiting body of a mushroom. The dimorphic fungi grow, according to environmental conditions, as moulds or yeasts. [EU]

Gangrene: Death of tissue, usually in considerable mass and generally associated with loss of vascular (nutritive) supply and followed by bacterial invasion and putrefaction. [EU]

Gout: Hereditary metabolic disorder characterized by recurrent acute arthritis, hyperuricemia and deposition of sodium urate in and around the joints, sometimes with formation of uric acid calculi. [NIH]

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]

Immunosuppressant: An agent capable of suppressing immune responses. [EU]

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

Ketoacidosis: Acidosis accompanied by the accumulation of ketone bodies (ketosis) in the body tissues and fluids, as in diabetic acidosis. [EU]

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

Mediator: An object or substance by which something is mediated, such as (1) a structure of the nervous system that transmits impulses eliciting a specific response; (2) a chemical substance (transmitter substance) that induces activity in an excitable tissue, such as nerve or muscle; or (3) a substance released from cells as the result of the interaction of antigen with antibody or by the action of antigen with a sensitized lymphocyte. [EU]

Memantine: Amantadine derivative that has some dopaminergic effects. It has been proposed as an antiparkinson agent. [NIH]

Neuroanatomy: Study of the anatomy of the nervous system as a specialty or discipline. [NIH]

Osteomyelitis: Inflammation of bone caused by a pyogenic organism. It may remain localized or may spread through the bone to involve the marrow, cortex, cancellous tissue, and periosteum. [EU]

Plasmapheresis: Procedure whereby plasma is separated and extracted from anticoagulated whole blood and the red cells retransfused to the donor. Plasmapheresis is also employed for therapeutic use. [NIH]

Podiatry: A specialty concerned with the diagnosis and treatment of foot disorders and injuries and anatomic defects of the foot. [NIH]

Selenium: An element with the atomic symbol Se, atomic number 34, and atomic weight 78.96. It is an essential micronutrient for mammals and other animals but is toxic in large amounts. Selenium protects intracellular structures against oxidative damage. It is an essential component of glutathione peroxidase. [NIH]

Tendinitis: Inflammation of tendons and of tendon-muscle attachments. [EU]

Topical: Pertaining to a particular surface area, as a topical anti-infective applied to a certain area of the skin and affecting only the area to which it is applied. [EU]

Warts: Benign epidermal proliferations or tumors; some are viral in origin. [NIH]

CHAPTER 7. MULTIMEDIA ON PERIPHERAL NEUROPATHY

Overview

Information on peripheral neuropathy can come in a variety of formats. Among multimedia sources, video productions, slides, audiotapes, and computer databases are often available. In this chapter, we show you how to keep current on multimedia sources of information on peripheral 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. If you see an interesting item, visit your local medical library to check on the availability of the title.

Video Recordings

Most disorders do not have a video dedicated to them. If they do, they are often rather technical in nature. An excellent source of multimedia information on peripheral neuropathy is the Combined Health Information Database. You will need to limit your search to "video recording" and "peripheral 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.)." By making these selections and typing "peripheral neuropathy" (or synonyms) into the "For these words:" box, you will only receive results on video productions. The following is a typical result when searching for video recordings on peripheral neuropathy:

- **Smoking and Diabetes**

  Source: Los Angeles, CA: National Health Video, Inc. 1998. (videocassette).

  Contact: Available from National Health Video, Inc. 12021 Wilshire Blvd., Suite 550, Los Angeles, CA 90025. (800) 543-6803. Fax (310) 477-8198. E-mail: Healthvid@aol.com. Price: $89.00 plus shipping and handling. Order number 272.

  Summary: This videotape provides people who have diabetes with information on the effect of smoking on the disease. Smoking has a greater adverse effect on people who have diabetes than on otherwise healthy smokers. For example, the risk of heart disease is 14 times higher in a person has diabetes and smokes. In addition, vasoconstriction can lead to blindness and severe peripheral neuropathy. Other adverse effects of smoking in a person with diabetes include increasing the risk of high blood pressure, stroke, respiratory disease, various cancers, and periodontal disease; impeding the control of infection; limiting joint mobility; and contributing to impotence. The video offers tips on quitting, including learning about smoking habits and using a substitute for smoking when a pattern is identified, setting a quitting date, and using nicotine replacement therapy. In addition, the video presents suggestions on avoiding postcessation weight gain.

- **Meeting the Diabetes Challenge in Long Term Care**

  Source: Cypress, CA: Medcom, Inc. 1995. (videocassette).

  Contact: Available from Medical Audio Visual Communications, Inc. P.O. Box 84548, 2336 Bloor Street West, Toronto, Ontario M6S 1TO Canada. (800) 757-4868 or (905) 602-1160. Fax (905) 602-8720. E-mail: dwc@mavc.com. Price: $235.00 plus shipping and handling. Order number MED307.

  Summary: This video describes the effects of diabetes on long-term care residents and presents the treatment methods used to manage this disease. Diabetes is widespread among the elderly, and it is easily overlooked because many of its symptoms are the same as those of other diseases. Treating long-term care residents who have diabetes involves balancing nutrition therapy, exercise, and medication. The video identifies the goals of nutrition therapy, discusses meal planning, and highlights the challenges posed by nutrition therapy. Other topics include diabetes pathology, exercise therapy, and medication and insulin. The video provides information on the side effects of oral hypoglycemic agents such as sulfonylureas and metformin and identifies the steps involved in monitoring residents who have diabetes. The video also

describes the symptoms of acute and long-term complications of diabetes. Acute complications include hyperglycemia, hypoglycemia, ketoacidosis, and hyperosmolar syndrome. Long-term complications include microvascular and macrovascular problems and peripheral neuropathy. The video also offers guidelines on proper leg and foot care.

- **Feet First Video**

  Source: Harrisburg, PA: Pennsylvania Diabetes Academy. 199x. (videocassette).

  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. 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 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.

- **Impotence and Diabetes**

  Source: Los Angeles, CA: National Health Video, Inc. 1999. (videocassette).

  Contact: Available from National Health Video, Inc. 12021 Wilshire Blvd., Suite 550, Los Angeles, CA 90025. (800) 543-6803. Fax (310) 477-8198. E-mail: Healthvid@aol.com. Price: $89.00 plus shipping and handling.

Summary: This patient education videotape program reviews the problem of erectile dysfunction (impotence) and diabetes mellitus. The program defines erectile dysfunction (ED) as the consistent inability to get and maintain an erection. The program first explores the physiology of erections (how they happen), including the need for mental and physical stimulation, nerve impulses in the brain, and responses in muscles, fibrous tissues, and veins and arteries. The program offers a diagram and the use of a balloon to describe how an erection happens, the anatomy of the corpera cavernosa, and the role of nitrous oxide as a neurochemical transmitter. Age is noted as a factor in ED, and men with diabetes tend to develop ED 10 to 15 years earlier than men who do not have diabetes. The program notes that psychological factors (stress, depression, guilt, and performance anxiety) can cause 10 to 15 percent of ED; a series of self test questions are included for viewers to determine if psychological factors may play a role in their own ED. For men with diabetes, nerve damage (peripheral neuropathy) is the most likely culprit for causing ED; damage to the blood vessels (atherosclerosis) is another cause. Poor blood glucose control is the most important factor in both of these problems. The program includes a section noting the impact of drugs (including alcohol and nicotine) on ED. The program outlines the steps in diagnosing erectile problems, including first admitting that there is a problem, talking with a doctor, undergoing diagnostic tests, and participating in treatment. The final section reviews treatment options, reiterating the importance of good blood glucose control and describing the use of drug therapy (Viagra), vacuum erectile systems, self injection, and surgery (blood vessel repair and penile implants). The program includes drawings, graphics, and footage of patients and their physicians through the diagnosis and treatment processes.

Bibliography: Multimedia on Peripheral Neuropathy

The National Library of Medicine is a rich source of information on healthcare-related multimedia productions including slides, computer software, and databases. To access the multimedia database, go to the following Web site: **http://locatorplus.gov/**. Select "Search LOCATORplus." Once in the search area, simply type in peripheral neuropathy (or synonyms). Then, in the option box provided below the search box, select "Audiovisuals and Computer Files." From there, you can choose to sort results by publication date, author, or relevance. The following multimedia has been indexed on peripheral neuropathy. For more information, follow the hyperlink indicated:

- **Administering peripheral I.V. therapy.** Source: [presented by] Springhouse Corporation, in consultation with Lynn C. Hadaway, Sue Masoorli; Year: 2001; Format: Videoreocording; Springhouse, PA: Springhouse Corp., c2001
- **Anatomy of nerves and muscles.** Source: GREMI, Groupe de recherche en enseignement médical informatisé; Micro-Intel; Year: 1996; Format: Electronic resource; [Canada]: SSB Multimedia, c1996
- **Axonal peripheral neuropathy.** Source: College of Medicine, Ohio State University; [produced by] Medical Audio-Visual and Television Center; Year: 1978; Format: Videorecording; Columbus, Ohio: The University: [for sale by its Health Services Audio-Visual and Television Center], c1978
- **Cancer and the nervous system.** Source: Professional Information Library; Year: 1978; Format: Sound recording; Dallas: The Library, p1978
- **Clinical neurochemistry and neuroimaging; Pain and peripheral neuropathy.** Source: Stephen Salloway; Year: 1998; Format: Videorecording; [Irvine, Calif.]: CME, c1998
- **Disorder of motility.** Source: Wayne State University College of Medicine and CIBA Pharmaceutical Products, Inc.; produced by Rex Fleming; Year: 1969; Format: Motion picture; [Summit, N. J.]: CIBA; [Detroit: for loan and sale by Wayne State Univ., c196-?]
- **Hemodynamic pressure monitoring: concepts.** Source: Mosby; Samuel Merritt College, Studio Three Productions; Year: 1995; Format: Videorecording; [Saint Louis, Mo.]: Mosby, c1995
- **Hemodynamic pressure monitoring: nursing management.** Source: Mosby; Samuel Merritt College, Studio Three Productions; Year: 1995; Format: Videorecording; [St. Louis]: Mosby, c1995
- **Intensive review of electromyography.** Source: CME Conference Video, Inc.; sponsored by Harvard Medical School, March 31-April 2, 1995; Year: 1995; Format: Videorecording; Mt. Laurel, NJ: CME Conference Video, 1995
- **Medial antebrachial cutaneous nerve graft.** Source: from the Film Library and the Clinical Congress of ACS; Year: 2001; Format: Videorecording; Woodbury, CT: Ciné-Med, [2001]
- **MR angiography of peripheral vascular disease .** Year: 1995; Format: Videorecording; [Oak Brook, Ill.]: Radiological Society of North America, c1995
- **Neuroanatomy. 3, The spinal cord, meninges, and blood supply .** Year: 1997; Format: Electronic resource; [Buckinghamshire, England?]: Anatomy Project; New York: Parthenon Pub. Group, c1997

- **Neurologic complication of endocrine disorders.** Source: Brooke Army Medical Center; Year: 1971; Format: Videorecording; Fort Sam Houston, Tex.: Academy of Health Sciences, 1971
- **Neurosurgery in an overseas general hospital.** Source: [presented by] the United States Army; Year: 1951; Format: Motion picture; United States: War Dept., 1951
- **Neurotoxicology.** Source: [presented by] Health Officers Association of California, Environmental Epidemiology Training Project; Year: 1989; Format: Videorecording; [Sacramento, Calif.]: Dept. of Health Services, State of California, c1989
- **Painful peripheral neuropathies.** Source: a Hahnemann University and Videotech Associates Inc. production; Year: 1983; Format: Videorecording; [S.l.]: The Associates, c1983
- **Peripheral artery disease.** Source: American College of Cardiology, Heart House Learning Center; Year: 1995; Format: Videorecording; Bethesda, MD: The College, c1995
- **Peripheral neurology.** Source: produced by Mayer Media; Year: 1996; Format: Videorecording; Woburn, MA: Butterworth-Heinemann, c1996
- **Peripheral vascular disease using MR angiography.** Source: [presented by] the EduMed Corporation; Year: 1997; Format: Videorecording; Lakeville, MN: EduMed Corp., [1997]
- **Peripherally inserted central catheters: insertion and maintenance.** Source: produced by Department of Veterans Affairs, Employee Education System, Learning Technology and Media Development Division, St. Louis Media Center; Year: 1998; Format: Videorecording; Baltimore, Md: Williams; Wilkins, c1998
- **Preventing vascular events: advances in antiplatelet therapy.** Source: Alan T. Hirsch, Eric C. Raps, Eric J. Topol; Year: 1998; Format: Videorecording; Clifton, N.J.: Network for Continuing Medical Education, c1998
- **Radiologic evaluation of cranial neuropathy.** Source: the Radiological Society of North America; Year: 1992; Format: Videorecording; [Oak Brook, Ill.]: RSNA, c1992
- **Selected portions of the 1991 American Association of Electrodiagnostic Medicine Meeting: Sept. 25-28, 1991.** Source: CME Conference Video; Year: 1991; Format: Videorecording; [Cherry Hill, N.J.]: CME Conference Video, c1991
- **Sequential bypass to dorsalis pedis artery with translocated non-reversed vein for limb salvage.** Source: from the Film Library and the

Clinical Congress of ACS; Year: 2000; Format: Videorecording; Woodbury, CT: Ciné-Med, [2000]

- **Smoking & diabetes.** Source: NHV, National Health Video Inc; Year: 1998; Format: Videorecording; Los Angeles, CA: NHV, c1998
- **Stent grafts for peripheral vascular disease.** Source: EduMed Corporation; Year: 1999; Format: Videorecording; Minnetonka, MN: EduMed, c1999
- **Surgical technique for axillary nerve exposure and repair.** Source: the American Academy of Orthopaedic Surgeons; [presented by] United States Navy; produced by Medical Media Productions, Naval School of Health Sciences; Year: 1999; Format: Videorecording; Rosemont, Ill.: The Academy, [1999]
- **Therapeutic exercise. Peripheral nerve injuries.** Source: [United States Army]; Year: 1947; Format: Motion picture; United States: War Office, 1947
- **Use of peripheral access device.** Source: Mosby; Samuel Merritt College, Studio Three Productions; Year: 1994; Format: Videorecording; St. Louis, Mo.: Mosby-Year Book, c1994
- **Vascular access devices.** Source: produced by Department of Pediatrics, Division of Hematology/Oncology and the Health Communications Network, Medical University of South Carolina; Year: 1990; Format: Videorecording; Charleston, S.C.: Medical University of South Carolina, c1990

Vocabulary Builder

Angiography: Radiography of blood vessels after injection of a contrast medium. [NIH]

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

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

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

Mobility: Capability of movement, of being moved, or of flowing freely. [EU]

Nicotine: Nicotine is highly toxic alkaloid. It is the prototypical agonist at nicotinic cholinergic receptors where it dramatically stimulates neurons and ultimately blocks synaptic transmission. Nicotine is also important medically because of its presence in tobacco smoke. [NIH]

Orthopaedic: Pertaining to the correction of deformities of the musculoskeletal system; pertaining to orthopaedics. [EU]

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

Vasoconstriction: The diminution of the calibre of vessels, especially constriction of arterioles leading to decreased blood flow to a part. [EU]

Veins: The vessels carrying blood toward the heart. [NIH]

CHAPTER 8. PERIODICALS AND NEWS ON PERIPHERAL NEUROPATHY

Overview

Keeping up on the news relating to peripheral neuropathy can be challenging. Subscribing to targeted periodicals can be an effective way to stay abreast of recent developments on peripheral neuropathy. Periodicals include newsletters, magazines, and academic journals.

In this chapter, we suggest a number of news sources and present various periodicals that cover peripheral neuropathy beyond and including those which are published by patient associations mentioned earlier. We will first focus on news services, and then on periodicals. News services, press releases, and newsletters generally use more accessible language, so if you do chose to subscribe to one of the more technical periodicals, make sure that it uses language you can easily follow.

News Services & Press Releases

Well before articles show up in newsletters or the popular press, they may appear in the form of a press release or a public relations announcement. One of the simplest ways of tracking press releases on peripheral neuropathy is to search the news wires. News wires are used by professional journalists, and have existed since the invention of the telegraph. Today, there are several major "wires" that are used by companies, universities, and other organizations to announce new medical breakthroughs. 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

Perhaps the broadest of the wires is PR Newswire Association, Inc. To access this archive, simply go to **http://www.prnewswire.com**. Below the search box, select the option "The last 30 days." In the search box, type "peripheral neuropathy" or synonyms. The search results are shown by order of relevance. When reading these press releases, do not forget that the sponsor of the release may be a company or organization that is trying to sell a particular product or therapy. Their views, therefore, may be biased.

Reuters

The Reuters' Medical News database can be very useful in exploring news archives relating to peripheral neuropathy. While some of the listed articles are free to view, others can be purchased for a nominal fee. To access this archive, go to **http://www.reutershealth.com/frame2/arch.html** and search by "peripheral neuropathy" (or synonyms). The following was recently listed in this archive for peripheral neuropathy:

- **Diabetic Retinopathy And Peripheral Neuropathy Not Worsened By Pregnancy**
  Source: Reuters Medical News
  Date: April 08, 1998
  http://www.reuters.gov/archive/1998/04/08/professional/links/19980408clin006.html
- **Peripheral Neuropathy An Adverse Effect Of Simvastatin Use**
  Source: Reuters Medical News
  Date: June 07, 1995
  http://www.reuters.gov/archive/1995/06/07/professional/links/19950607clin005.html

The NIH

Within MEDLINEplus, the NIH has made an agreement with the New York Times Syndicate, the AP News Service, and Reuters to deliver news that can be browsed by the public. Search news releases at **http://www.nlm.nih.gov/medlineplus/alphanews_a.html.** MEDLINEplus allows you to browse across an alphabetical index. Or you can search by date at **http://www.nlm.nih.gov/medlineplus/newsbydate.html**. Often, news items are indexed by MEDLINEplus within their search engine.

Business Wire

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

Internet Wire

Internet Wire is more focused on technology than the other wires. To access this site, go to **http://www.internetwire.com** and use the "Search Archive" option. Type in "peripheral neuropathy" (or synonyms). As this service is oriented to technology, you may wish to search for press releases covering diagnostic procedures or tests that you may have read about.

Search Engines

Free-to-view news can also be found in the news section of your favorite search engines (see the health news page at Yahoo: **http://dir.yahoo.com/Health/News_and_Media/,** or use this Web site's general news search page **http://news.yahoo.com/.** Type in "peripheral neuropathy" (or synonyms). If you know the name of a company that is relevant to peripheral neuropathy, you can go to any stock trading Web site (such as **www.etrade.com**) and search for the company name there. News items across various news sources are reported on indicated hyperlinks.

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 "peripheral neuropathy" (or synonyms).

Newsletter Articles

If you choose not to subscribe to a newsletter, you can nevertheless find references to newsletter articles. We recommend that you use the Combined Health Information Database, while limiting your search criteria to "newsletter articles." Again, you will need to use the "Detailed Search" option. Go 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."

By making these selections, and typing in "peripheral neuropathy" (or synonyms) into the "For these words:" box, you will only receive results on newsletter articles. You should check back periodically with this database as it is updated every 3 months. The following is a typical result when searching for newsletter articles on peripheral neuropathy:

- **Rheumatic Manifestations of Diabetes Mellitus**

  Source: Bulletin on the Rheumatic Diseases. 49(5): 1-3. 2000.

  Contact: Available from Arthritis Foundation. 1330 West Peachtree Street, Atlanta, GA 30309. (404) 872-7100. Fax (404) 872-9559. Website: www.arthritis.org.

  Summary: This article discusses the musculoskeletal disorders that occur exclusively or predominantly in people who have diabetes. The musculoskeletal syndromes that occur in people who have diabetes may be divided into those related to increased collagen deposition resulting in limitation of normal joint function, those related to neuropathy, and other conditions. Nonenzymatic glycosylation of proteins and excessive deposition of these proteins in tissue has been proposed as an explanation for the development of syndromes related to increased collagen deposition. These syndromes include cheiroarthropathy, frozen shoulder, flexor tenosynovitis, and Dupuytren's contractures. Long term diabetes is frequently complicated by peripheral neuropathy. This may predispose to several musculoskeletal syndromes, including Charcot's arthropathy and reflex sympathetic dystrophy. Other syndromes that people who have arthritis may be more prone to include osteoarthritis, osteopenia, diffuse idiopathic skeletal hyperostosis, infections, gout, pseudogout, carpal tunnel syndrome, and rheumatoid arthritis. Decisions to use nonsteroidal antiinflammatory drugs and glucocorticoids to treat patients with musculoskeletal complaints must account for the presence of diabetes. 1 table. 20 references.

Academic Periodicals covering Peripheral Neuropathy

Academic periodicals can be a highly technical yet valuable source of information on peripheral neuropathy. We have compiled the following list of periodicals known to publish articles relating to peripheral neuropathy

and which are currently indexed within the National Library of Medicine's PubMed database (follow hyperlinks to view more information, summaries, etc., for each). In addition to these sources, to keep current on articles written on peripheral neuropathy published by any of the periodicals listed below, you can simply follow the hyperlink indicated or go to the following Web site: **www.ncbi.nlm.nih.gov/pubmed**. Type the periodical's name into the search box to find the latest studies published.

If you want complete details about the historical contents of a periodical, you can also visit the 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." The following is a sample of periodicals which publish articles on peripheral neuropathy:

- **Acta Neurologica Scandinavica. (Acta Neurol Scand)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=Acta+Neurologica+Scandinavica&dispmax=20&dispstart=0

- **American Journal of Clinical Oncology : the Official Publication of the American Radium Society. (Am J Clin Oncol)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=American+Journal+of+Clinical+Oncology+:+the+Official+Publication+of+the+American+Radium+Society&dispmax=20&dispstart=0

- **American Journal of Kidney Diseases : the Official Journal of the National Kidney Foundation. (Am J Kidney Dis)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=American+Journal+of+Kidney+Diseases+:+the+Official+Journal+of+the+National+Kidney+Foundation&dispmax=20&dispstart=0

- **Annals of Neurology. (Ann Neurol)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=Annals+of+Neurology&dispmax=20&dispstart=0

- **Clinical Cancer Research : an Official Journal of the American Association for Cancer Research. (Clin Cancer Res)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=Clinical+Cancer+Research+:+an+Official+Journal+of+the+American+Association+for+Cancer+Research&dispmax=20&dispstart=0

- **European Neurology. (Eur Neurol)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=European+Neurology&dispmax=20&dispstart=0

- **Jama : the Journal of the American Medical Association. (JAMA)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=Jama+:+the+Journal+of+the+American+Medical+Association&dispmax=20&dispstart=0

- **Journal of Alternative and Complementary Medicine (New York, N. . . (J Altern Complement Med)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=Journal+of+Alternative+and+Complementary+Medicine+(New+York,+N.+.+&dispmax=20&dispstart=0

- **Journal of Neuro-Oncology. (J Neurooncol)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=Journal+of+Neuro-Oncology&dispmax=20&dispstart=0

- **The Annals of Pharmacotherapy. (Ann Pharmacother)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=The+Annals+of+Pharmacotherapy&dispmax=20&dispstart=0

- **The Journal of Comparative Neurology. (J Comp Neurol)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=The+Journal+of+Comparative+Neurology&dispmax=20&dispstart=0

- **The Journal of Neuroscience : the Official Journal of the Society for Neuroscience. (J Neurosci)**
  http://www.ncbi.nlm.nih.gov/entrez/jrbrowser.cgi?field=0&regexp=The+Journal+of+Neuroscience+:+the+Official+Journal+of+the+Society+for+Neuroscience&dispmax=20&dispstart=0

Vocabulary Builder

Angioplasty: Endovascular reconstruction of an artery, which may include the removal of atheromatous plaque and/or the endothelial lining as well as simple dilatation. These are procedures performed by catheterization. When reconstruction of an artery is performed surgically, it is called endarterectomy. [NIH]

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]

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

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]

Hyperostosis: Hypertrophy of bone; exostosis. [EU]

Idiopathic: Of the nature of an idiopathy; self-originated; of unknown causation. [EU]

Osteoarthritis: Noninflammatory degenerative joint disease occurring chiefly in older persons, characterized by degeneration of the articular cartilage, hypertrophy of bone at the margins, and changes in the synovial membrane. It is accompanied by pain and stiffness, particularly after prolonged activity. [EU]

Retinopathy: 1. retinitis (= inflammation of the retina). 2. retinosis (= degenerative, noninflammatory condition of the retina). [EU]

Tenosynovitis: Inflammation of a tendon sheath. [EU]

CHAPTER 9. PHYSICIAN GUIDELINES AND DATABASES

Overview

Doctors and medical researchers rely on a number of information sources to help patients with their conditions. Many will subscribe to journals or newsletters published by their professional associations or refer to specialized textbooks or clinical guides published for the medical profession. In this chapter, we focus on databases and Internet-based guidelines created or written for this professional audience.

NIH Guidelines

For the more common disorders, the National Institutes of Health publish guidelines that are frequently consulted by physicians. Publications are typically written by one or more of the various NIH Institutes. For physician guidelines, commonly referred to as "clinical" or "professional" guidelines, you can visit the following Institutes:

- Office of the Director (OD); guidelines consolidated across agencies available at **http://www.nih.gov/health/consumer/conkey.htm**
- National Institute of General Medical Sciences (NIGMS); fact sheets available at **http://www.nigms.nih.gov/news/facts/**
- National Library of Medicine (NLM); extensive encyclopedia (A.D.A.M., Inc.) with guidelines: **http://www.nlm.nih.gov/medlineplus/healthtopics.html**
- National Institute of Neurological Disorders and Stroke (NINDS); neurological disorder information pages available at **http://www.ninds.nih.gov/health_and_medical/disorder_index.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.[26] 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:[27]

- **Bioethics:** Access to published literature on the ethical, legal and public policy issues surrounding healthcare and biomedical research. This information is provided in conjunction with the Kennedy Institute of Ethics located at Georgetown University, Washington, D.C.: **http://www.nlm.nih.gov/databases/databases_bioethics.html**
- **HIV/AIDS Resources:** Describes various links and databases dedicated to HIV/AIDS research: **http://www.nlm.nih.gov/pubs/factsheets/aidsinfs.html**
- **NLM Online Exhibitions:** Describes "Exhibitions in the History of Medicine": **http://www.nlm.nih.gov/exhibition/exhibition.html**. Additional resources for historical scholarship in medicine: **http://www.nlm.nih.gov/hmd/hmd.html**
- **Biotechnology Information:** Access to public databases. The National Center for Biotechnology Information conducts research in computational biology, develops software tools for analyzing genome data, and disseminates biomedical information for the better understanding of molecular processes affecting human health and disease: **http://www.ncbi.nlm.nih.gov/**
- **Population Information:** The National Library of Medicine provides access to worldwide coverage of population, family planning, and related health issues, including family planning technology and programs, fertility, and population law and policy: **http://www.nlm.nih.gov/databases/databases_population.html**
- **Cancer Information:** Access to caner-oriented databases: **http://www.nlm.nih.gov/databases/databases_cancer.html**

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[26] Remember, for the general public, the National Library of Medicine recommends the databases referenced in MEDLINE*plus* (**http://medlineplus.gov/** or **http://www.nlm.nih.gov/medlineplus/databases.html**).

[27] See http://www.nlm.nih.gov/databases/databases.html.

- **Profiles in Science:** Offering the archival collections of prominent twentieth-century biomedical scientists to the public through modern digital technology: **http://www.profiles.nlm.nih.gov/**
- **Chemical Information:** Provides links to various chemical databases and references: **http://sis.nlm.nih.gov/Chem/ChemMain.html**
- **Clinical Alerts:** Reports the release of findings from the NIH-funded clinical trials where such release could significantly affect morbidity and mortality: **http://www.nlm.nih.gov/databases/alerts/clinical_alerts.html**
- **Space Life Sciences:** Provides links and information to space-based research (including NASA): **http://www.nlm.nih.gov/databases/databases_space.html**
- **MEDLINE:** Bibliographic database covering the fields of medicine, nursing, dentistry, veterinary medicine, the healthcare system, and the pre-clinical sciences: **http://www.nlm.nih.gov/databases/databases_medline.html**
- **Toxicology and Environmental Health Information (TOXNET):** Databases covering toxicology and environmental health: **http://sis.nlm.nih.gov/Tox/ToxMain.html**
- **Visible Human Interface:** Anatomically detailed, three-dimensional representations of normal male and female human bodies: **http://www.nlm.nih.gov/research/visible/visible_human.html**

While all of the above references may be of interest to physicians who study and treat peripheral neuropathy, the following are particularly noteworthy.

The Combined Health Information Database

A comprehensive source of information on clinical guidelines written for professionals is the Combined Health Information Database. You will need to limit your search to "Brochure/Pamphlet," "Fact Sheet," or "Information Package" and peripheral neuropathy using the "Detailed Search" option. Go directly to the following hyperlink: **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 the publication date, select "All Years," select your preferred language, and the format option "Fact Sheet." By making these selections and typing "peripheral neuropathy" (or synonyms) into the "For these words:" box above, you will only receive results on fact sheets dealing with peripheral neuropathy. The following is a sample result:

- **Thioctic Acid**

  Contact: AIDS Project Los Angeles, 3550 Wilshire Blvd Ste 300, Los Angeles, CA, 90010-2404, (213) 201-1600, http://www.apla.org.

  Summary: In this article, the author explores the potential value of thioctic acid, or lipoic acid, for the treatment of liver damage in HIV/AIDS patients. He explains that thioctic acid is a non-toxic micronutrient, incorporated by nutritional biochemists as a member of the B vitamin family, and biologically active in minute amounts. The principle physiological function of thioctic acid appears to be its action as a coenzyme in different metabolic reactions. The author states thioctic acid has been prescribed by physicians as a liver protective agent for alcoholics, and in cases of idiopathic liver enzyme elevation, viral hepatitis, and residual drug-induced liver injury. He refers to research showing thioctic acid to be effective for chemical hypersensitivity syndrome, diabetic neuropathy, peripheral neuropathy, heavy metal toxicity, and elevated liver enzymes. He believes thioctic acid has important implications for people with AIDS by serving to lower elevated liver enzyme levels brought on by some of their medications. Those taking thioctic acid on their own are cautioned to inform their physicians, since it will affect liver enzyme tests sometimes used to determine dosages of medications. The paper includes information on availability and prophylactic and therapeutic dosage forms.

- **Guidelines for the Diagnosis and Outpatient Management of Diabetic Peripheral Neuropathy**

  Source: Diabetes Reviews. 7(4): 237-244. 1999.

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

  Summary: This article provides guidelines for the diagnosis and outpatient management of diabetic peripheral neuropathy. These guidelines were developed from an international consensus meeting attended by diabetologists, neurologists, primary care physicians, podiatrists, and diabetes specialist nurses. Diabetic peripheral neuropathy is defined as the presence of symptoms or signs of peripheral nerve dysfunction in people who have diabetes, after exclusion of other causes. The guidelines outline the components of an annual examination of a person who has diabetes and provide recommendations on methods of assessment and management of diabetic peripheral neuropathy and patient education. Assessment guidelines focus on obtaining a patient history; examining the patient, including inspecting the feet and conducting neurological and vascular examinations; performing other

investigations; and identifying the at risk foot. Management guidelines focus on education of patients who do not have clinical neuropathy and those who have stage 2 clinical neuropathy and referral of patients who have stage 3 neuropathy. The guidelines use a question and answer format to provide information about who should provide patient education, what methods should be used, and what elements should be included in an education program. Although the guidelines are intended to be used by physicians involved in the outpatient management of people who have diabetes, they emphasize the concept of a multidisciplinary diabetes footcare team. 2 appendices. 4 tables. (AA-M).

The NLM Gateway[28]

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.[29] One target audience for the Gateway is the Internet user who is new to NLM's online resources and does not know what information is available or how best to search for it. This audience may include physicians and other healthcare providers, researchers, librarians, students, and, increasingly, patients, their families, and the public.[30] To use the NLM Gateway, simply go to the search site at **http://gateway.nlm.nih.gov/gw/Cmd**. Type "peripheral 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.

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

[29] 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).

[30] Other users may find the Gateway useful for an overall search of NLM's information resources. Some searchers may locate what they need immediately, while others will utilize the Gateway as an adjunct tool to other NLM search services such as PubMed® and MEDLINEplus®. The Gateway connects users with multiple NLM retrieval systems while also providing a search interface for its own collections. These collections include various types of information that do not logically belong in PubMed, LOCATORplus, or other established NLM retrieval systems (e.g., meeting announcements and pre-1966 journal citations). The Gateway will provide access to the information found in an increasing number of NLM retrieval systems in several phases.

Results Summary

Category	Items Found
Journal Articles	348687
Books / Periodicals / Audio Visual	2576
Consumer Health	294
Meeting Abstracts	2575
Other Collections	87
Total	354219

HSTAT[31]

HSTAT is a free, Web-based resource that provides access to full-text documents used in healthcare decision-making.[32] HSTAT's audience includes healthcare providers, health service researchers, policy makers, insurance companies, consumers, and the information professionals who serve these groups. HSTAT provides access to a wide variety of publications, including 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.[33] Simply search by "peripheral neuropathy" (or synonyms) at the following Web site: **http://text.nlm.nih.gov**.

Coffee Break: Tutorials for Biologists[34]

Some patients may wish to have access to a general healthcare site that takes a scientific view of the news and covers recent breakthroughs in biology that

[31] Adapted from HSTAT: http://www.nlm.nih.gov/pubs/factsheets/hstat.html.
[32] The HSTAT URL is **http://hstat.nlm.nih.gov/**.
[33] 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.
[34] Adapted from http://www.ncbi.nlm.nih.gov/Coffeebreak/Archive/FAQ.html.

may one day assist physicians in developing treatments. To this end, we recommend "Coffee Break," 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.[35] 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.[36] This site has new articles every few weeks, so it can be considered an online magazine of sorts, and intended for general background information. You can access the Coffee Break Web site at **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 a few 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/**.
- **Image Engine:** Multimedia electronic medical record system that integrates a wide range of digitized clinical images with textual data stored in the University of Pittsburgh Medical Center's MARS electronic medical record system; see the following Web site: **http://www.cml.upmc.edu/cml/imageengine/imageEngine.html**.
- **Medical World Search:** Searches full text from thousands of selected medical sites on the Internet; see **http://www.mwsearch.com/**.
- **MedWeaver:** Prototype system that allows users to search differential diagnoses for any list of signs and symptoms, to search medical literature, and to explore relevant Web sites; see **http://www.med.virginia.edu/~wmd4n/medweaver.html**.
- **Metaphrase:** Middleware component intended for use by both caregivers and medical records personnel. It converts the informal language

[35] 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.

[36] 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.

generally used by caregivers into terms from formal, controlled vocabularies; see **http://www.lexical.com/Metaphrase.html**.

The Genome Project and Peripheral Neuropathy

With all the discussion in the press about the Human Genome Project, it is only natural that physicians, researchers, and patients want to know about how human genes relate to peripheral neuropathy. In the following section, we will discuss databases and references used by physicians and scientists who work in this area.

Online Mendelian Inheritance in Man (OMIM)

The Online Mendelian Inheritance in Man (OMIM) database is a catalog of human genes and genetic disorders authored and edited by Dr. Victor A. McKusick and his colleagues at Johns Hopkins and elsewhere. OMIM was developed for the World Wide Web by the National Center for Biotechnology Information (NCBI).[37] The database contains textual information, pictures, and reference information. It also contains copious links to NCBI's Entrez database of MEDLINE articles and sequence information.

Go to **http://www.ncbi.nlm.nih.gov/Omim/searchomim.html** to search the database. Type "peripheral neuropathy" (or synonyms) in the search box, and click "Submit Search." If too many results appear, you can narrow the search by adding the word "clinical." Each report will have additional links to related research and databases. By following these links, especially the link titled "Database Links," you will be exposed to numerous specialized databases that are largely used by the scientific community. These databases are overly technical and seldom used by the general public, but offer an abundance of information. The following is an example of the results you can obtain from the OMIM for peripheral neuropathy:

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[37] Adapted from **http://www.ncbi.nlm.nih.gov/**. Established in 1988 as a national resource for molecular biology information, NCBI creates public databases, conducts research in computational biology, develops software tools for analyzing genome data, and disseminates biomedical information--all for the better understanding of molecular processes affecting human health and disease.

- **Deafness, Sensorineural, with Peripheral Neuropathy and Arterial Disease**
  Web site: http://www.ncbi.nlm.nih.gov/htbin-post/Omim/dispmim?124950
- **Optic Atrophy, Hearing Loss, and Peripheral Neuropathy**
  Web site: http://www.ncbi.nlm.nih.gov/htbin-post/Omim/dispmim?165199
- **Peripheral Neuropathy and Optic Atrophy**
  Web site: http://www.ncbi.nlm.nih.gov/htbin-post/Omim/dispmim?601152
- **Peripheral Neuropathy, Ataxia, Focal Necrotizing Encephalopathy, and Spongy Degeneration of Brain**
  Web site: http://www.ncbi.nlm.nih.gov/htbin-post/Omim/dispmim?260970
- **Spinocerebellar Ataxia with Rigidity and Peripheral Neuropathy**
  Web site: http://www.ncbi.nlm.nih.gov/htbin-post/Omim/dispmim?183050

Genes and Disease (NCBI - Map)

The Genes and Disease database is produced by the National Center for Biotechnology Information of the National Library of Medicine at the National Institutes of Health. This Web site categorizes each disorder by the system of the body associated with it. Go to **http://www.ncbi.nlm.nih.gov/disease/**, and browse the system pages to have a full view of important conditions linked to human genes. Since this site is regularly updated, you may wish to re-visit it from time to time. The following systems and associated disorders are addressed:

- **Muscle and Bone:** Movement and growth.
  Examples: Duchenne muscular dystrophy, Ellis-van Creveld syndrome, Marfan syndrome, myotonic dystrophy, spinal muscular atrophy.
  Web site: **http://www.ncbi.nlm.nih.gov/disease/Muscle.html**
- **Nervous System:** Mind and body.
  Examples: Alzheimer disease, Amyotrophic lateral sclerosis, Angelman syndrome, Charcot-Marie-Tooth disease, epilepsy, essential tremor, Fragile X syndrome, Friedreich's ataxia, Huntington disease, Niemann-Pick disease, Parkinson disease, Prader-Willi syndrome, Rett syndrome, Spinocerebellar atrophy, Williams syndrome.
  Web site: **http://www.ncbi.nlm.nih.gov/disease/Brain.html**

- **Signals:** Cellular messages.
  Examples: Ataxia telangiectasia, Baldness, Cockayne syndrome, Glaucoma, SRY: sex determination, Tuberous sclerosis, Waardenburg syndrome, Werner syndrome.
  Web site: **http://www.ncbi.nlm.nih.gov/disease/Signals.html**
- **Transporters:** Pumps and channels.
  Examples: Cystic Fibrosis, deafness, diastrophic dysplasia, Hemophilia A, long-QT syndrome, Menkes syndrome, Pendred syndrome, polycystic kidney disease, sickle cell anemia, Wilson's disease, Zellweger syndrome.
  Web site: **http://www.ncbi.nlm.nih.gov/disease/Transporters.html**

Entrez

Entrez is a search and retrieval system that integrates several linked databases at the National Center for Biotechnology Information (NCBI). These databases include nucleotide sequences, protein sequences, macromolecular structures, whole genomes, and MEDLINE through PubMed. Entrez provides access to the following databases:

- **PubMed:** Biomedical literature (PubMed),
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed**
- **Nucleotide Sequence Database (Genbank):**
  Web site:
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Nucleotide
- **Protein Sequence Database:**
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Protein**
- **Structure:** Three-dimensional macromolecular structures,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Structure**
- **Genome:** Complete genome assemblies,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Genome**
- **PopSet:** Population study data sets,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Popset**
- **OMIM:** Online Mendelian Inheritance in Man,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=OMIM**
- **Taxonomy:** Organisms in GenBank,
  Web site:
  http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Taxonomy
- **Books:** Online books,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=books**

- **ProbeSet:** Gene Expression Omnibus (GEO),
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=geo**
- **3D Domains:** Domains from Entrez Structure,
  Web site: **http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=geo**
- **NCBI's Protein Sequence Information Survey Results:**
  Web site: **http://www.ncbi.nlm.nih.gov/About/proteinsurvey/**

To access the Entrez system at the National Center for Biotechnology Information, go to **http://www.ncbi.nlm.nih.gov/entrez/**, and then select the database that you would like to search. The databases available are listed in the drop box next to "Search." In the box next to "for," enter "peripheral neuropathy" (or synonyms) and click "Go."

Jablonski's Multiple Congenital Anomaly/Mental Retardation (MCA/MR) Syndromes Database[38]

This online resource can be quite useful. It has been developed to facilitate the identification and differentiation of syndromic entities. Special attention is given to the type of information that is usually limited or completely omitted in existing reference sources due to space limitations of the printed form.

At the following Web site you can also search across syndromes using an index: **http://www.nlm.nih.gov/mesh/jablonski/syndrome_toc/toc_a.html.** You can search by keywords at this Web site: **http://www.nlm.nih.gov/mesh/jablonski/syndrome_db.html**.

The Genome Database[39]

Established at Johns Hopkins University in Baltimore, Maryland in 1990, the Genome Database (GDB) is the official central repository for genomic mapping data resulting from the Human Genome Initiative. In the spring of 1999, the Bioinformatics Supercomputing Centre (BiSC) at the Hospital for Sick Children in Toronto, Ontario assumed the management of GDB. The Human Genome Initiative is a worldwide research effort focusing on structural analysis of human DNA to determine the location and sequence of

[38] Adapted from the National Library of Medicine:
http://www.nlm.nih.gov/mesh/jablonski/about_syndrome.html.
[39] Adapted from the Genome Database:
http://gdbwww.gdb.org/gdb/aboutGDB.html#mission.

the estimated 100,000 human genes. In support of this project, GDB stores and curates data generated by researchers worldwide who are engaged in the mapping effort of the Human Genome Project (HGP). GDB's mission is to provide scientists with an encyclopedia of the human genome which is continually revised and updated to reflect the current state of scientific knowledge. Although GDB has historically focused on gene mapping, its focus will broaden as the Genome Project moves from mapping to sequence, and finally, to functional analysis.

To access the GDB, simply go to the following hyperlink: **http://www.gdb.org/**. Search "All Biological Data" by "Keyword." Type "peripheral neuropathy" (or synonyms) into the search box, and review the results. If more than one word is used in the search box, then separate each one with the word "and" or "or" (using "or" might be useful when using synonyms). This database is extremely technical as it was created for specialists. The articles are the results which are the most accessible to non-professionals and often listed under the heading "Citations." The contact names are also accessible to non-professionals.

Specialized References

The following books are specialized references written for professionals interested in peripheral neuropathy (sorted alphabetically by title, hyperlinks provide rankings, information, and reviews at Amazon.com):

- **The Behavioral Neurology of White Matter** by Christopher M. Filley; Paperback - 279 pages; 1st edition (September 15, 2001), Oxford University Press; ISBN: 019513561X; **http://www.amazon.com/exec/obidos/ASIN/019513561X/icongroupinterna**
- **The Cerebellum and Its Disorders** by Mario-Ubaldo Manto, Massimo Pandolfo; Hardcover - 1st edition (January 2002), Cambridge University Press; ISBN: 0521771560; **http://www.amazon.com/exec/obidos/ASIN/0521771560/icongroupinterna**
- **Clinical Neurology** by David A. Greenberg, et al; Paperback - 390 pages; 5th edition (February 9, 2002), Appleton & Lange; ISBN: 0071375430; **http://www.amazon.com/exec/obidos/ASIN/0071375430/icongroupinterna**
- **Clinical Neurology for Psychiatrists** by David M. Kaufman; Hardcover - 670 pages, 5th edition (January 15, 2001), W. B. Saunders Co.; ISBN: 0721689957; **http://www.amazon.com/exec/obidos/ASIN/0721689957/icongroupinterna**

- **Comprehensive Neurology** by Roger N. Rosenberg (Editor), David E. Pleasure (Editor); 1280 pages, 2nd edition (April 1998), Wiley-Liss; ISBN: 0471169587; **http://www.amazon.com/exec/obidos/ASIN/0471169587/icongroupinterna**
- **Emergent and Urgent Neurology** by William J. Weiner (Editor), Lisa M. Shulman (Editor); Hardcover - 571 pages; 2nd edition (January 15, 1999), Lippincott, Williams & Wilkins Publishers; ISBN: 0397518579; **http://www.amazon.com/exec/obidos/ASIN/0397518579/icongroupinterna**
- **Neurology in Clinical Practice: Volume I: Principles of Diagnosis and Management, Volume II: The Neurological Disorders (2-Volume Set, Includes a 12-Month Subscription to the Online Edition)** by W. G. Bradley, et al; Hardcover **-** 2413 pages, 3rd edition, Vol 1-2 (January 15, 2000), Butterworth-Heinemann; ISBN: 0750699736; **http://www.amazon.com/exec/obidos/ASIN/0750699736/icongroupinterna**
- **Neuroscience: Exploring the Brain** by Mark F. Bear, et al; Hardcover - 855 pages, 2nd edition (January 15, 2001), Lippincott, Williams & Wilkins Publishers; ISBN: 0683305964; **http://www.amazon.com/exec/obidos/ASIN/0683305964/icongroupinterna**
- **Office Practice of Neurology** by Martain A. Samuels, Steven F. Feske; Hardcover, Churchill Livingstone; ISBN: 0443065578; **http://www.amazon.com/exec/obidos/ASIN/0443065578/icongroupinterna**
- **Patient-Based Approaches to Cognitive Neuroscience** by Martha J. Farah (Editor), Todd E. Feinberg (Editor); Paperback - 425 pages (April 3, 2000), MIT Press; ISBN: 0262561239; **http://www.amazon.com/exec/obidos/ASIN/0262561239/icongroupinterna**
- **Principles of Neural Science** by Eric R. Kandel (Editor), et al; Hardcover - 1414 pages, 4th edition (January 5, 2000), McGraw-Hill Professional Publishing; ISBN: 0838577016; **http://www.amazon.com/exec/obidos/ASIN/0838577016/icongroupinterna**
- **Review Manual for Neurology in Clinical Practice** by Karl E. Misulis, et al; Paperback, Butterworth-Heinemann Medical; ISBN: 0750671920; **http://www.amazon.com/exec/obidos/ASIN/0750671920/icongroupinterna**

Vocabulary Builder

Encephalopathy: Any degenerative disease of the brain. [EU]

Hepatitis: Inflammation of the liver. [EU]

Hypersensitivity: A state of altered reactivity in which the body reacts with an exaggerated immune response to a foreign substance. Hypersensitivity reactions are classified as immediate or delayed, types I and IV, respectively, in the Gell and Coombs classification (q.v.) of immune responses. [EU]

Rigidity: Stiffness or inflexibility, chiefly that which is abnormal or morbid; rigor. [EU]

CHAPTER 10. DISSERTATIONS ON PERIPHERAL NEUROPATHY

Overview

University researchers are active in studying almost all known disorders and conditions. The result of research is often published in the form of Doctoral or Master's dissertations. You should understand, therefore, that applied diagnostic procedures and/or therapies can take many years to develop after the thesis that proposed the new technique or approach was written.

In this chapter, we will give you a bibliography on recent dissertations relating to peripheral neuropathy. You can read about these in more detail using the Internet or your local medical library. We will also provide you with information on how to use the Internet to stay current on dissertations.

Dissertations on Peripheral Neuropathy

ProQuest Digital Dissertations is the largest archive of academic dissertations available. From this archive, we have compiled the following list covering dissertations devoted to peripheral neuropathy. You will see that the information provided includes the dissertation's title, its author, and the author's institution. To read more about the following, simply use the Internet address indicated. The following covers recent dissertations dealing with peripheral neuropathy:

- **Improving Vibrotactile Carpal Tunnel Syndrome Screening** by Khalighi, Mehdi; Phd from The University of Utah, 2001, 198 pages http://wwwlib.umi.com/dissertations/fullcit/9996953

- **Molecular and Cellular Mechanisms of Aromatic Hydrocarbon Axonopathy** by Kim, Min-sun; Phd from Oregon State University, 2002, 89 pages
  http://wwwlib.umi.com/dissertations/fullcit/3044336
- **Postural Balance and Acceleration Threshold Detection for Anterior Horizontal Translation in Diabetic and Non-diabetic Elderly** by Balasubramanian, Venkatesh; Phd from Louisiana Tech University, 2001, 142 pages
  http://wwwlib.umi.com/dissertations/fullcit/9995016
- **Uncovering a New Biological Function of Apolipoprotein E: Regulation of the Blood-nerve Barrier** by Fullerton, Stephanie Marie; Phd from Duke University, 2001, 123 pages
  http://wwwlib.umi.com/dissertations/fullcit/3030969
- **Utilities of Metastatic Breast Cancer Patients Treated with Taxanes Compared to Utilities of Oncology Nurses** by Hauser, Robert Sean; Phd from The University of Texas at Austin, 2001, 261 pages
  http://wwwlib.umi.com/dissertations/fullcit/3035947

Keeping Current

As previously mentioned, an effective way to stay current on dissertations dedicated to peripheral neuropathy is to use the database called *ProQuest Digital Dissertations* via the Internet, located at the following Web address: **http://wwwlib.umi.com/dissertations.** The site allows you to freely access the last two years of citations and abstracts. Ask your medical librarian if the library has full and unlimited access to this database. From the library, you should be able to do more complete searches than with the limited 2-year access available to the general public.

Vocabulary Builder

Aromatic: Having a spicy odour. [EU]

PART III. APPENDICES

ABOUT PART III

Part III is a collection of appendices on general medical topics which may be of interest to patients with peripheral neuropathy and related conditions.

APPENDIX A. RESEARCHING YOUR MEDICATIONS

Overview

There are a number of sources available on new or existing medications which could be prescribed to patients with peripheral neuropathy. While a number of hard copy or CD-Rom resources are available to patients and physicians for research purposes, a more flexible method is to use Internet-based databases. In this chapter, we will begin with a general overview of medications. We will then proceed to outline official recommendations on how you should view your medications. You may also want to research medications that you are currently taking for other conditions as they may interact with medications for peripheral neuropathy. Research can give you information on the side effects, interactions, and limitations of prescription drugs used in the treatment of peripheral neuropathy. Broadly speaking, there are two sources of information on approved medications: public sources and private sources. We will emphasize free-to-use public sources.

Your Medications: The Basics[40]

The Agency for Health Care Research and Quality has published extremely useful guidelines on how you can best participate in the medication aspects of peripheral neuropathy. Taking medicines is not always as simple as swallowing a pill. It can involve many steps and decisions each day. The AHCRQ recommends that patients with peripheral neuropathy take part in treatment decisions. Do not be afraid to ask questions and talk about your concerns. By taking a moment to ask questions early, you may avoid problems later. Here are some points to cover each time a new medicine is prescribed**:**

- Ask about all parts of your treatment, including diet changes, exercise, and medicines.
- Ask about the risks and benefits of each medicine or other treatment you might receive.
- Ask how often you or your doctor will check for side effects from a given medication.

Do not hesitate to ask what is important to you about your medicines. You may want a medicine with the fewest side effects, or the fewest doses to take each day. You may care most about cost, or how the medicine might affect how you live or work. Or, you may want the medicine your doctor believes will work the best. Telling your doctor will help him or her select the best treatment for you.

Do not be afraid to "bother" your doctor with your concerns and questions about medications for peripheral neuropathy. You can also talk to a nurse or a pharmacist. They can help you better understand your treatment plan. Feel free to bring a friend or family member with you when you visit your doctor. Talking over your options with someone you trust can help you make better choices, especially if you are not feeling well. Specifically, ask your doctor the following:

- The name of the medicine and what it is supposed to do.
- How and when to take the medicine, how much to take, and for how long.
- What food, drinks, other medicines, or activities you should avoid while taking the medicine.
- What side effects the medicine may have, and what to do if they occur.

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[40] This section is adapted from AHCRQ: **http://www.ahcpr.gov/consumer/ncpiebro.htm**.

- If you can get a refill, and how often.
- About any terms or directions you do not understand.
- What to do if you miss a dose.
- If there is written information you can take home (most pharmacies have information sheets on your prescription medicines; some even offer large-print or Spanish versions).

Do not forget to tell your doctor about all the medicines you are currently taking (not just those for peripheral neuropathy). This includes prescription medicines and the medicines that you buy over the counter. Then your doctor can avoid giving you a new medicine that may not work well with the medications you take now. When talking to your doctor, you may wish to prepare a list of medicines you currently take, the reason you take them, and how you take them. Be sure to include the following information for each:

- Name of medicine
- Reason taken
- Dosage
- Time(s) of day

Also include any over-the-counter medicines, such as:

- Laxatives
- Diet pills
- Vitamins
- Cold medicine
- Aspirin or other pain, headache, or fever medicine
- Cough medicine
- Allergy relief medicine
- Antacids
- Sleeping pills
- Others (include names)

Learning More about Your Medications

Because of historical investments by various organizations and the emergence of the Internet, it has become rather simple to learn about the medications your doctor has recommended for peripheral 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 **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.[41]

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

Of course, we as editors cannot be certain as to what medications you are taking. Therefore, we have compiled a list of medications associated with the treatment of peripheral neuropathy. Once again, due to space limitations, we only list a sample of medications and provide hyperlinks to ample documentation (e.g. typical dosage, side effects, drug-interaction risks, etc.). The following drugs have been mentioned in the Pharmacopeia and other sources as being potentially applicable to peripheral neuropathy:

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[41] Though cumbersome, the FDA database can be freely browsed at the following site: **www.fda.gov/cder/da/da.htm**.

Bethanechol

- **Systemic - U.S. Brands:** Duvoid; Urabeth; Urecholine
  http://www.nlm.nih.gov/medlineplus/druginfo/bethanecholsystemic202090.html

Carbamazepine

- **Systemic - U.S. Brands:** Atretol; Carbatrol; Epitol; Tegretol; Tegretol-XR
  http://www.nlm.nih.gov/medlineplus/druginfo/carbamazepinesystemic202111.html

Didanosine

- **Systemic - U.S. Brands:** Videx
  http://www.nlm.nih.gov/medlineplus/druginfo/didanosinesystemic202616.html

Fludrocortisone

- **Systemic - U.S. Brands:** Florinef
  http://www.nlm.nih.gov/medlineplus/druginfo/fludrocortisonesystemic202244.html

Gabapentin

- **Systemic - U.S. Brands:** Neurontin
  http://www.nlm.nih.gov/medlineplus/druginfo/gabapentinsystemic202732.html

Metoclopramide

- **Systemic - U.S. Brands:** Octamide; Reglan
  http://www.nlm.nih.gov/medlineplus/druginfo/metoclopramidesystemic202364.html

Stavudine

- **Systemic - U.S. Brands:** Zerit
  http://www.nlm.nih.gov/medlineplus/druginfo/stavudinesystemic202728.html

Zalcitabine

- **Systemic - U.S. Brands:** HIVID
  http://www.nlm.nih.gov/medlineplus/druginfo/zalcitabinesystemic202652.html

Commercial Databases

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

Reuters Health Drug Database

The Reuters Health Drug Database can be searched by keyword at the hyperlink: **http://www.reutershealth.com/frame2/drug.html**.[42]

Mosby's GenRx

Mosby's GenRx 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. Information can be obtained at the following hyperlink: **http://www.genrx.com/Mosby/PhyGenRx/group.html**.

Physicians Desk Reference

The Physicians Desk Reference database (also available in CD-Rom and book format) is a full-text drug database. The database is searchable by brand name, generic name or by indication. It features multiple drug interactions reports. Information can be obtained at the following hyperlink: **http://physician.pdr.net/physician/templates/en/acl/psuser_t.htm**.

Other Web Sites

A number of additional Web sites discuss drug information. As an example, you may like to look at **www.drugs.com** which 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. which allows users to download articles on various drugs and therapeutics for a nominal fee: **http://www.medletter.com/**.

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[42] Adapted from *A to Z Drug Facts* by Facts and Comparisons.

Contraindications and Interactions (Hidden Dangers)

Some of the medications mentioned in the previous discussions can be problematic for patients with peripheral neuropathy--not because they are used in the treatment process, but because of contraindications, or side effects. Medications with contraindications are those that could react with drugs used to treat peripheral neuropathy or potentially create deleterious side effects in patients with peripheral neuropathy. You should ask your physician about any contraindications, especially as these might apply to other medications that you may be taking for common ailments.

Drug-drug interactions occur when two or more drugs react with each other. This drug-drug interaction may cause you to experience an unexpected side effect. Drug interactions may make your medications less effective, cause unexpected side effects, or increase the action of a particular drug. Some drug interactions can even be harmful to you.

Be sure to read the label every time you use a nonprescription or prescription drug, and take the time to learn about drug interactions. These precautions may be critical to your health. You can reduce the risk of potentially harmful drug interactions and side effects with a little bit of knowledge and common sense.

Drug labels contain important information about ingredients, uses, warnings, and directions which you should take the time to read and understand. Labels also include warnings about possible drug interactions. Further, drug labels may change as new information becomes available. This is why it's especially important to read the label every time you use a medication. When your doctor prescribes a new drug, discuss all over-the-counter and prescription medications, dietary supplements, vitamins, botanicals, minerals and herbals you take as well as the foods you eat. Ask your pharmacist for the package insert for each prescription drug you take. The package insert provides more information about potential drug interactions.

A Final Warning

At some point, you may hear of alternative medications from friends, relatives, or in the news media. Advertisements may suggest that certain alternative drugs can produce positive results for patients with peripheral neuropathy. Exercise caution--some of these drugs may have fraudulent

claims, and others may actually hurt you. The Food and Drug Administration (FDA) is the official U.S. agency charged with discovering which medications are likely to improve the health of patients with peripheral neuropathy. The FDA warns patients to watch out for[43]:

- Secret formulas (real scientists share what they know)
- Amazing breakthroughs or miracle cures (real breakthroughs don't happen very often; when they do, real scientists do not call them amazing or miracles)
- Quick, painless, or guaranteed cures
- If it sounds too good to be true, it probably isn't true.

If you have any questions about any kind of 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**.

General References

In addition to the resources provided earlier in this chapter, the following general references describe medications (sorted alphabetically by title; hyperlinks provide rankings, information and reviews at Amazon.com):

- **Current Therapy in Neurologic Disease** by Richard T. Johnson, et al; Hardcover **-** 457 pages, 6th edition (January 15, 2002), Mosby-Year Book; ISBN: 0323014720; **http://www.amazon.com/exec/obidos/ASIN/0323014720/icongroupinterna**
- **Emerging Pharmacological Tools in Clinical Neurology** by MedPanel Inc. (Author); Digital - 66 pages, MarketResearch.com; ISBN: B00005RBN8; **http://www.amazon.com/exec/obidos/ASIN/B00005RBN8/icongroupinterna**
- **Goodman & Gilman's The Pharmacological Basis of Therapeutics by** Joel G. Hardman (Editor), Lee E. Limbird; Hardcover - 1825 pages, 10th edition (August 13, 2001), McGraw-Hill Professional Publishing; ISBN: 0071354697; **http://www.amazon.com/exec/obidos/ASIN/0071354697/icongroupinterna**

[43] This section has been adapted from http://www.fda.gov/opacom/lowlit/medfraud.html.

- **Neurology and General Medicine** by Michael J. Aminoff (Editor), Hardcover - 992 pages, 3rd edition (March 15, 2001), Churchill Livingstone; ISBN: 0443065713; **http://www.amazon.com/exec/obidos/ASIN/0443065713/icongroupinterna**
- **Neurology and Medicine** by Hughes Perkins; Hardcover - 415 pages, 1st edition (December 15, 1999), B. M. J. Books; ISBN: 0727912240; **http://www.amazon.com/exec/obidos/ASIN/0727912240/icongroupinterna**
- **Pharmacological Management of Neurological and Psychiatric Disorders** by S. J. Enna (Editor), et al; Hardcover - 736 pages, 1st edition, McGraw-Hill Professional Publishing; ISBN: 0070217645; **http://www.amazon.com/exec/obidos/ASIN/0070217645/icongroupinterna**

Vocabulary Builder

The following vocabulary builder gives definitions of words used in this chapter that have not been defined in previous chapters:

Bethanechol: A slowly hydrolyzed muscarinic agonist with no nicotinic effects. Bethanechol is generally used to increase smooth muscle tone, as in the GI tract following abdominal surgery or in urinary retention in the absence of obstruction. It may cause hypotension, cardiac rate changes, and bronchial spasms. [NIH]

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

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

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

Stavudine: A dideoxynucleoside analog that inhibits reverse transcriptase and has in vitro activity against HIV. [NIH]

APPENDIX B. RESEARCHING ALTERNATIVE MEDICINE

Overview

Complementary and alternative medicine (CAM) is one of the most contentious aspects of modern medical practice. You may have heard of these treatments on the radio or on television. Maybe you have seen articles written about these treatments in magazines, newspapers, or books. Perhaps your friends or doctor have mentioned alternatives.

In this chapter, we will begin by giving you a broad perspective on complementary and alternative therapies. Next, we will introduce you to official information sources on CAM relating to peripheral neuropathy. Finally, at the conclusion of this chapter, we will provide a list of readings on peripheral neuropathy from various authors. We will begin, however, with the National Center for Complementary and Alternative Medicine's (NCCAM) overview of complementary and alternative medicine.

What Is CAM?[44]

Complementary and alternative medicine (CAM) covers a broad range of healing philosophies, approaches, and therapies. Generally, it is defined as those treatments and healthcare practices which are not taught in medical schools, used in hospitals, or reimbursed by medical insurance companies. Many CAM therapies are termed "holistic," which generally means that the healthcare practitioner considers the whole person, including physical, mental, emotional, and spiritual health. Some of these therapies are also known as "preventive," which means that the practitioner educates and

[44] Adapted from the NCCAM: **http://nccam.nih.gov/nccam/fcp/faq/index.html#what-is**.

treats the person to prevent health problems from arising, rather than treating symptoms after problems have occurred.

People use CAM treatments and therapies in a variety of ways. Therapies are used alone (often referred to as alternative), in combination with other alternative therapies, or in addition to conventional treatment (sometimes referred to as complementary). Complementary and alternative medicine, or "integrative medicine," includes a broad range of healing philosophies, approaches, and therapies. Some approaches are consistent with physiological principles of Western medicine, while others constitute healing systems with non-Western origins. While some therapies are far outside the realm of accepted Western medical theory and practice, others are becoming established in mainstream medicine.

Complementary and alternative therapies are used in an effort to prevent illness, reduce stress, prevent or reduce side effects and symptoms, or control or cure disease. Some commonly used methods of complementary or alternative therapy include mind/body control interventions such as visualization and relaxation, manual healing including acupressure and massage, homeopathy, vitamins or herbal products, and acupuncture.

What Are the Domains of Alternative Medicine?[45]

The list of CAM practices changes continually. The reason being is that these new practices and therapies are often proved to be safe and effective, and therefore become generally accepted as "mainstream" healthcare practices. Today, CAM practices may be grouped within five major domains: (1) alternative medical systems, (2) mind-body interventions, (3) biologically-based treatments, (4) manipulative and body-based methods, and (5) energy therapies. The individual systems and treatments comprising these categories are too numerous to list in this sourcebook. Thus, only limited examples are provided within each.

Alternative Medical Systems

Alternative medical systems involve complete systems of theory and practice that have evolved independent of, and often prior to, conventional biomedical approaches. Many are traditional systems of medicine that are

[45] Adapted from the NCCAM: http://nccam.nih.gov/nccam/fcp/classify/index.html.

practiced by individual cultures throughout the world, including a number of venerable Asian approaches.

Traditional oriental medicine emphasizes the balance or disturbances of qi (pronounced chi) or vital energy in health and disease, respectively. Traditional oriental medicine consists of a group of techniques and methods including acupuncture, herbal medicine, oriental massage, and qi gong (a form of energy therapy). Acupuncture involves stimulating specific anatomic points in the body for therapeutic purposes, usually by puncturing the skin with a thin needle.

Ayurveda is India's traditional system of medicine. Ayurvedic medicine (meaning "science of life") is a comprehensive system of medicine that places equal emphasis on body, mind, and spirit. Ayurveda strives to restore the innate harmony of the individual. Some of the primary Ayurvedic treatments include diet, exercise, meditation, herbs, massage, exposure to sunlight, and controlled breathing.

Other traditional healing systems have been developed by the world's indigenous populations. These populations include Native American, Aboriginal, African, Middle Eastern, Tibetan, and Central and South American cultures. Homeopathy and naturopathy are also examples of complete alternative medicine systems.

Homeopathic medicine is an unconventional Western system that is based on the principle that "like cures like," i.e., that the same substance that in large doses produces the symptoms of an illness, in very minute doses cures it. Homeopathic health practitioners believe that the more dilute the remedy, the greater its potency. Therefore, they use small doses of specially prepared plant extracts and minerals to stimulate the body's defense mechanisms and healing processes in order to treat illness.

Naturopathic medicine is based on the theory that disease is a manifestation of alterations in the processes by which the body naturally heals itself and emphasizes health restoration rather than disease treatment. Naturopathic physicians employ an array of healing practices, including the following: diet and clinical nutrition, homeopathy, acupuncture, herbal medicine, hydrotherapy (the use of water in a range of temperatures and methods of applications), spinal and soft-tissue manipulation, physical therapies (such as those involving electrical currents, ultrasound, and light), therapeutic counseling, and pharmacology.

Mind-Body Interventions

Mind-body interventions employ a variety of techniques designed to facilitate the mind's capacity to affect bodily function and symptoms. Only a select group of mind-body interventions having well-documented theoretical foundations are considered CAM. For example, patient education and cognitive-behavioral approaches are now considered "mainstream." On the other hand, complementary and alternative medicine includes meditation, certain uses of hypnosis, dance, music, and art therapy, as well as prayer and mental healing.

Biological-Based Therapies

This category of CAM includes natural and biological-based practices, interventions, and products, many of which overlap with conventional medicine's use of dietary supplements. This category includes herbal, special dietary, orthomolecular, and individual biological therapies.

Herbal therapy employs an individual herb or a mixture of herbs for healing purposes. An herb is a plant or plant part that produces and contains chemical substances that act upon the body. Special diet therapies, such as those proposed by Drs. Atkins, Ornish, Pritikin, and Weil, are believed to prevent and/or control illness as well as promote health. Orthomolecular therapies aim to treat disease with varying concentrations of chemicals such as magnesium, melatonin, and mega-doses of vitamins. Biological therapies include, for example, the use of laetrile and shark cartilage to treat cancer and the use of bee pollen to treat autoimmune and inflammatory diseases.

Manipulative and Body-Based Methods

This category includes methods that are based on manipulation and/or movement of the body. For example, chiropractors focus on the relationship between structure and function, primarily pertaining to the spine, and how that relationship affects the preservation and restoration of health. Chiropractors use manipulative therapy as an integral treatment tool.

In contrast, osteopaths place particular emphasis on the musculoskeletal system and practice osteopathic manipulation. Osteopaths believe that all of the body's systems work together and that disturbances in one system may have an impact upon function elsewhere in the body. Massage therapists manipulate the soft tissues of the body to normalize those tissues.

Energy Therapies

Energy therapies focus on energy fields originating within the body (biofields) or those from other sources (electromagnetic fields). Biofield therapies are intended to affect energy fields (the existence of which is not yet experimentally proven) that surround and penetrate the human body. Some forms of energy therapy manipulate biofields by applying pressure and/or manipulating the body by placing the hands in or through these fields. Examples include Qi gong, Reiki and Therapeutic Touch.

Qi gong is a component of traditional oriental medicine that combines movement, meditation, and regulation of breathing to enhance the flow of vital energy (qi) in the body, improve blood circulation, and enhance immune function. Reiki, the Japanese word representing Universal Life Energy, is based on the belief that, by channeling spiritual energy through the practitioner, the spirit is healed and, in turn, heals the physical body. Therapeutic Touch is derived from the ancient technique of "laying-on of hands." It is based on the premises that the therapist's healing force affects the patient's recovery and that healing is promoted when the body's energies are in balance. By passing their hands over the patient, these healers identify energy imbalances.

Bioelectromagnetic-based therapies involve the unconventional use of electromagnetic fields to treat illnesses or manage pain. These therapies are often used to treat asthma, cancer, and migraine headaches. Types of electromagnetic fields which are manipulated in these therapies include pulsed fields, magnetic fields, and alternating current or direct current fields.

Can Alternatives Affect My Treatment?

A critical issue in pursuing complementary alternatives mentioned thus far is the risk that these might have undesirable interactions with your medical treatment. It becomes all the more important to speak with your doctor who can offer advice on the use of alternatives. Official sources confirm this view. Though written for women, we find that the National Women's Health Information Center's advice on pursuing alternative medicine is appropriate for patients of both genders and all ages.[46]

[46] Adapted from **http://www.4woman.gov/faq/alternative.htm**.

Is It Okay to Want Both Traditional and Alternative or Complementary Medicine?

Should you wish to explore non-traditional types of treatment, be sure to discuss all issues concerning treatments and therapies with your healthcare provider, whether a physician or practitioner of complementary and alternative medicine. Competent healthcare management requires knowledge of both conventional and alternative therapies you are taking for the practitioner to have a complete picture of your treatment plan.

The decision to use complementary and alternative treatments is an important one. Consider before selecting an alternative therapy, the safety and effectiveness of the therapy or treatment, the expertise and qualifications of the healthcare practitioner, and the quality of delivery. These topics should be considered when selecting any practitioner or therapy.

Finding CAM References on Peripheral Neuropathy

Having read the previous discussion, you may be wondering which complementary or alternative treatments might be appropriate for peripheral neuropathy. For the remainder of this chapter, we will direct you to a number of official sources which can assist you in researching studies and publications. Some of these articles are rather technical, so some patience may be required.

The Combined Health Information Database

For a targeted search, The Combined Health Information Database is a bibliographic database produced by health-related agencies of the Federal Government (mostly from the National Institutes of Health). This database is updated four times a year at the end of January, April, July, and October. Check the titles, summaries, and availability of CAM-related information by using the "Simple Search" option at the following Web site: **http://chid.nih.gov/simple/simple.html**. In the drop box at the top, select "Complementary and Alternative Medicine." Then type "peripheral neuropathy" (or synonyms) in the second search box. We recommend that you select 100 "documents per page" and to check the "whole records" options. The following was extracted using this technique:

- **Acupuncture and Amitriptyline for Pain Due to HIV-Related Peripheral Neuropathy: A Randomized Controlled Trial**

  Source: JAMA. Journal of the American Medical Association. 280(18): 1590-1595. November 11, 1998.

  Summary: This journal article describes a randomized, controlled trial of a standardized acupuncture regimen (SAR) and amitriptyline hydrochloride for pain due to human immunodeficiency virus (HIV)-related peripheral neuropathy. Patients were recruited from Terry Beirn Community Programs for Clinical Research on AIDS (HIV primary care providers) in 10 cities across the United States. A total of 250 patients with HIV-associated, symptomatic, lower extremity peripheral neuropathy were enrolled into 1 of 3 options: (1) a modified double-blind 2 x 2 factorial design of SAR, amitriptyline, or the combination compared with a placebo; (2) a modified double-blind design of SAR versus control points; and (3) a double-blind design of amitriptyline versus a placebo. Treatments were administered for 14 weeks. The main outcome measures were changes in mean pain scores at 6 and 14 weeks, using patient ratings recorded in a daily pain diary. Patients in all treatment and comparison groups had a reduction in mean pain scores at 6 and 14 weeks compared with baseline. For both the SAR and amitriptyline comparisons, changes in pain scores were not significantly different between active treatment and control groups. The authors conclude that neither acupuncture nor amitriptyline appears to be more effective than a placebo in relieving pain caused by HIV-related peripheral neuropathy. The article has 3 figures, 4 tables, and 39 references. (AA-M).

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 allow patients to search for articles that specifically relate to peripheral neuropathy and complementary medicine. To search the database, go to the following Web site: **www.nlm.nih.gov/nccam/camonpubmed.html**. Select "CAM on PubMed." Enter "peripheral neuropathy" (or synonyms) into the search box. Click "Go." The following references provide information on particular aspects of complementary and alternative medicine (CAM) that are related to peripheral neuropathy:

- **A clinical study on treatment of diabetic peripheral neuropathy with tang zhi min capsules.**
  Author(s): Ren H.

Source: J Tradit Chin Med. 2000 December; 20(4): 258-61. No Abstract Available.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11263276&dopt=Abstract

- **A painful peripheral neuropathy in the rat produced by the chemotherapeutic drug, paclitaxel.**
  Author(s): Polomano RC, Mannes AJ, Clark US, Bennett GJ.
  Source: Pain. 2001 December; 94(3): 293-304.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11731066&dopt=Abstract

- **Acupuncture and amitriptyline for pain due to HIV-related peripheral neuropathy: a randomized controlled trial. Terry Beirn Community Programs for Clinical Research on AIDS.**
  Author(s): Shlay JC, Chaloner K, Max MB, Flaws B, Reichelderfer P, Wentworth D, Hillman S, Brizz B, Cohn DL.
  Source: Jama : the Journal of the American Medical Association. 1998 November 11; 280(18): 1590-5.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9820261&dopt=Abstract

- **Chronic inorganic mercury induced peripheral neuropathy.**
  Author(s): Chu CC, Huang CC, Ryu SJ, Wu TN.
  Source: Acta Neurologica Scandinavica. 1998 December; 98(6): 461-5.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9875628&dopt=Abstract

- **Clinical observation on treatment of diabetic peripheral neuropathy with reinforced tianma duzhong capsule.**
  Author(s): Li M, Wang X.
  Source: J Tradit Chin Med. 1999 September; 19(3): 182-4. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10921146&dopt=Abstract

- **Damage to the cytoskeleton of large diameter sensory neurons and myelinated axons in vincristine-induced painful peripheral neuropathy in the rat.**
  Author(s): Topp KS, Tanner KD, Levine JD.

Source: The Journal of Comparative Neurology. 2000 September 4; 424(4): 563-76.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10931481&dopt=Abstract

- **Diabetic peripheral neuropathy. Effectiveness of electrotherapy and amitriptyline for symptomatic relief.**
  Author(s): Kumar D, Alvaro MS, Julka IS, Marshall HJ.
  Source: Diabetes Care. 1998 August; 21(8): 1322-5.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9702441&dopt=Abstract

- **Fulminant peripheral neuropathy with severe quadriparesis associated with vincristine therapy.**
  Author(s): Moudgil SS, Riggs JE.
  Source: The Annals of Pharmacotherapy. 2000 October; 34(10): 1136-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11054980&dopt=Abstract

- **Neurotrophic factors and diabetic peripheral neuropathy.**
  Author(s): Apfel SC.
  Source: European Neurology. 1999; 41 Suppl 1: 27-34. Review.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10023126&dopt=Abstract

- **Nociceptor hyper-responsiveness during vincristine-induced painful peripheral neuropathy in the rat.**
  Author(s): Tanner KD, Reichling DB, Levine JD.
  Source: The Journal of Neuroscience : the Official Journal of the Society for Neuroscience. 1998 August 15; 18(16): 6480-91.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9698336&dopt=Abstract

- **Peripheral neuropathy due to biweekly paclitaxel, epirubicin and cisplatin in patients with advanced ovarian cancer.**
  Author(s): Postma TJ, Hoekman K, van Riel JM, Heimans JJ, Vermorken JB.
  Source: Journal of Neuro-Oncology. 1999; 45(3): 241-6.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10845395&dopt=Abstract

- **Peripheral neuropathy: alternative and complementary options.**
  Author(s): Huebscher R.
  Source: Nurse Pract Forum. 2000 June; 11(2): 73-7. Review. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11220057&dopt=Abstract

- **Reduction of paclitaxel-induced peripheral neuropathy with glutamine.**
  Author(s): Vahdat L, Papadopoulos K, Lange D, Leuin S, Kaufman E, Donovan D, Frederick D, Bagiella E, Tiersten A, Nichols G, Garrett T, Savage D, Antman K, Hesdorffer CS, Balmaceda C.
  Source: Clinical Cancer Research : an Official Journal of the American Association for Cancer Research. 2001 May; 7(5): 1192-7.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11350883&dopt=Abstract

- **Reversible peripheral neuropathy induced by a single administration of high-dose paclitaxel.**
  Author(s): Iniguez C, Larrode P, Mayordomo JI, Gonzalez P, Adelantado S, Yubero A, Tres A, Morales F.
  Source: Neurology. 1998 September; 51(3): 868-70.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9748043&dopt=Abstract

- **Role of protein kinase Cepsilon and protein kinase A in a model of paclitaxel-induced painful peripheral neuropathy in the rat.**
  Author(s): Dina OA, Chen X, Reichling D, Levine JD.
  Source: Neuroscience. 2001; 108(3): 507-15.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11738263&dopt=Abstract

- **Severe lead-induced peripheral neuropathy in a dialysis patient.**
  Author(s): Barats MS, Gonick HC, Rothenberg S, Balabanian M, Manton WI.
  Source: American Journal of Kidney Diseases : the Official Journal of the National Kidney Foundation. 2000 May; 35(5): 963-8.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10793035&dopt=Abstract

- **The WldS protein protects against axonal degeneration: a model of gene therapy for peripheral neuropathy.**
  Author(s): Wang MS, Fang G, Culver DG, Davis AA, Rich MM, Glass JD.
  Source: Annals of Neurology. 2001 December; 50(6): 773-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11761475&dopt=Abstract

- **Use of noninvasive electroacupuncture for the treatment of HIV-related peripheral neuropathy: a pilot study.**
  Author(s): Galantino ML, Eke-Okoro ST, Findley TW, Condoluci D.
  Source: Journal of Alternative and Complementary Medicine (New York, N.Y.). 1999 April; 5(2): 135-42.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10328635&dopt=Abstract

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.thedacare.org/healthnotes/**
- Open Directory Project: **http://dmoz.org/Health/Alternative/**
- TPN.com: **http://www.tnp.com/**
- Yahoo.com: **http://dir.yahoo.com/Health/Alternative_Medicine/**
- WebMD®Health: **http://my.webmd.com/drugs_and_herbs**
- WellNet: **http://www.wellnet.ca/herbsa-c.htm**
- WholeHealthMD.com: **http://www.wholehealthmd.com/reflib/0,1529,,00.html**

The following is a specific Web list relating to Peripheral 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**

AIDS and HIV
Source: Integrative Medicine Communications; www.onemedicine.com
Hyperlink: http://www.drkoop.com/interactivemedicine/ConsConditions/HIVandAIDScc.html

Bell's Palsy
Source: Healthnotes, Inc.; www.healthnotes.com
Hyperlink: http://www.thedacare.org/healthnotes/Concern/Bells_Palsy.htm

Diabetes
Source: Prima Communications, Inc.
Hyperlink: http://www.personalhealthzone.com/pg000285.html

HIV and AIDS
Source: Integrative Medicine Communications; www.onemedicine.com
Hyperlink: http://www.drkoop.com/interactivemedicine/ConsConditions/HIVandAIDScc.html

HIV and AIDS Support
Source: Healthnotes, Inc.; www.healthnotes.com
Hyperlink: http://www.thedacare.org/healthnotes/Concern/HIV_Support.htm

Multiple Sclerosis
Source: Healthnotes, Inc.; www.healthnotes.com
Hyperlink: http://www.thedacare.org/healthnotes/Concern/Multiple_Sclerosis.htm

Serum Sickness
Source: Integrative Medicine Communications; www.onemedicine.com
Hyperlink: http://www.drkoop.com/interactivemedicine/ConsConditions/SerumSicknesscc.html

- **Herbs and Supplements**

Betaine
Alternative names: Trimethylglycine
Source: Integrative Medicine Communications; www.onemedicine.com
Hyperlink: http://www.drkoop.com/interactivemedicine/ConsSupplements/Betainecs.html

Didanosine
Source: Healthnotes, Inc.; www.healthnotes.com
Hyperlink: http://www.thedacare.org/healthnotes/Drug/Didanosine.htm

Evening Primrose
Alternative names: Oenothera biennis, Sun Drop
Source: Integrative Medicine Communications; www.onemedicine.com
Hyperlink: http://www.drkoop.com/interactivemedicine/ConsHerbs/EveningPrimrosech.html

Gamma-Linolenic Acid (GLA)
Source: Integrative Medicine Communications; www.onemedicine.com
Hyperlink: http://www.drkoop.com/interactivemedicine/ConsSupplements/GammaLinolenicAcidGLAcs.html

GLA
Source: Integrative Medicine Communications; www.onemedicine.com
Hyperlink: http://www.drkoop.com/interactivemedicine/ConsSupplements/GammaLinolenicAcidGLAcs.html

GLA (Gamma-Linolenic Acid)
Source: Prima Communications, Inc.
Hyperlink: http://www.personalhealthzone.com/pg000111.html

Isoniazid
Source: Healthnotes, Inc.; www.healthnotes.com
Hyperlink:
http://www.thedacare.org/healthnotes/Drug/Isoniazid.htm

Lipoic Acid
Source: Prima Communications, Inc.
Hyperlink: http://www.personalhealthzone.com/pg000093.html

MAO Inhibitors
Source: Prima Communications, Inc.
Hyperlink: http://www.personalhealthzone.com/pg000372.html

Methionine
Source: Healthnotes, Inc.; www.healthnotes.com
Hyperlink:
http://www.thedacare.org/healthnotes/Supp/Methionine.htm

Oenothera biennis
Source: Integrative Medicine Communications;
www.onemedicine.com
Hyperlink:
http://www.drkoop.com/interactivemedicine/ConsHerbs/Evening Primrosech.html

Phenelzine
Source: Healthnotes, Inc.; www.healthnotes.com
Hyperlink:
http://www.thedacare.org/healthnotes/Drug/Phenelzine.htm

Sun Drop
Source: Integrative Medicine Communications;
www.onemedicine.com
Hyperlink:
http://www.drkoop.com/interactivemedicine/ConsHerbs/Evening Primrosech.html

Trimethylglycine
Source: Integrative Medicine Communications;
www.onemedicine.com
Hyperlink:
http://www.drkoop.com/interactivemedicine/ConsSupplements/Betainecs.html

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: **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. The following additional references describe, in broad terms, alternative and complementary medicine (sorted alphabetically by title; hyperlinks provide rankings, information, and reviews at Amazon.com):

- **Alternative and Complementary Treatment in Neurologic Illness** by Michael I. Weintraub (Editor); Paperback - 288 pages (March 23, 2001), Churchill Livingstone; ISBN: 0443065586;
  http://www.amazon.com/exec/obidos/ASIN/0443065586/icongroupinterna
- **Radical Healing: Integrating the World's Great Therapeutic Traditions to Create a New Transformative Medicine** by Rudolph Ballentine, M.D., Linda Funk (Illustrator); Paperback - 612 pages; Reprint edition (March 14, 2000), Three Rivers Press; ISBN: 0609804847;
  http://www.amazon.com/exec/obidos/ASIN/0609804847/icongroupinterna
- **The Review of Natural Products** by Facts and Comparisons (Editor); Cd-Rom edition (January 2002), Facts & Comparisons; ISBN: 1574391453;
  http://www.amazon.com/exec/obidos/ASIN/1574391453/icongroupinterna

For additional information on complementary and alternative medicine, ask your doctor or write to:

National Institutes of Health
National Center for Complementary and Alternative Medicine Clearinghouse
P. O. Box 8218
Silver Spring, MD 20907-8218

Vocabulary Builder

The following vocabulary builder gives definitions of words used in this chapter that have not been defined in previous chapters:

Isoniazid: Antibacterial agent used primarily as a tuberculostatic. It remains the treatment of choice for tuberculosis. [NIH]

APPENDIX C. RESEARCHING NUTRITION

Overview

Since the time of Hippocrates, doctors have understood the importance of diet and nutrition to patients' health and well-being. Since then, they have accumulated an impressive archive of studies and knowledge dedicated to this subject. Based on their experience, doctors and healthcare providers may recommend particular dietary supplements to patients with peripheral neuropathy. Any dietary recommendation is based on a patient's age, body mass, gender, lifestyle, eating habits, food preferences, and health condition. It is therefore likely that different patients with peripheral neuropathy may be given different recommendations. Some recommendations may be directly related to peripheral neuropathy, while others may be more related to the patient's general health. These recommendations, themselves, may differ from what official sources recommend for the average person.

In this chapter we will begin by briefly reviewing the essentials of diet and nutrition that will broadly frame more detailed discussions of peripheral neuropathy. We will then show you how to find studies dedicated specifically to nutrition and peripheral neuropathy.

Food and Nutrition: General Principles

What Are Essential Foods?

Food is generally viewed by official sources as consisting of six basic elements: (1) fluids, (2) carbohydrates, (3) protein, (4) fats, (5) vitamins, and (6) minerals. Consuming a combination of these elements is considered to be a healthy diet:

- **Fluids** are essential to human life as 80-percent of the body is composed of water. Water is lost via urination, sweating, diarrhea, vomiting, diuretics (drugs that increase urination), caffeine, and physical exertion.
- **Carbohydrates** are the main source for human energy (thermoregulation) and the bulk of typical diets. They are mostly classified as being either simple or complex. Simple carbohydrates include sugars which are often consumed in the form of cookies, candies, or cakes. Complex carbohydrates consist of starches and dietary fibers. Starches are consumed in the form of pastas, breads, potatoes, rice, and other foods. Soluble fibers can be eaten in the form of certain vegetables, fruits, oats, and legumes. Insoluble fibers include brown rice, whole grains, certain fruits, wheat bran and legumes.
- **Proteins** are eaten to build and repair human tissues. Some foods that are high in protein are also high in fat and calories. Food sources for protein include nuts, meat, fish, cheese, and other dairy products.
- **Fats** are consumed for both energy and the absorption of certain vitamins. There are many types of fats, with many general publications recommending the intake of unsaturated fats or those low in cholesterol.

Vitamins and minerals are fundamental to human health, growth, and, in some cases, disease prevention. Most are consumed in your diet (exceptions being vitamins K and D which are produced by intestinal bacteria and sunlight on the skin, respectively). Each vitamin and mineral plays a different role in health. The following outlines essential vitamins:

- **Vitamin A** is important to the health of your eyes, hair, bones, and skin; sources of vitamin A include foods such as eggs, carrots, and cantaloupe.
- **Vitamin B^1**, also known as thiamine, is important for your nervous system and energy production; food sources for thiamine include meat, peas, fortified cereals, bread, and whole grains.
- **Vitamin B^2**, also known as riboflavin, is important for your nervous system and muscles, but is also involved in the release of proteins from

nutrients; food sources for riboflavin include dairy products, leafy vegetables, meat, and eggs.

- **Vitamin B^3**, also known as niacin, is important for healthy skin and helps the body use energy; food sources for niacin include peas, peanuts, fish, and whole grains
- **Vitamin B^6**, also known as pyridoxine, is important for the regulation of cells in the nervous system and is vital for blood formation; food sources for pyridoxine include bananas, whole grains, meat, and fish.
- **Vitamin B^{12}** is vital for a healthy nervous system and for the growth of red blood cells in bone marrow; food sources for vitamin B^{12} include yeast, milk, fish, eggs, and meat.
- **Vitamin C** allows the body's immune system to fight various diseases, strengthens body tissue, and improves the body's use of iron; food sources for vitamin C include a wide variety of fruits and vegetables.
- **Vitamin D** helps the body absorb calcium which strengthens bones and teeth; food sources for vitamin D include oily fish and dairy products.
- **Vitamin E** can help protect certain organs and tissues from various degenerative diseases; food sources for vitamin E include margarine, vegetables, eggs, and fish.
- **Vitamin K** is essential for bone formation and blood clotting; common food sources for vitamin K include leafy green vegetables.
- **Folic Acid** maintains healthy cells and blood and, when taken by a pregnant woman, can prevent her fetus from developing neural tube defects; food sources for folic acid include nuts, fortified breads, leafy green vegetables, and whole grains.

It should be noted that one can overdose on certain vitamins which become toxic if consumed in excess (e.g. vitamin A, D, E and K).
Like vitamins, minerals are chemicals that are required by the body to remain in good health. Because the human body does not manufacture these chemicals internally, we obtain them from food and other dietary sources. The more important minerals include:

- **Calcium** is needed for healthy bones, teeth, and muscles, but also helps the nervous system function; food sources for calcium include dry beans, peas, eggs, and dairy products.
- **Chromium** is helpful in regulating sugar levels in blood; food sources for chromium include egg yolks, raw sugar, cheese, nuts, beets, whole grains, and meat.

- **Fluoride** is used by the body to help prevent tooth decay and to reinforce bone strength; sources of fluoride include drinking water and certain brands of toothpaste.
- **Iodine** helps regulate the body's use of energy by synthesizing into the hormone thyroxine; food sources include leafy green vegetables, nuts, egg yolks, and red meat.
- **Iron** helps maintain muscles and the formation of red blood cells and certain proteins; food sources for iron include meat, dairy products, eggs, and leafy green vegetables.
- **Magnesium** is important for the production of DNA, as well as for healthy teeth, bones, muscles, and nerves; food sources for magnesium include dried fruit, dark green vegetables, nuts, and seafood.
- **Phosphorous** is used by the body to work with calcium to form bones and teeth; food sources for phosphorous include eggs, meat, cereals, and dairy products.
- **Selenium** primarily helps maintain normal heart and liver functions; food sources for selenium include wholegrain cereals, fish, meat, and dairy products.
- **Zinc** helps wounds heal, the formation of sperm, and encourage rapid growth and energy; food sources include dried beans, shellfish, eggs, and nuts.

The United States government periodically publishes recommended diets and consumption levels of the various elements of food. Again, your doctor may encourage deviations from the average official recommendation based on your specific condition. To learn more about basic dietary guidelines, visit the Web site: **http://www.health.gov/dietaryguidelines/**. Based on these guidelines, many foods are required to list the nutrition levels on the food's packaging. Labeling Requirements are listed at the following site maintained by the Food and Drug Administration: **http://www.cfsan.fda.gov/~dms/lab-cons.html**. When interpreting these requirements, the government recommends that consumers become familiar with the following abbreviations before reading FDA literature:[47]

- **DVs (Daily Values):** A new dietary reference term that will appear on the food label. It is made up of two sets of references, DRVs and RDIs.
- **DRVs (Daily Reference Values):** A set of dietary references that applies to fat, saturated fat, cholesterol, carbohydrate, protein, fiber, sodium, and potassium.

[47] Adapted from the FDA: **http://www.fda.gov/fdac/special/foodlabel/dvs.html**.

- **RDIs (Reference Daily Intakes):** A set of dietary references based on the Recommended Dietary Allowances for essential vitamins and minerals and, in selected groups, protein. The name "RDI" replaces the term "U.S. RDA."
- **RDAs (Recommended Dietary Allowances):** A set of estimated nutrient allowances established by the National Academy of Sciences. It is updated periodically to reflect current scientific knowledge.

What Are Dietary Supplements?[48]

Dietary supplements are widely available through many commercial sources, including health food stores, grocery stores, pharmacies, and by mail. Dietary supplements are provided in many forms including tablets, capsules, powders, gel-tabs, extracts, and liquids. Historically in the United States, the most prevalent type of dietary supplement was a multivitamin/mineral tablet or capsule that was available in pharmacies, either by prescription or "over the counter." Supplements containing strictly herbal preparations were less widely available. Currently in the United States, a wide array of supplement products are available, including vitamin, mineral, other nutrients, and botanical supplements as well as ingredients and extracts of animal and plant origin.

The Office of Dietary Supplements (ODS) of the National Institutes of Health is the official agency of the United States which has the expressed goal of acquiring "new knowledge to help prevent, detect, diagnose, and treat disease and disability, from the rarest genetic disorder to the common cold."[49] According to the ODS, dietary supplements can have an important impact on the prevention and management of disease and on the maintenance of health.[50] The ODS notes that considerable research on the effects of dietary supplements has been conducted in Asia and Europe where

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[48] This discussion has been adapted from the NIH: http://ods.od.nih.gov/whatare/whatare.html.

[49] Contact: The Office of 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**.

[50] Adapted from **http://ods.od.nih.gov/about/about.html**. The Dietary Supplement Health and Education Act defines dietary supplements as "a product (other than tobacco) intended to supplement the diet that bears or contains one or more of the following dietary ingredients: a vitamin, mineral, amino acid, herb or other botanical; or a dietary substance for use to supplement the diet by increasing the total dietary intake; or a concentrate, metabolite, constituent, extract, or combination of any ingredient described above; and intended for ingestion in the form of a capsule, powder, softgel, or gelcap, and not represented as a conventional food or as a sole item of a meal or the diet."

the use of plant products, in particular, has a long tradition. However, the overwhelming majority of supplements have not been studied scientifically. To explore the role of dietary supplements in the improvement of health care, the ODS plans, organizes, and supports conferences, workshops, and symposia on scientific topics related to dietary supplements. The ODS often works in conjunction with other NIH Institutes and Centers, other government agencies, professional organizations, and public advocacy groups.

To learn more about official information on dietary supplements, visit the ODS site at **http://ods.od.nih.gov/whatare/whatare.html**. Or contact:

The Office of 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

Finding Studies on Peripheral Neuropathy

The NIH maintains an office dedicated to patient nutrition and diet. 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). 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.[51] IBIDS is available to the public free of charge through the ODS Internet page: **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. We recommend that you start with the Consumer Database. While you may not find references for the topics that are of most interest to you, check back

[51] 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.

periodically as this database is frequently updated. More studies can be found by searching the Full IBIDS Database. Healthcare professionals and researchers generally use the third option, which lists peer-reviewed citations. In all cases, we suggest that you take advantage of the "Advanced Search" option that allows you to retrieve up to 100 fully explained references in a comprehensive format. Type "peripheral neuropathy" (or synonyms) into the search box. To narrow the search, you can also select the "Title" field. The following is a typical result when searching for recently indexed consumer information on peripheral neuropathy:

- **Food shortages and an epidemic of optic and peripheral neuropathy in Cuba.**
  Author(s): School of Nutrition and a Research Scientist, USDA Human Nutrition Research Center on Aging, Tufts University, Boston, MA 02111.
  Source: Tucker, K Hedges, T R Nutr-Revolume 1993 December; 51(12): 349-57 0029-6643
- **Impact of peripheral neuropathy on bone density in patients with type 1 diabetes.**
  Author(s): Medical Department C, Roskilde County Hospital Koge, Denmark. mariannerix@hotmail.com
  Source: Rix, M Andreassen, H Eskildsen, P Diabetes-Care. 1999 May; 22(5): 827-31 0149-5992
- **Lack of effect of clonidine and pentoxifylline in short-term therapy of diabetic peripheral neuropathy.**
  Author(s): Department of Medicine, Yale University School of Medicine, New Haven, Connecticut.
  Source: Cohen, K L Lucibello, F E Chomiak, M Diabetes-Care. 1990 October; 13(10): 1074-7 0149-5992
- **Slow gastric emptying in type I diabetes: relation to autonomic and peripheral neuropathy, blood glucose, and glycemic control.**
  Author(s): Department of Surgery, University of Vienna, Austria.
  Source: Merio, R Festa, A Bergmann, H Eder, T Eibl, N Stacher Janotta, G Weber, U Budka, C Heckenberg, A Bauer, P Francesconi, M Schernthaner, G Stacher, G Diabetes-Care. 1997 March; 20(3): 419-23 0149-5992

The following information is typical of that found when using the "Full IBIDS Database" when searching using "peripheral neuropathy" (or a synonym):

- **A highly successful and novel model for treatment of chronic painful diabetic peripheral neuropathy.**
  Author(s): Diabetes Research and Treatment Center, Southern Illinois University, Springfield 61702.
  Source: Pfeifer, M A Ross, D R Schrage, J P Gelber, D A Schumer, M P Crain, G M Markwell, S J Jung, S Diabetes-Care. 1993 August; 16(8): 1103-15 0149-5992
- **A novel antioxidant alleviates heat hyperalgesia in rats with an experimental painful peripheral neuropathy.**
  Author(s): Department of Anatomy, Hebrew University-Hadassah Dental and Medical School, Jerusalem, Israel.
  Source: Tal, M Neuroreport. 1996 May 31; 7(8): 1382-4 0959-4965
- **Absence of major peripheral neuropathy in a phase II trial of ifosfamide with vinorelbine in patients with ovarian cancer previously treated with platinum and paclitaxel.**
  Author(s): Department of Medicine, University of Chicago, Illinois, USA. gfleming@medicine.bsd.uchicago.edu
  Source: Fleming, G F Waggoner, S E Rotmensch, J Langhauser, C Am-J-Clin-Oncol. 2001 February; 24(1): 52-7 0277-3732
- **Acute peripheral neuropathy in adults. Guillain-Barre syndrome and related disorders.**
  Author(s): Department of Neurology, Indiana University School of Medicine, Indianapolis, Indiana 46202, USA.
  Source: Pascuzzi, R M Fleck, J D Neurol-Clin. 1997 August; 15(3): 529-47 0733-8619
- **Improvement of peripheral neuropathy by testosterone in a patient with 48,XXYY syndrome.**
  Author(s): Department of Rehabilitation Medicine, Tokai University School of Medicine, Kanagawa, Japan.
  Source: Izumi, S Tsubahara, A Tokai-J-Exp-Clin-Med. 2000 June; 25(2): 39-44 0385-0005
- **Peripheral neuropathy following high-dose etoposide and autologous bone marrow transplantation.**
  Author(s): University of Toronto Autologous Bone Marrow Transplant Program, Toronto Hospital, Canada.
  Source: Imrie, K R Couture, F Turner, C C Sutcliffe, S B Keating, A Bone-Marrow-Transplant. 1994 January; 13(1): 77-9 0268-3369
- **Peripheral neuropathy in allergic granulomatous angiitis.**
  Author(s): Department of Orthopaedic Surgery, Yanagawa Rehabilitation Hospital, Japan.

Source: Okuno, T Sagara, M Inoue, A Ayabe, M Kurume-Med-J. 1997; 44(3): 225-31 0023-5679

- **Peripheral neuropathy: alternative and complementary options.**
  Author(s): huebsch@execpc.com
  Source: Huebscher, R Nurse-Pract-Forum. 2000 June; 11(2): 73-7 1045-5485

- **Treatment of symptomatic diabetic peripheral neuropathy with the anti-oxidant alpha-lipoic acid. A 3-week multicentre randomized controlled trial (ALADIN Study).**
  Author(s): Diabetes-Forschungsinstitut an der Heinrich-Heine-Universitat, Dusseldorf, Germany.
  Source: Ziegler, D Hanefeld, M Ruhnau, K J Meissner, H P Lobisch, M Schutte, K Gries, F A Diabetologia. 1995 December; 38(12): 1425-33 0012-186X

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.thedacare.org/healthnotes/**
- 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 Peripheral 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:

- **Vitamins**

  Pyridoxine
  Source: Integrative Medicine Communications;
  www.onemedicine.com
  Hyperlink:
  http://www.drkoop.com/interactivemedicine/ConsSupplements/VitaminB6Pyridoxinecs.html

  Vitamin B6
  Source: Prima Communications, Inc.
  Hyperlink: http://www.personalhealthzone.com/pg000225.html

Vitamin B6 (Pyridoxine)
Source: Integrative Medicine Communications; www.onemedicine.com
Hyperlink: http://www.drkoop.com/interactivemedicine/ConsSupplements/VitaminB6Pyridoxinecs.html

- **Minerals**

Acetyl-L-Carnitine
Source: Healthnotes, Inc.; www.healthnotes.com
Hyperlink: http://www.thedacare.org/healthnotes/Supp/Acetyl_L_Carnitine.htm

Biotin
Source: Healthnotes, Inc.; www.healthnotes.com
Hyperlink: http://www.thedacare.org/healthnotes/Supp/Biotin.htm

Biotin
Source: Integrative Medicine Communications; www.onemedicine.com
Hyperlink: http://www.drkoop.com/interactivemedicine/ConsSupplements/VitaminHBiotincs.html

Biotin
Source: Prima Communications, Inc.
Hyperlink: http://www.personalhealthzone.com/pg000108.html

Vitamin H (Biotin)
Source: Integrative Medicine Communications; www.onemedicine.com
Hyperlink: http://www.drkoop.com/interactivemedicine/ConsSupplements/VitaminHBiotincs.html

- **Food and Diet**

  Diabetes
  Source: Healthnotes, Inc.; www.healthnotes.com
  Hyperlink:
  http://www.thedacare.org/healthnotes/Concern/Diabetes.htm

Vocabulary Builder

The following vocabulary builder defines words used in the references in this chapter that have not been defined in previous chapters:

Angiitis: Inflammation of a vessel, chiefly of a blood or a lymph vessel; called also vasculitis. [EU]

Antioxidant: One of many widely used synthetic or natural substances added to a product to prevent or delay its deterioration by action of oxygen in the air. Rubber, paints, vegetable oils, and prepared foods commonly contain antioxidants. [EU]

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

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]

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

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]

Iodine: A nonmetallic element of the halogen group that is represented by the atomic symbol I, atomic number 53, and atomic weight of 126.90. It is a nutritionally essential element, especially important in thyroid hormone synthesis. In solution, it has anti-infective properties and is used topically. [NIH]

Niacin: Water-soluble vitamin of the B complex occurring in various animal and plant tissues. Required by the body for the formation of coenzymes NAD and NADP. Has pellagra-curative, vasodilating, and antilipemic properties. [NIH]

Overdose: 1. to administer an excessive dose. 2. an excessive dose. [EU]

Pentoxifylline: A methylxanthine derivative that inhibits phosphodiesterase

and affects blood rheology. It improves blood flow by increasing erythrocyte and leukocyte flexibility. It also inhibits platelet aggregation. Pentoxifylline modulates immunologic activity by stimulating cytokine production. [NIH]

Riboflavin: Nutritional factor found in milk, eggs, malted barley, liver, kidney, heart, and leafy vegetables. The richest natural source is yeast. It occurs in the free form only in the retina of the eye, in whey, and in urine; its principal forms in tissues and cells are as FMN and FAD. [NIH]

Thermoregulation: Heat regulation. [EU]

Thyroxine: An amino acid of the thyroid gland which exerts a stimulating effect on thyroid metabolism. [NIH]

APPENDIX D. FINDING MEDICAL LIBRARIES

Overview

At a medical library you can find medical texts and reference books, consumer health publications, specialty newspapers and magazines, as well as medical journals. In this Appendix, we show you how to quickly find a medical library in your area.

Preparation

Before going to the library, highlight the references mentioned in this sourcebook that you find interesting. Focus on those items that are not available via the Internet, and ask the reference librarian for help with your search. He or she may know of additional resources that could be helpful to you. Most importantly, 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. NLM's interlibrary loan services are only available to libraries. If you would like to access NLM medical literature, then visit a library in your area that can request the publications for you.[52]

[52] Adapted from the NLM: http://www.nlm.nih.gov/psd/cas/interlibrary.html.

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 Open to the Public

In addition to the NN/LM, the National Library of Medicine (NLM) lists a number of libraries that are generally open to the public and have reference facilities. The following is the NLM's list plus hyperlinks to each library Web site. These Web pages can provide information on hours of operation and other restrictions. The list below is a small sample of 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):[53]

- **Alabama:** Health InfoNet of Jefferson County (Jefferson County Library Cooperative, Lister Hill Library of the Health Sciences), **http://www.uab.edu/infonet/**
- **Alabama:** Richard M. Scrushy Library (American Sports Medicine Institute), **http://www.asmi.org/LIBRARY.HTM**
- **Arizona:** Samaritan Regional Medical Center: The Learning Center (Samaritan Health System, Phoenix, Arizona), **http://www.samaritan.edu/library/bannerlibs.htm**
- **California:** Kris Kelly Health Information Center (St. Joseph Health System), **http://www.humboldt1.com/~kkhic/index.html**
- **California:** Community Health Library of Los Gatos (Community Health Library of Los Gatos), **http://www.healthlib.org/orgresources.html**
- **California:** Consumer Health Program and Services (CHIPS) (County of Los Angeles Public Library, Los Angeles County Harbor-UCLA Medical Center Library) - Carson, CA, **http://www.colapublib.org/services/chips.html**
- **California:** Gateway Health Library (Sutter Gould Medical Foundation)
- **California:** Health Library (Stanford University Medical Center), **http://www-med.stanford.edu/healthlibrary/**

[53] Abstracted from **http://www.nlm.nih.gov/medlineplus/libraries.html**.

- **California:** Patient Education Resource Center - Health Information and Resources (University of California, San Francisco), **http://sfghdean.ucsf.edu/barnett/PERC/default.asp**
- **California:** Redwood Health Library (Petaluma Health Care District), **http://www.phcd.org/rdwdlib.html**
- **California:** San José PlaneTree Health Library, **http://planetreesanjose.org/**
- **California:** Sutter Resource Library (Sutter Hospitals Foundation), **http://go.sutterhealth.org/comm/resc-library/sac-resources.html**
- **California:** University of California, Davis. Health Sciences Libraries
- **California:** ValleyCare Health Library & Ryan Comer Cancer Resource Center (ValleyCare Health System), **http://www.valleycare.com/library.html**
- **California:** Washington Community Health Resource Library (Washington Community Health Resource Library), **http://www.healthlibrary.org/**
- **Colorado:** William V. Gervasini Memorial Library (Exempla Healthcare), **http://www.exempla.org/conslib.htm**
- **Connecticut:** Hartford Hospital Health Science Libraries (Hartford Hospital), **http://www.harthosp.org/library/**
- **Connecticut:** Healthnet: Connecticut Consumer Health Information Center (University of Connecticut Health Center, Lyman Maynard Stowe Library), **http://library.uchc.edu/departm/hnet/**
- **Connecticut:** Waterbury Hospital Health Center Library (Waterbury Hospital), **http://www.waterburyhospital.com/library/consumer.shtml**
- **Delaware:** Consumer Health Library (Christiana Care Health System, Eugene du Pont Preventive Medicine & Rehabilitation Institute), **http://www.christianacare.org/health_guide/health_guide_pmri_health_info.cfm**
- **Delaware:** Lewis B. Flinn Library (Delaware Academy of Medicine), **http://www.delamed.org/chls.html**
- **Georgia:** Family Resource Library (Medical College of Georgia), **http://cmc.mcg.edu/kids_families/fam_resources/fam_res_lib/frl.htm**
- **Georgia:** Health Resource Center (Medical Center of Central Georgia), **http://www.mccg.org/hrc/hrchome.asp**
- **Hawaii:** Hawaii Medical Library: Consumer Health Information Service (Hawaii Medical Library), **http://hml.org/CHIS/**

- **Idaho:** DeArmond Consumer Health Library (Kootenai Medical Center), **http://www.nicon.org/DeArmond/index.htm**
- **Illinois:** Health Learning Center of Northwestern Memorial Hospital (Northwestern Memorial Hospital, Health Learning Center), **http://www.nmh.org/health_info/hlc.html**
- **Illinois:** Medical Library (OSF Saint Francis Medical Center), **http://www.osfsaintfrancis.org/general/library/**
- **Kentucky:** Medical Library - Services for Patients, Families, Students & the Public (Central Baptist Hospital), **http://www.centralbap.com/education/community/library.htm**
- **Kentucky:** University of Kentucky - Health Information Library (University of Kentucky, Chandler Medical Center, Health Information Library), **http://www.mc.uky.edu/PatientEd/**
- **Louisiana:** Alton Ochsner Medical Foundation Library (Alton Ochsner Medical Foundation), **http://www.ochsner.org/library/**
- **Louisiana:** Louisiana State University Health Sciences Center Medical Library-Shreveport, **http://lib-sh.lsuhsc.edu/**
- **Maine:** Franklin Memorial Hospital Medical Library (Franklin Memorial Hospital), **http://www.fchn.org/fmh/lib.htm**
- **Maine:** Gerrish-True Health Sciences Library (Central Maine Medical Center), **http://www.cmmc.org/library/library.html**
- **Maine:** Hadley Parrot Health Science Library (Eastern Maine Healthcare), **http://www.emh.org/hll/hpl/guide.htm**
- **Maine:** Maine Medical Center Library (Maine Medical Center), **http://www.mmc.org/library/**
- **Maine:** Parkview Hospital, **http://www.parkviewhospital.org/communit.htm#Library**
- **Maine:** Southern Maine Medical Center Health Sciences Library (Southern Maine Medical Center), **http://www.smmc.org/services/service.php3?choice=10**
- **Maine:** Stephens Memorial Hospital Health Information Library (Western Maine Health), **http://www.wmhcc.com/hil_frame.html**
- **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), **http://www.deerlodge.mb.ca/library/libraryservices.shtml**

- **Maryland:** Health Information Center at the Wheaton Regional Library (Montgomery County, Md., 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), **http://www.lowellgeneral.org/library/HomePageLinks/WWW.htm**
- **Massachusetts:** Paul E. Woodard Health Sciences Library (New England Baptist Hospital), **http://www.nebh.org/health_lib.asp**
- **Massachusetts:** St. Luke's Hospital Health Sciences Library (St. Luke's Hospital), **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), **http://healthnet.umassmed.edu/**
- **Michigan:** Botsford General Hospital Library - Consumer Health (Botsford General Hospital, Library & Internet Services), **http://www.botsfordlibrary.org/consumer.htm**
- **Michigan:** Helen DeRoy Medical Library (Providence Hospital and Medical Centers), **http://www.providence-hospital.org/library/**
- **Michigan:** Marquette General Hospital - Consumer Health Library (Marquette General Hospital, Health Information Center), **http://www.mgh.org/center.html**
- **Michigan:** Patient Education Resouce Center - University of Michigan Cancer Center (University of Michigan Comprehensive Cancer Center), **http://www.cancer.med.umich.edu/learn/leares.htm**
- **Michigan:** Sladen Library & Center for Health Information Resources - Consumer Health Information, **http://www.sladen.hfhs.org/library/consumer/index.html**
- **Montana:** Center for Health Information (St. Patrick Hospital and Health Sciences Center), **http://www.saintpatrick.org/chi/librarydetail.php3?ID=41**

- **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), **http://www.lvccld.org/special_collections/medical/index.htm**
- **New Hampshire:** Dartmouth Biomedical Libraries (Dartmouth College Library), **http://www.dartmouth.edu/~biomed/resources.htmld/conshealth.htmld/**
- **New Jersey:** Consumer Health Library (Rahway Hospital), **http://www.rahwayhospital.com/library.htm**
- **New Jersey:** Dr. Walter Phillips Health Sciences Library (Englewood Hospital and Medical Center), **http://www.englewoodhospital.com/links/index.htm**
- **New Jersey:** Meland Foundation (Englewood Hospital and Medical Center), **http://www.geocities.com/ResearchTriangle/9360/**
- **New York:** Choices in Health Information (New York Public Library) - NLM Consumer Pilot Project participant, **http://www.nypl.org/branch/health/links.html**
- **New York:** Health Information Center (Upstate Medical University, State University of New York), **http://www.upstate.edu/library/hic/**
- **New York:** Health Sciences Library (Long Island Jewish Medical Center), **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:** Saint Francis Health System Patient/Family Resource Center (Saint Francis Health System), **http://www.sfh-tulsa.com/patientfamilycenter/default.asp**

- **Oregon:** Planetree Health Resource Center (Mid-Columbia Medical Center), **http://www.mcmc.net/phrc/**
- **Pennsylvania:** Community Health Information Library (Milton S. Hershey Medical Center), **http://www.hmc.psu.edu/commhealth/**
- **Pennsylvania:** Community Health Resource Library (Geisinger Medical Center), **http://www.geisinger.edu/education/commlib.shtml**
- **Pennsylvania:** HealthInfo Library (Moses Taylor Hospital), **http://www.mth.org/healthwellness.html**
- **Pennsylvania:** Hopwood Library (University of Pittsburgh, Health Sciences Library System), **http://www.hsls.pitt.edu/chi/hhrcinfo.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), **http://www.shscares.org/services/lrc/index.asp**
- **Pennsylvania:** Medical Library (UPMC Health System), **http://www.upmc.edu/passavant/library.htm**
- **Quebec, Canada:** Medical Library (Montreal General Hospital), **http://ww2.mcgill.ca/mghlib/**
- **South Dakota:** Rapid City Regional Hospital - Health Information Center (Rapid City Regional Hospital, Health Information Center), **http://www.rcrh.org/education/LibraryResourcesConsumers.htm**
- **Texas:** Houston HealthWays (Houston Academy of Medicine-Texas Medical Center Library), **http://hhw.library.tmc.edu/**
- **Texas:** Matustik Family Resource Center (Cook Children's Health Care System), **http://www.cookchildrens.com/Matustik_Library.html**
- **Washington:** Community Health Library (Kittitas Valley Community Hospital), **http://www.kvch.com/**
- **Washington:** Southwest Washington Medical Center Library (Southwest Washington Medical Center), **http://www.swmedctr.com/Home/**

APPENDIX E. YOUR RIGHTS AND INSURANCE

Overview

Any patient with peripheral neuropathy faces a series of issues related more to the healthcare industry than to the medical condition itself. This appendix covers two important topics in this regard: your rights and responsibilities as a patient, and how to get the most out of your medical insurance plan.

Your Rights as a Patient

The President's Advisory Commission on Consumer Protection and Quality in the Healthcare Industry has created the following summary of your rights as a patient.[54]

Information Disclosure

Consumers have the right to receive accurate, easily understood information. Some consumers require assistance in making informed decisions about health plans, health professionals, and healthcare facilities. Such information includes:

- ***Health plans.*** Covered benefits, cost-sharing, and procedures for resolving complaints, licensure, certification, and accreditation status, comparable measures of quality and consumer satisfaction, provider network composition, the procedures that govern access to specialists and emergency services, and care management information.

[54]Adapted from Consumer Bill of Rights and Responsibilities: **http://www.hcqualitycommission.gov/press/cbor.html#head1**.

- ***Health professionals.*** Education, board certification, and recertification, years of practice, experience performing certain procedures, and comparable measures of quality and consumer satisfaction.
- ***Healthcare facilities.*** Experience in performing certain procedures and services, accreditation status, comparable measures of quality, worker, and consumer satisfaction, and procedures for resolving complaints.
- ***Consumer assistance programs.*** Programs must be carefully structured to promote consumer confidence and to work cooperatively with health plans, providers, payers, and regulators. Desirable characteristics of such programs are sponsorship that ensures accountability to the interests of consumers and stable, adequate funding.

Choice of Providers and Plans

Consumers have the right to a choice of healthcare providers that is sufficient to ensure access to appropriate high-quality healthcare. To ensure such choice, the Commission recommends the following:

- ***Provider network adequacy.*** All health plan networks should provide access to sufficient numbers and types of providers to assure that all covered services will be accessible without unreasonable delay -- including access to emergency services 24 hours a day and 7 days a week. If a health plan has an insufficient number or type of providers to provide a covered benefit with the appropriate degree of specialization, the plan should ensure that the consumer obtains the benefit outside the network at no greater cost than if the benefit were obtained from participating providers.
- ***Women's health services.*** Women should be able to choose a qualified provider offered by a plan -- such as gynecologists, certified nurse midwives, and other qualified healthcare providers -- for the provision of covered care necessary to provide routine and preventative women's healthcare services.
- ***Access to specialists.*** Consumers with complex or serious medical conditions who require frequent specialty care should have direct access to a qualified specialist of their choice within a plan's network of providers. Authorizations, when required, should be for an adequate number of direct access visits under an approved treatment plan.
- ***Transitional care.*** Consumers who are undergoing a course of treatment for a chronic or disabling condition (or who are in the second or third trimester of a pregnancy) at the time they involuntarily change health

plans or at a time when a provider is terminated by a plan for other than cause should be able to continue seeing their current specialty providers for up to 90 days (or through completion of postpartum care) to allow for transition of care.

- ***Choice of health plans.*** Public and private group purchasers should, wherever feasible, offer consumers a choice of high-quality health insurance plans.

Access to Emergency Services

Consumers have the right to access emergency healthcare services when and where the need arises. Health plans should provide payment when a consumer presents to an emergency department with acute symptoms of sufficient severity--including severe pain--such that a "prudent layperson" could reasonably expect the absence of medical attention to result in placing that consumer's health in serious jeopardy, serious impairment to bodily functions, or serious dysfunction of any bodily organ or part.

Participation in Treatment Decisions

Consumers have the right and responsibility to fully participate in all decisions related to their healthcare. Consumers who are unable to fully participate in treatment decisions have the right to be represented by parents, guardians, family members, or other conservators. Physicians and other health professionals should:

- Provide patients with sufficient information and opportunity to decide among treatment options consistent with the informed consent process.
- Discuss all treatment options with a patient in a culturally competent manner, including the option of no treatment at all.
- Ensure that persons with disabilities have effective communications with members of the health system in making such decisions.
- Discuss all current treatments a consumer may be undergoing.
- Discuss all risks, benefits, and consequences to treatment or nontreatment.
- Give patients the opportunity to refuse treatment and to express preferences about future treatment decisions.

- Discuss the use of advance directives -- both living wills and durable powers of attorney for healthcare -- with patients and their designated family members.
- Abide by the decisions made by their patients and/or their designated representatives consistent with the informed consent process.

Health plans, health providers, and healthcare facilities should:

- Disclose to consumers factors -- such as methods of compensation, ownership of or interest in healthcare facilities, or matters of conscience -- that could influence advice or treatment decisions.
- Assure that provider contracts do not contain any so-called "gag clauses" or other contractual mechanisms that restrict healthcare providers' ability to communicate with and advise patients about medically necessary treatment options.
- Be prohibited from penalizing or seeking retribution against healthcare professionals or other health workers for advocating on behalf of their patients.

Respect and Nondiscrimination

Consumers have the right to considerate, respectful care from all members of the healthcare industry at all times and under all circumstances. An environment of mutual respect is essential to maintain a quality healthcare system. To assure that right, the Commission recommends the following:

- Consumers must not be discriminated against in the delivery of healthcare services consistent with the benefits covered in their policy, or as required by law, based on race, ethnicity, national origin, religion, sex, age, mental or physical disability, sexual orientation, genetic information, or source of payment.
- Consumers eligible for coverage under the terms and conditions of a health plan or program, or as required by law, must not be discriminated against in marketing and enrollment practices based on race, ethnicity, national origin, religion, sex, age, mental or physical disability, sexual orientation, genetic information, or source of payment.

Confidentiality of Health Information

Consumers have the right to communicate with healthcare providers in confidence and to have the confidentiality of their individually identifiable

healthcare information protected. Consumers also have the right to review and copy their own medical records and request amendments to their records.

Complaints and Appeals

Consumers have the right to a fair and efficient process for resolving differences with their health plans, healthcare providers, and the institutions that serve them, including a rigorous system of internal review and an independent system of external review. A free copy of the Patient's Bill of Rights is available from the American Hospital Association.[55]

Patient Responsibilities

Treatment is a two-way street between you and your healthcare providers. To underscore the importance of finance in modern healthcare as well as your responsibility for the financial aspects of your care, the President's Advisory Commission on Consumer Protection and Quality in the Healthcare Industry has proposed that patients understand the following "Consumer Responsibilities."[56] In a healthcare system that protects consumers' rights, it is reasonable to expect and encourage consumers to assume certain responsibilities. Greater individual involvement by the consumer in his or her care increases the likelihood of achieving the best outcome and helps support a quality-oriented, cost-conscious environment. Such responsibilities include:

- Take responsibility for maximizing healthy habits such as exercising, not smoking, and eating a healthy diet.
- Work collaboratively with healthcare providers in developing and carrying out agreed-upon treatment plans.
- Disclose relevant information and clearly communicate wants and needs.
- Use your health insurance plan's internal complaint and appeal processes to address your concerns.
- Avoid knowingly spreading disease.

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[55] To order your free copy of the Patient's Bill of Rights, telephone 312-422-3000 or visit the American Hospital Association's Web site: http://www.aha.org. Click on "Resource Center," go to "Search" at bottom of page, and then type in "Patient's Bill of Rights." The Patient's Bill of Rights is also available from Fax on Demand, at 312-422-2020, document number 471124.

[56] Adapted from http://www.hcqualitycommission.gov/press/cbor.html#head1.

- Recognize the reality of risks, the limits of the medical science, and the human fallibility of the healthcare professional.
- Be aware of a healthcare provider's obligation to be reasonably efficient and equitable in providing care to other patients and the community.
- Become knowledgeable about your health plan's coverage and options (when available) including all covered benefits, limitations, and exclusions, rules regarding use of network providers, coverage and referral rules, appropriate processes to secure additional information, and the process to appeal coverage decisions.
- Show respect for other patients and health workers.
- Make a good-faith effort to meet financial obligations.
- Abide by administrative and operational procedures of health plans, healthcare providers, and Government health benefit programs.

Choosing an Insurance Plan

There are a number of official government agencies that help consumers understand their healthcare insurance choices.[57] The U.S. Department of Labor, in particular, recommends ten ways to make your health benefits choices work best for you.[58]

1. Your options are important. There are many different types of health benefit plans. Find out which one your employer offers, then check out the plan, or plans, offered. Your employer's human resource office, the health plan administrator, or your union can provide information to help you match your needs and preferences with the available plans. The more information you have, the better your healthcare decisions will be.

2. Reviewing the benefits available. Do the plans offered cover preventive care, well-baby care, vision or dental care? Are there deductibles? Answers to these questions can help determine the out-of-pocket expenses you may face. Matching your needs and those of your family members will result in the best possible benefits. Cheapest may not always be best. Your goal is high quality health benefits.

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[57] More information about quality across programs is provided at the following AHRQ Web site:
http://www.ahrq.gov/consumer/qntascii/qnthplan.htm.

[58] Adapted from the Department of Labor:
http://www.dol.gov/dol/pwba/public/pubs/health/top10-text.html.

3. Look for quality. The quality of healthcare services varies, but quality can be measured. You should consider the quality of healthcare in deciding among the healthcare plans or options available to you. Not all health plans, doctors, hospitals and other providers give the highest quality care. Fortunately, there is quality information you can use right now to help you compare your healthcare choices. Find out how you can measure quality. Consult the U.S. Department of Health and Human Services publication "Your Guide to Choosing Quality Health Care" on the Internet at **www.ahcpr.gov/consumer**.

4. Your plan's summary plan description (SPD) provides a wealth of information. Your health plan administrator can provide you with a copy of your plan's SPD. It outlines your benefits and your legal rights under the Employee Retirement Income Security Act (ERISA), the federal law that protects your health benefits. It should contain information about the coverage of dependents, what services will require a co-pay, and the circumstances under which your employer can change or terminate a health benefits plan. Save the SPD and all other health plan brochures and documents, along with memos or correspondence from your employer relating to health benefits.

5. Assess your benefit coverage as your family status changes. Marriage, divorce, childbirth or adoption, and the death of a spouse are all life events that may signal a need to change your health benefits. You, your spouse and dependent children may be eligible for a special enrollment period under provisions of the Health Insurance Portability and Accountability Act (HIPAA). Even without life-changing events, the information provided by your employer should tell you how you can change benefits or switch plans, if more than one plan is offered. If your spouse's employer also offers a health benefits package, consider coordinating both plans for maximum coverage.

6. Changing jobs and other life events can affect your health benefits. Under the Consolidated Omnibus Budget Reconciliation Act (COBRA), you, your covered spouse, and your dependent children may be eligible to purchase extended health coverage under your employer's plan if you lose your job, change employers, get divorced, or upon occurrence of certain other events. Coverage can range from 18 to 36 months depending on your situation. COBRA applies to most employers with 20 or more workers and requires your plan to notify you of your rights. Most plans require eligible individuals to make their COBRA election within 60 days of the plan's notice. Be sure to follow up with your plan sponsor if you don't receive notice, and make sure you respond within the allotted time.

7. HIPAA can also help if you are changing jobs, particularly if you have a medical condition. HIPAA generally limits pre-existing condition exclusions to a maximum of 12 months (18 months for late enrollees). HIPAA also requires this maximum period to be reduced by the length of time you had prior "creditable coverage." You should receive a certificate documenting your prior creditable coverage from your old plan when coverage ends.

8. Plan for retirement. Before you retire, find out what health benefits, if any, extend to you and your spouse during your retirement years. Consult with your employer's human resources office, your union, the plan administrator, and check your SPD. Make sure there is no conflicting information among these sources about the benefits you will receive or the circumstances under which they can change or be eliminated. With this information in hand, you can make other important choices, like finding out if you are eligible for Medicare and Medigap insurance coverage.

9. Know how to file an appeal if your health benefits claim is denied. Understand how your plan handles grievances and where to make appeals of the plan's decisions. Keep records and copies of correspondence. Check your health benefits package and your SPD to determine who is responsible for handling problems with benefit claims. Contact PWBA for customer service assistance if you are unable to obtain a response to your complaint.

10. You can take steps to improve the quality of the healthcare and the health benefits you receive. Look for and use things like Quality Reports and Accreditation Reports whenever you can. Quality reports may contain consumer ratings -- how satisfied consumers are with the doctors in their plan, for instance-- and clinical performance measures -- how well a healthcare organization prevents and treats illness. Accreditation reports provide information on how accredited organizations meet national standards, and often include clinical performance measures. Look for these quality measures whenever possible. Consult "Your Guide to Choosing Quality Health Care" on the Internet at **www.ahcpr.gov/consumer**.

Medicare and Medicaid

Illness strikes both rich and poor families. For low-income families, Medicaid is available to defer the costs of treatment. The Health Care Financing Administration (HCFA) administers Medicare, the nation's largest health insurance program, which covers 39 million Americans. In the following pages, you will learn the basics about Medicare insurance as well as useful

contact information on how to find more in-depth information about Medicaid.[59]

Who is Eligible for Medicare?

Generally, you are eligible for Medicare if you or your spouse worked for at least 10 years in Medicare-covered employment and you are 65 years old and a citizen or permanent resident of the United States. You might also qualify for coverage if you are under age 65 but have a disability or end-stage renal disease (permanent kidney failure requiring dialysis or transplant). Here are some simple guidelines:

You can get Part A at age 65 without having to pay premiums if:

- You are already receiving retirement benefits from Social Security or the Railroad Retirement Board.
- You are eligible to receive Social Security or Railroad benefits but have not yet filed for them.
- You or your spouse had Medicare-covered government employment.

If you are under 65, you can get Part A without having to pay premiums if:

- You have received Social Security or Railroad Retirement Board disability benefit for 24 months.
- You are a kidney dialysis or kidney transplant patient.

Medicare has two parts:

- Part A (Hospital Insurance). Most people do not have to pay for Part A.
- Part B (Medical Insurance). Most people pay monthly for Part B.

Part A (Hospital Insurance)

Helps Pay For: Inpatient hospital care, care in critical access hospitals (small facilities that give limited outpatient and inpatient services to people in rural areas) and skilled nursing facilities, hospice care, and some home healthcare.

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[59] This section has been adapted from the Official U.S. Site for Medicare Information: **http://www.medicare.gov/Basics/Overview.asp**.

Cost: Most people get Part A automatically when they turn age 65. You do not have to pay a monthly payment called a premium for Part A because you or a spouse paid Medicare taxes while you were working.

If you (or your spouse) did not pay Medicare taxes while you were working and you are age 65 or older, you still may be able to buy Part A. If you are not sure you have Part A, look on your red, white, and blue Medicare card. It will show "Hospital Part A" on the lower left corner of the card. You can also call the Social Security Administration toll free at 1-800-772-1213 or call your local Social Security office for more information about buying Part A. If you get benefits from the Railroad Retirement Board, call your local RRB office or 1-800-808-0772. For more information, call your Fiscal Intermediary about Part A bills and services. The phone number for the Fiscal Intermediary office in your area can be obtained from the following Web site: **http://www.medicare.gov/Contacts/home.asp**.

Part B (Medical Insurance)

Helps Pay For: Doctors, services, outpatient hospital care, and some other medical services that Part A does not cover, such as the services of physical and occupational therapists, and some home healthcare. Part B helps pay for covered services and supplies when they are medically necessary.

Cost: As of 2001, you pay the Medicare Part B premium of $50.00 per month. In some cases this amount may be higher if you did not choose Part B when you first became eligible at age 65. The cost of Part B may go up 10% for each 12-month period that you were eligible for Part B but declined coverage, except in special cases. You will have to pay the extra 10% cost for the rest of your life.

Enrolling in Part B is your choice. You can sign up for Part B anytime during a 7-month period that begins 3 months before you turn 65. Visit your local Social Security office, or call the Social Security Administration at 1-800-772-1213 to sign up. If you choose to enroll in Part B, the premium is usually taken out of your monthly Social Security, Railroad Retirement, or Civil Service Retirement payment. If you do not receive any of the above payments, Medicare sends you a bill for your part B premium every 3 months. You should receive your Medicare premium bill in the mail by the 10th of the month. If you do not, call the Social Security Administration at 1-800-772-1213, or your local Social Security office. If you get benefits from the Railroad Retirement Board, call your local RRB office or 1-800-808-0772. For more information, call your Medicare carrier about bills and services. The

phone number for the Medicare carrier in your area can be found at the following Web site: **http://www.medicare.gov/Contacts/home.asp**. You may have choices in how you get your healthcare including the Original Medicare Plan, Medicare Managed Care Plans (like HMOs), and Medicare Private Fee-for-Service Plans.

Medicaid

Medicaid is a joint federal and state program that helps pay medical costs for some people with low incomes and limited resources. Medicaid programs vary from state to state. People on Medicaid may also get coverage for nursing home care and outpatient prescription drugs which are not covered by Medicare. You can find more information about Medicaid on the HCFA.gov Web site at **http://www.hcfa.gov/medicaid/medicaid.htm**.

States also have programs that pay some or all of Medicare's premiums and may also pay Medicare deductibles and coinsurance for certain people who have Medicare and a low income. To qualify, you must have:

- Part A (Hospital Insurance),
- Assets, such as bank accounts, stocks, and bonds that are not more than $4,000 for a single person, or $6,000 for a couple, and
- A monthly income that is below certain limits.

For more information on these programs, look at the Medicare Savings Programs brochure, **http://www.medicare.gov/Library/PDFNavigation/PDFInterim.asp?Language=English&Type=Pub&PubID=10126**. There are also Prescription Drug Assistance Programs available. Find information on these programs which offer discounts or free medications to individuals in need at **http://www.medicare.gov/Prescription/Home.asp**.

NORD's Medication Assistance Programs

Finally, the National Organization for Rare Disorders, Inc. (NORD) administers medication programs sponsored by humanitarian-minded pharmaceutical and biotechnology companies to help uninsured or under-insured individuals secure life-saving or life-sustaining drugs.[60] NORD

[60] Adapted from NORD: **http://www.rarediseases.org/cgi-bin/nord/progserv#patient?id=rPIzL9oD&mv_pc=30**.

programs ensure that certain vital drugs are available "to those individuals whose income is too high to qualify for Medicaid but too low to pay for their prescribed medications." The program has standards for fairness, equity, and unbiased eligibility. It currently covers some 14 programs for nine pharmaceutical companies. NORD also offers early access programs for investigational new drugs (IND) under the approved "Treatment INDs" programs of the Food and Drug Administration (FDA). In these programs, a limited number of individuals can receive investigational drugs that have yet to be approved by the FDA. These programs are generally designed for rare conditions or disorders. For more information, visit **www.rarediseases.org**.

Additional Resources

In addition to the references already listed in this chapter, you may need more information on health insurance, hospitals, or the healthcare system in general. The NIH has set up an excellent guidance Web site that addresses these and other issues. Topics include:[61]

- Health Insurance:
  http://www.nlm.nih.gov/medlineplus/healthinsurance.html
- Health Statistics:
  http://www.nlm.nih.gov/medlineplus/healthstatistics.html
- HMO and Managed Care:
  http://www.nlm.nih.gov/medlineplus/managedcare.html
- Hospice Care: **http://www.nlm.nih.gov/medlineplus/hospicecare.html**
- Medicaid: **http://www.nlm.nih.gov/medlineplus/medicaid.html**
- Medicare: **http://www.nlm.nih.gov/medlineplus/medicare.html**
- Nursing Homes and Long-term Care:
  http://www.nlm.nih.gov/medlineplus/nursinghomes.html
- Patient's Rights, Confidentiality, Informed Consent, Ombudsman Programs, Privacy and Patient Issues:
  http://www.nlm.nih.gov/medlineplus/patientissues.html
- Veteran's Health, Persian Gulf War, Gulf War Syndrome, Agent Orange:
  http://www.nlm.nih.gov/medlineplus/veteranshealth.html

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[61] You can access this information at:
http://www.nlm.nih.gov/medlineplus/healthsystem.html.

Vocabulary Builder

Incontinence: Inability to control excretory functions, as defecation (faecal i.) or urination (urinary i.). [EU]

ONLINE GLOSSARIES

The Internet provides access to a number of free-to-use medical dictionaries and glossaries. The National Library of Medicine has compiled the following list of online dictionaries:

- ADAM Medical Encyclopedia (A.D.A.M., Inc.), comprehensive medical reference: **http://www.nlm.nih.gov/medlineplus/encyclopedia.html**
- MedicineNet.com Medical Dictionary (MedicineNet, Inc.): **http://www.medterms.com/Script/Main/hp.asp**
- Merriam-Webster Medical Dictionary (Inteli-Health, Inc.): **http://www.intelihealth.com/IH/**
- Multilingual Glossary of Technical and Popular Medical Terms in Eight European Languages (European Commission) - Danish, Dutch, English, French, German, Italian, Portuguese, and Spanish: **http://allserv.rug.ac.be/~rvdstich/eugloss/welcome.html**
- On-line Medical Dictionary (CancerWEB): **http://www.graylab.ac.uk/omd/**
- Technology Glossary (National Library of Medicine) - Health Care Technology: **http://www.nlm.nih.gov/nichsr/ta101/ta10108.htm**
- Terms and Definitions (Office of Rare Diseases): **http://rarediseases.info.nih.gov/ord/glossary_a-e.html**

Beyond these, MEDLINEplus contains a very user-friendly encyclopedia covering every aspect of medicine (licensed from A.D.A.M., Inc.). The ADAM Medical Encyclopedia Web site address is **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)**. Topics of interest can be researched by using keywords before continuing elsewhere, as these basic definitions and concepts will be useful in more advanced areas of research. You may choose to print various pages specifically relating to peripheral neuropathy and keep them on file. The NIH, in particular, suggests that patients with peripheral neuropathy visit the following Web sites in the ADAM Medical Encyclopedia:

- **Basic Guidelines for Peripheral Neuropathy**

  Mononeuritis multiplex
  Web site:
  http://www.nlm.nih.gov/medlineplus/ency/article/000782.htm

  Peripheral neuropathy
  Web site:
  http://www.nlm.nih.gov/medlineplus/ency/article/000593.htm

- **Signs & Symptoms for Peripheral Neuropathy**

  Abdominal bloating
  Web site:
  http://www.nlm.nih.gov/medlineplus/ency/article/003123.htm

  Abnormal sensations
  Web site:
  http://www.nlm.nih.gov/medlineplus/ency/article/003206.htm

  Anhidrosis
  Web site:
  http://www.nlm.nih.gov/medlineplus/ency/article/003219.htm

  Bloating
  Web site:
  http://www.nlm.nih.gov/medlineplus/ency/article/003123.htm

  Blurred vision
  Web site:
  http://www.nlm.nih.gov/medlineplus/ency/article/003029.htm

  Constipation
  Web site:
  http://www.nlm.nih.gov/medlineplus/ency/article/003125.htm

  Decreased sensation
  Web site:
  http://www.nlm.nih.gov/medlineplus/ency/article/003206.htm

Diarrhea
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003126.htm

Difficulty beginning to urinate
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003143.htm

Difficulty breathing
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003075.htm

Difficulty swallowing
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003115.htm

Dizziness
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003093.htm

Double vision
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003029.htm

Early satiety
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003127.htm

Fainting
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003092.htm

Foot pain
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003183.htm

Heat intolerance
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003094.htm

Hypotension
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003083.htm

Impotence
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003164.htm

Incontinence
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003142.htm

Lack of muscle control
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003198.htm

Lack of sensation
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003206.htm

Leukemia
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/001299.htm

Loss of movement
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003190.htm

Loss of sensation
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003206.htm

Loss of tissue mass
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003188.htm

Male impotence
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003164.htm

Movement difficulties
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003198.htm

Movement difficulties:
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003198.htm

Muscle
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003193.htm

Muscle atrophy
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003188.htm

Muscle wasting
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003188.htm

Muscle weakness
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003174.htm

Nausea
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003117.htm

Numbness
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003206.htm

Paralysis
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003190.htm

Paresthesia
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003206.htm

Skin ulcer
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003220.htm

Sweating
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003218.htm

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

Tingling
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003206.htm

Urinary hesitancy
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003143.htm

Vomiting
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003117.htm

Weakness
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003174.htm

Weight loss
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003107.htm

- **Diagnostics and Tests for Peripheral Neuropathy**

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

Blood pressure
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003398.htm

Blood sugar levels
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003482.htm

Blood-sugar levels
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003482.htm

Casts
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003586.htm

Cysts
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003240.htm

EMG
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003929.htm

Nerve biopsy
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003928.htm

Nerve conduction tests
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003927.htm

Nerve conduction velocity
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003927.htm

Ulcer
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/003225.htm

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

- **Background Topics for Peripheral Neuropathy**

Analgesics
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002123.htm

Incidence
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002387.htm

Mercury
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002476.htm

Myelin
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002261.htm

Pain medications
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002123.htm

Peripheral
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002273.htm

Safety
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/001931.htm

Splints
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/000040.htm

Systemic
Web site:
http://www.nlm.nih.gov/medlineplus/ency/article/002294.htm

Online Dictionary Directories

The following are additional online directories compiled by the National Library of Medicine, including a number of specialized medical dictionaries and glossaries:

- Medical Dictionaries: Medical & Biological (World Health Organization): **http://www.who.int/hlt/virtuallibrary/English/diction.htm#Medical**
- MEL-Michigan Electronic Library List of Online Health and Medical Dictionaries (Michigan Electronic Library): **http://mel.lib.mi.us/health/health-dictionaries.html**
- Patient Education: Glossaries (DMOZ Open Directory Project): **http://dmoz.org/Health/Education/Patient_Education/Glossaries/**
- Web of Online Dictionaries (Bucknell University): **http://www.yourdictionary.com/diction5.html#medicine**

PERIPHERAL NEUROPATHY GLOSSARY

The following is a complete glossary of terms used in this sourcebook. The definitions are derived from official public sources including the National Institutes of Health [NIH] and the European Union [EU]. After this glossary, we list a number of additional hardbound and electronic glossaries and dictionaries that you may wish to consult.

Acyclovir: Functional analog of the nucleoside guanosine. It acts as an antimetabolite, especially in viruses. It is used as an antiviral agent, especially in herpes infections. [NIH]

Adenoma: A benign epithelial tumour in which the cells form recognizable glandular structures or in which the cells are clearly derived from glandular epithelium. [EU]

Alkaloid: One of a large group of nitrogenous basis substances found in plants. They are usually very bitter and many are pharmacologically active. Examples are atropine, caffeine, coniine, morphine, nicotine, quinine, strychnine. The term is also applied to synthetic substances (artificial a's) which have structures similar to plant alkaloids, such as procaine. [EU]

Altretamine: An alkylating agent proposed as an antineoplastic. It also acts as a chemosterilant for male houseflies and other insects. [NIH]

Amitriptyline: Tricyclic antidepressant with anticholinergic and sedative properties. It appears to prevent the re-uptake of norepinephrine and serotonin at nerve terminals, thus potentiating the action of these neurotransmitters. Amitriptyline also appears to antaganize cholinergic and alpha-1 adrenergic responses to bioactive amines. [NIH]

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

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

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

Anesthesia: A state characterized by loss of feeling or sensation. This depression of nerve function is usually the result of pharmacologic action and is induced to allow performance of surgery or other painful procedures. [NIH]

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]

Angiitis: Inflammation of a vessel, chiefly of a blood or a lymph vessel; called also vasculitis. [EU]

Angiography: Radiography of blood vessels after injection of a contrast medium. [NIH]

Angioplasty: Endovascular reconstruction of an artery, which may include the removal of atheromatous plaque and/or the endothelial lining as well as simple dilatation. These are procedures performed by catheterization. When reconstruction of an artery is performed surgically, it is called endarterectomy. [NIH]

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

Antiarrhythmic: An agent that prevents or alleviates cardiac arrhythmia. [EU]

Antibiotic: A chemical substance produced by a microorganism which has the capacity, in dilute solutions, to inhibit the growth of or to kill other microorganisms. Antibiotics that are sufficiently nontoxic to the host are used as chemotherapeutic agents in the treatment of infectious diseases of man, animals and plants. [EU]

Antibody: An immunoglobulin molecule that has a specific amino acid sequence by virtue of which it interacts only with the antigen that induced its synthesis in cells of the lymphoid series (especially plasma cells), or with antigen closely related to it. Antibodies are classified according to their ode of action as agglutinins, bacteriolysins, haemolysins, opsonins, precipitins, etc. [EU]

Anticonvulsant: An agent that prevents or relieves convulsions. [EU]

Antidepressant: An agent that stimulates the mood of a depressed patient, including tricyclic antidepressants and monoamine oxidase inhibitors. [EU]

Antimicrobial: Killing microorganisms, or suppressing their multiplication or growth. [EU]

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

Antioxidant: One of many widely used synthetic or natural substances added to a product to prevent or delay its deterioration by action of oxygen in the air. Rubber, paints, vegetable oils, and prepared foods commonly contain antioxidants. [EU]

Anxiety: The unpleasant emotional state consisting of psychophysiological responses to anticipation of unreal or imagined danger, ostensibly resulting from unrecognized intrapsychic conflict. Physiological concomitants include increased heart rate, altered respiration rate, sweating, trembling, weakness, and fatigue; psychological concomitants include feelings of impending danger, powerlessness, apprehension, and tension. [EU]

Aromatic: Having a spicy odour. [EU]

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

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

Arthropathy: Any joint disease. [EU]

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

Ataxia: Failure of muscular coordination; irregularity of muscular action. [EU]

Atony: Lack of normal tone or strength. [EU]

Atrial: Pertaining to an atrium. [EU]

Atrophy: A wasting away; a diminution in the size of a cell, tissue, organ, or part. [EU]

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

Axons: Nerve fibers that are capable of rapidly conducting impulses away from the neuron cell body. [NIH]

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

Benztropine: A centrally active muscarinic antagonist that has been used in the symptomatic treatment of parkinson disease. Benztropine also inhibits the uptake of dopamine. [NIH]

Bethanechol: A slowly hydrolyzed muscarinic agonist with no nicotinic effects. Bethanechol is generally used to increase smooth muscle tone, as in the GI tract following abdominal surgery or in urinary retention in the absence of obstruction. It may cause hypotension, cardiac rate changes, and bronchial spasms. [NIH]

Bilateral: Having two sides, or pertaining to both sides. [EU]

Biopsy: The removal and examination, usually microscopic, of tissue from the living body, performed to establish precise diagnosis. [EU]

Blister: Visible accumulations of fluid within or beneath the epidermis. [NIH]

Bursitis: Inflammation of a bursa, occasionally accompanied by a calcific deposit in the underlying supraspinatus tendon; the most common site is the subdeltoid bursa. [EU]

Cachexia: A profound and marked state of constitutional disorder; general ill health and malnutrition. [EU]

Campylobacter: A genus of bacteria found in the reproductive organs, intestinal tract, and oral cavity of animals and man. Some species are pathogenic. [NIH]

Cannabinoids: Compounds extracted from Cannabis sativa L. and metabolites having the cannabinoid structure. The most active constituents are tetrahydrocannabinol, cannabinol, and cannabidiol. [NIH]

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

Carbamazepine: An anticonvulsant used to control grand mal and psychomotor or focal seizures. Its mode of action is not fully understood, but some of its actions resemble those of phenytoin; although there is little chemical resemblance between the two compounds, their three-dimensional structure is similar. [NIH]

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

Carboplatin: An organoplatinum compound that possesses antineoplastic activity. [NIH]

Carcinoma: A malignant new growth made up of epithelial cells tending to infiltrate the surrounding tissues and give rise to metastases. [EU]

Cardiology: The study of the heart, its physiology, and its functions. [NIH]

Cardiopulmonary: Pertaining to the heart and lungs. [EU]

Cardiovascular: Pertaining to the heart and blood vessels. [EU]

Carnitine: Constituent of striated muscle and liver. It is used therapeutically to stimulate gastric and pancreatic secretions and in the treatment of hyperlipoproteinemias. [NIH]

Cerebellar: Pertaining to the cerebellum. [EU]

Cerebellum: Part of the metencephalon that lies in the posterior cranial fossa behind the brain stem. It is concerned with the coordination of movement. [NIH]

Chelation: Combination with a metal in complexes in which the metal is part of a ring. [EU]

Chemotherapeutics: Noun plural but singular or plural in constructions : chemotherapy. [EU]

Chemotherapy: The treatment of disease by means of chemicals that have a specific toxic effect upon the disease - producing microorganisms or that selectively destroy cancerous tissue. [EU]

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]

Chronic: Persisting over a long period of time. [EU]

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

Claudication: Limping or lameness. [EU]

Clubfoot: A deformed foot in which the foot is plantarflexed, inverted and adducted. [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: The protein substance of the white fibres (collagenous fibres) of skin, tendon, bone, cartilage, and all other connective tissue; composed of molecules of tropocollagen (q.v.), it is converted into gelatin by boiling. collagenous pertaining to collagen; forming or producing collagen. [EU]

Concomitant: Accompanying; accessory; joined with another. [EU]

Conduction: The transfer of sound waves, heat, nervous impulses, or electricity. [EU]

Constipation: Infrequent or difficult evacuation of the faeces. [EU]

Constitutional: 1. affecting the whole constitution of the body; not local. 2. pertaining to the constitution. [EU]

Contracture: A condition of fixed high resistance to passive stretch of a muscle, resulting from fibrosis of the tissues supporting the muscles or the joints, or from disorders of the muscle fibres. [EU]

Contusion: A bruise; an injury of a part without a break in the skin. [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]

Cysteine: A thiol-containing non-essential amino acid that is oxidized to form cystine. [NIH]

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]

Cytoskeleton: The network of filaments, tubules, and interconnecting

filamentous bridges which give shape, structure, and organization to the cytoplasm. [NIH]

Cytotoxic: Pertaining to or exhibiting cytotoxicity. [EU]

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

Dementia: An acquired organic mental disorder with loss of intellectual abilities of sufficient severity to interfere with social or occupational functioning. The dysfunction is multifaceted and involves memory, behavior, personality, judgment, attention, spatial relations, language, abstract thought, and other executive functions. The intellectual decline is usually progressive, and initially spares the level of consciousness. [NIH]

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

Didanosine: A dideoxynucleoside compound in which the 3'-hydroxy group on the sugar moiety has been replaced by a hydrogen. This modification prevents the formation of phosphodiester linkages which are needed for the completion of nucleic acid chains. Didanosine is a potent inhibitor of HIV replication, acting as a chain-terminator of viral DNA by binding to reverse transcriptase; ddI is then metabolized to dideoxyadenosine triphosphate, its putative active metabolite. [NIH]

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

Dizziness: An imprecise term which may refer to a sense of spatial disorientation, motion of the environment, or lightheadedness. [NIH]

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

Dyspnea: Difficult or labored breathing. [NIH]

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

Electroacupuncture: A form of acupuncture using low frequency electrically stimulated needles to produce analgesia and anesthesia and to treat disease. [NIH]

Electromyography: Recording of the changes in electric potential of muscle by means of surface or needle electrodes. [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]

Electroshock: Induction of a stress reaction in experimental subjects by

means of an electrical shock; applies to either convulsive or non-convulsive states. [NIH]

Encephalopathy: Any degenerative disease of the brain. [EU]

Endogenous: Developing or originating within the organisms or arising from causes within the organism. [EU]

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]

Enzyme: A protein molecule that catalyses chemical reactions of other substances without itself being destroyed or altered upon completion of the reactions. Enzymes are classified according to the recommendations of the Nomenclature Committee of the International Union of Biochemistry. Each enzyme is assigned a recommended name and an Enzyme Commission (EC) number. They are divided into six main groups; oxidoreductases, transferases, hydrolases, lyases, isomerases, and ligases. [EU]

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]

Epirubicin: An anthracycline antibiotic which is the 4'-epi-isomer of doxorubicin. The compound exerts its antitumor effects by interference with the synthesis and function of DNA. Clinical studies indicate activity in breast cancer, non-Hodgkin's lymphomas, ovarian cancer, soft-tissue sarcomas, pancreatic cancer, gastric cancer, small-cell lung cancer and acute leukemia. It is equal in activity to doxorubicin but exhibits less acute toxicities and less cardiotoxicity. [NIH]

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

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]

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

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]

Fibrillation: A small, local, involuntary contraction of muscle, invisible under the skin, resulting from spontaneous activation of single muscle cells or muscle fibres. [EU]

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

Fungus: A general term used to denote a group of eukaryotic protists, including mushrooms, yeasts, rusts, moulds, smuts, etc., which are characterized by the absence of chlorophyll and by the presence of a rigid cell wall composed of chitin, mannans, and sometimes cellulose. They are usually of simple morphological form or show some reversible cellular specialization, such as the formation of pseudoparenchymatous tissue in the fruiting body of a mushroom. The dimorphic fungi grow, according to environmental conditions, as moulds or yeasts. [EU]

Gait: Manner or style of walking. [NIH]

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

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

Gangrene: Death of tissue, usually in considerable mass and generally associated with loss of vascular (nutritive) supply and followed by bacterial invasion and putrefaction. [EU]

Gastroenteritis: An acute inflammation of the lining of the stomach and intestines, characterized by anorexia, nausea, diarrhoea, abdominal pain, and weakness, which has various causes, including food poisoning due to infection with such organisms as Escherichia coli, Staphylococcus aureus, and Salmonella species; consumption of irritating food or drink; or psychological factors such as anger, stress, and fear. Called also enterogastritis. [EU]

Gastrointestinal: Pertaining to or communicating with the stomach and intestine, as a gastrointestinal fistula. [EU]

Glucose: D-glucose, a monosaccharide (hexose), C6H12O6, also known as dextrose (q.v.), found in certain foodstuffs, especially fruits, and in the normal blood of all animals. It is the end product of carbohydrate

metabolism and is the chief source of energy for living organisms, its utilization being controlled by insulin. Excess glucose is converted to glycogen and stored in the liver and muscles for use as needed and, beyond that, is converted to fat and stored as adipose tissue. Glucose appears in the urine in diabetes mellitus. [EU]

Glutamine: A non-essential amino acid present abundantly throught the body and is involved in many metabolic processes. It is synthesized from glutamic acid and ammonia. It is the principal carrier of nitrogen in the body and is an important energy source for many cells. [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]

Gout: Hereditary metabolic disorder characterized by recurrent acute arthritis, hyperuricemia and deposition of sodium urate in and around the joints, sometimes with formation of uric acid calculi. [NIH]

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

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

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

Hepatitis: Inflammation of the liver. [EU]

Hyperalgesia: Excessive sensitiveness or sensibility to pain. [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]

Hyperostosis: Hypertrophy of bone; exostosis. [EU]

Hypersensitivity: A state of altered reactivity in which the body reacts with an exaggerated immune response to a foreign substance. Hypersensitivity reactions are classified as immediate or delayed, types I and IV, respectively, in the Gell and Coombs classification (q.v.) of immune responses. [EU]

Hypoplasia: Incomplete development or underdevelopment of an organ or tissue. [EU]

Hypotension: Abnormally low blood pressure; seen in shock but not necessarily indicative of it. [EU]

Hypothyroidism: Deficiency of thyroid activity. In adults, it is most common in women and is characterized by decrease in basal metabolic rate,

tiredness and lethargy, sensitivity to cold, and menstrual disturbances. If untreated, it progresses to full-blown myxoedema. In infants, severe hypothyroidism leads to cretinism. In juveniles, the manifestations are intermediate, with less severe mental and developmental retardation and only mild symptoms of the adult form. When due to pituitary deficiency of thyrotropin secretion it is called secondary hypothyroidism. [EU]

Hypoxanthine: A purine and a reaction intermediate in the metabolism of adenosine and in the formation of nucleic acids by the salvage pathway. [NIH]

Idiopathic: Of the nature of an idiopathy; self-originated; of unknown causation. [EU]

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

Immunosuppressant: An agent capable of suppressing immune responses. [EU]

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

Incontinence: Inability to control excretory functions, as defecation (faecal i.) or urination (urinary i.). [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: The therapeutic introduction of a fluid other than blood, as saline solution, solution, into a vein. [EU]

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

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

Intravenous: Within a vein or veins. [EU]

Iodine: A nonmetallic element of the halogen group that is represented by the atomic symbol I, atomic number 53, and atomic weight of 126.90. It is a nutritionally essential element, especially important in thyroid hormone synthesis. In solution, it has anti-infective properties and is used topically. [NIH]

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

Isoniazid: Antibacterial agent used primarily as a tuberculostatic. It remains

the treatment of choice for tuberculosis. [NIH]

Ketoacidosis: Acidosis accompanied by the accumulation of ketone bodies (ketosis) in the body tissues and fluids, as in diabetic acidosis. [EU]

Lesion: Any pathological or traumatic discontinuity of tissue or loss of function of a part. [EU]

Lipid: Any of a heterogeneous group of flats and fatlike substances characterized by being water-insoluble and being extractable by nonpolar (or fat) solvents such as alcohol, ether, chloroform, benzene, etc. All contain as a major constituent aliphatic hydrocarbons. The lipids, which are easily stored in the body, serve as a source of fuel, are an important constituent of cell structure, and serve other biological functions. Lipids may be considered to include fatty acids, neutral fats, waxes, and steroids. Compound lipids comprise the glycolipids, lipoproteins, and phospholipids. [EU]

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]

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

Lupus: A form of cutaneous tuberculosis. It is seen predominantly in women and typically involves the nasal, buccal, and conjunctival mucosa. [NIH]

Malformation: A morphologic defect resulting from an intrinsically abnormal developmental process. [EU]

Mediator: An object or substance by which something is mediated, such as (1) a structure of the nervous system that transmits impulses eliciting a specific response; (2) a chemical substance (transmitter substance) that induces activity in an excitable tissue, such as nerve or muscle; or (3) a substance released from cells as the result of the interaction of antigen with antibody or by the action of antigen with a sensitized lymphocyte. [EU]

Memantine: Amantadine derivative that has some dopaminergic effects. It has been proposed as an antiparkinson agent. [NIH]

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

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

Mexiletine: Antiarrhythmic agent pharmacologically similar to lidocaine. It

may have some anticonvulsant properties. [NIH]

Mobility: Capability of movement, of being moved, or of flowing freely. [EU]

Molecular: Of, pertaining to, or composed of molecules : a very small mass of matter. [EU]

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]

Monotherapy: A therapy which uses only one drug. [EU]

Morale: The prevailing temper or spirit of an individual or group in relation to the tasks or functions which are expected. [NIH]

Motility: The ability to move spontaneously. [EU]

Myositis: Inflammation of a voluntary muscle. [EU]

Narcotic: 1. pertaining to or producing narcosis. 2. an agent that produces insensibility or stupor, applied especially to the opioids, i.e. to any natural or synthetic drug that has morphine-like actions. [EU]

Nausea: An unpleasant sensation, vaguely referred to the epigastrium and abdomen, and often culminating in vomiting. [EU]

Nephrotoxic: Toxic or destructive to kidney cells. [EU]

Neuralgia: Paroxysmal pain which extends along the course of one or more nerves. Many varieties of neuralgia are distinguished according to the part affected or to the cause, as brachial, facial, occipital, supraorbital, etc., or anaemic, diabetic, gouty, malarial, syphilitic, etc. [EU]

Neuroanatomy: Study of the anatomy of the nervous system as a specialty or discipline. [NIH]

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

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

Neuropathy: A general term denoting functional disturbances and/or pathological changes in the peripheral nervous system. The etiology may be known e.g. arsenical n., diabetic n., ischemic n., traumatic n.) or unknown. Encephalopathy and myelopathy are corresponding terms relating to involvement of the brain and spinal cord, respectively. The term is also used to designate noninflammatory lesions in the peripheral nervous system, in

contrast to inflammatory lesions (neuritis). [EU]

Niacin: Water-soluble vitamin of the B complex occurring in various animal and plant tissues. Required by the body for the formation of coenzymes NAD and NADP. Has pellagra-curative, vasodilating, and antilipemic properties. [NIH]

Nicotine: Nicotine is highly toxic alkaloid. It is the prototypical agonist at nicotinic cholinergic receptors where it dramatically stimulates neurons and ultimately blocks synaptic transmission. Nicotine is also important medically because of its presence in tobacco smoke. [NIH]

Nimodipine: A calcium channel blockader with preferential cerebrovascular activity. It has marked cerebrovascular dilating effects and lowers blood pressure. [NIH]

Oncolytic: Pertaining to, characterized by, or causing oncolysis (= the lysis or destruction of tumour cells). [EU]

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

Oral: Pertaining to the mouth, taken through or applied in the mouth, as an oral medication or an oral thermometer. [EU]

Orthopaedic: Pertaining to the correction of deformities of the musculoskeletal system; pertaining to orthopaedics. [EU]

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

Osteoarthritis: Noninflammatory degenerative joint disease occurring chiefly in older persons, characterized by degeneration of the articular cartilage, hypertrophy of bone at the margins, and changes in the synovial membrane. It is accompanied by pain and stiffness, particularly after prolonged activity. [EU]

Osteomyelitis: Inflammation of bone caused by a pyogenic organism. It may remain localized or may spread through the bone to involve the marrow, cortex, cancellous tissue, and periosteum. [EU]

Overdose: 1. to administer an excessive dose. 2. an excessive dose. [EU]

Paclitaxel: Antineoplastic agent isolated from the bark of the Pacific yew tree, Taxus brevifolia. Paclitaxel stabilizes microtubules in their polymerized form and thus mimics the action of the proto-oncogene proteins C-MOS. [NIH]

Pancreas: A mixed exocrine and endocrine gland situated transversely across the posterior abdominal wall in the epigastric and hypochondriac regions. The endocrine portion is comprised of the islets of langerhans, while the exocrine portion is a compound acinar gland that secretes digestive enzymes. [NIH]

Pancreatitis: Acute or chronic inflammation of the pancreas, which may be

asymptomatic or symptomatic, and which is due to autodigestion of a pancreatic tissue by its own enzymes. It is caused most often by alcoholism or biliary tract disease; less commonly it may be associated with hyperlipaemia, hyperparathyroidism, abdominal trauma (accidental or operative injury), vasculitis, or uraemia. [EU]

Paralysis: Loss or impairment of motor function in a part due to lesion of the neural or muscular mechanism; also by analogy, impairment of sensory function (sensory paralysis). In addition to the types named below, paralysis is further distinguished as traumatic, syphilitic, toxic, etc., according to its cause; or as obturator, ulnar, etc., according to the nerve part, or muscle specially affected. [EU]

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

Pentamidine: Antiprotozoal agent effective in trypanosomiasis, leishmaniasis, and some fungal infections; used in treatment of Pneumocystis carinii pneumonia in HIV-infected patients. It may cause diabetes mellitus, central nervous system damage, and other toxic effects. [NIH]

Pentoxifylline: A methylxanthine derivative that inhibits phosphodiesterase and affects blood rheology. It improves blood flow by increasing erythrocyte and leukocyte flexibility. It also inhibits platelet aggregation. Pentoxifylline modulates immunologic activity by stimulating cytokine production. [NIH]

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

Pharmacists: Those persons legally qualified by education and training to engage in the practice of pharmacy. [NIH]

Phenytoin: An anticonvulsant that is used in a wide variety of seizures. It is also an anti-arrhythmic and a muscle relaxant. The mechanism of therapeutic action is not clear, although several cellular actions have been described including effects on ion channels, active transport, and general membrane stabilization. The mechanism of its muscle relaxant effect appears to involve a reduction in the sensitivity of muscle spindles to stretch. Phenytoin has been proposed for several other therapeutic uses, but its use has been limited by its many adverse effects and interactions with other drugs. [NIH]

Plasmapheresis: Procedure whereby plasma is separated and extracted from anticoagulated whole blood and the red cells retransfused to the donor. Plasmapheresis is also employed for therapeutic use. [NIH]

Podiatry: A specialty concerned with the diagnosis and treatment of foot disorders and injuries and anatomic defects of the foot. [NIH]

Polyneuritis: Inflammation of many nerves at once; multiple or disseminated, neuritis. [EU]

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]

Preclinical: Before a disease becomes clinically recognizable. [EU]

Precursor: Something that precedes. In biological processes, a substance from which another, usually more active or mature substance is formed. In clinical medicine, a sign or symptom that heralds another. [EU]

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]

Progressive: Advancing; going forward; going from bad to worse; increasing in scope or severity. [EU]

Prophylaxis: The prevention of disease; preventive treatment. [EU]

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]

Protease: Proteinase (= any enzyme that catalyses the splitting of interior peptide bonds in a protein). [EU]

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

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

Psychomotor: Pertaining to motor effects of cerebral or psychic activity. [EU]

Pulse: The rhythmical expansion and contraction of an artery produced by waves of pressure caused by the ejection of blood from the left ventricle of the heart as it contracts. [NIH]

Pyrazinamide: A pyrazine that is used therapeutically as an antitubercular agent. [NIH]

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

Radium: Radium. A radioactive element of the alkaline earth series of metals. It has the atomic symbol Ra, atomic number 88, and atomic weight 226. Radium is the product of the disintegration of uranium and is present in

pitchblende and all ores containing uranium. It is used clinically as a source of beta and gamma-rays in radiotherapy, particularly brachytherapy. [NIH]

Recombinant: 1. a cell or an individual with a new combination of genes not found together in either parent; usually applied to linked genes. [EU]

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

Reflex: 1; reflected. 2. a reflected action or movement; the sum total of any particular involuntary activity. [EU]

Refractory: Not readily yielding to treatment. [EU]

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

Retinopathy: 1. retinitis (= inflammation of the retina). 2. retinosis (= degenerative, noninflammatory condition of the retina). [EU]

Rheumatoid: Resembling rheumatism. [EU]

Riboflavin: Nutritional factor found in milk, eggs, malted barley, liver, kidney, heart, and leafy vegetables. The richest natural source is yeast. It occurs in the free form only in the retina of the eye, in whey, and in urine; its principal forms in tissues and cells are as FMN and FAD. [NIH]

Rifabutin: A broad-spectrum antibiotic that is being used as prophylaxis against disseminated Mycobacterium avium complex infection in HIV-positive patients. [NIH]

Rigidity: Stiffness or inflexibility, chiefly that which is abnormal or morbid; rigor. [EU]

Sarcoidosis: An idiopathic systemic inflammatory granulomatous disorder comprised of epithelioid and multinucleated giant cells with little necrosis. It usually invades the lungs with fibrosis and may also involve lymph nodes, skin, liver, spleen, eyes, phalangeal bones, and parotid glands. [NIH]

Sarcoma: A tumour made up of a substance like the embryonic connective tissue; tissue composed of closely packed cells embedded in a fibrillar or homogeneous substance. Sarcomas are often highly malignant. [EU]

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

Selenium: An element with the atomic symbol Se, atomic number 34, and atomic weight 78.96. It is an essential micronutrient for mammals and other animals but is toxic in large amounts. Selenium protects intracellular structures against oxidative damage. It is an essential component of glutathione peroxidase. [NIH]

Serum: The clear portion of any body fluid; the clear fluid moistening serous membranes. 2. blood serum; the clear liquid that separates from blood on clotting. 3. immune serum; blood serum from an immunized animal used for passive immunization; an antiserum; antitoxin, or antivenin. [EU]

Skeletal: Pertaining to the skeleton. [EU]

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

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

Species: A taxonomic category subordinate to a genus (or subgenus) and superior to a subspecies or variety, composed of individuals possessing common characters distinguishing them from other categories of individuals of the same taxonomic level. In taxonomic nomenclature, species are designated by the genus name followed by a Latin or Latinized adjective or noun. [EU]

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

Stavudine: A dideoxynucleoside analog that inhibits reverse transcriptase and has in vitro activity against HIV. [NIH]

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]

Sulfadiazine: A short-acting sulfonamide used in combination with pyrimethamine to treat toxoplasmosis in patients with acquired immunodeficiency syndrome and in newborns with congenital infections. [NIH]

Symptomatic: 1. pertaining to or of the nature of a symptom. 2. indicative (of a particular disease or disorder). 3. exhibiting the symptoms of a particular disease but having a different cause. 4. directed at the allying of symptoms, as symptomatic treatment. [EU]

Syncope: A temporary suspension of consciousness due to generalized cerebral schemia, a faint or swoon. [EU]

Systemic: Pertaining to or affecting the body as a whole. [EU]

Tachycardia: Excessive rapidity in the action of the heart; the term is usually applied to a heart rate above 100 per minute and may be qualified as atrial, junctional (nodal), or ventricular, and as paroxysmal. [EU]

Tendinitis: Inflammation of tendons and of tendon-muscle attachments. [EU]

Teniposide: A semisynthetic derivative of podophyllotoxin that exhibits antitumor activity. Teniposide 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 cells from entering into the mitotic phase of the cell cycle, and lead to cell death. Teniposide acts primarily in the G2 and S phases of the cycle. [NIH]

Tenosynovitis: Inflammation of a tendon sheath. [EU]

Thermal: Pertaining to or characterized by heat. [EU]

Thermoregulation: Heat regulation. [EU]

Thioguanine: An antineoplastic compound which also has antimetabolite action. The drug is used in the therapy of acute leukemia. [NIH]

Thoracic: Pertaining to or affecting the chest. [EU]

Thyroxine: An amino acid of the thyroid gland which exerts a stimulating effect on thyroid metabolism. [NIH]

Topical: Pertaining to a particular surface area, as a topical anti-infective applied to a certain area of the skin and affecting only the area to which it is applied. [EU]

Toxic: Pertaining to, due to, or of the nature of a poison or toxin; manifesting the symptoms of severe infection. [EU]

Transplantation: The grafting of tissues taken from the patient's own body or from another. [EU]

Tricyclic: Containing three fused rings or closed chains in the molecular structure. [EU]

Tuberculosis: Any of the infectious diseases of man and other animals caused by species of mycobacterium. [NIH]

Ulcer: A local defect, or excavation, of the surface of an organ or tissue; which is produced by the sloughing of inflammatory necrotic tissue. [EU]

Urinary: Pertaining to the urine; containing or secreting urine. [EU]

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

Vasculitis: Inflammation of a vessel, angiitis. [EU]

Vasoconstriction: The diminution of the calibre of vessels, especially constriction of arterioles leading to decreased blood flow to a part. [EU]

Vasomotor: 1. affecting the calibre of a vessel, especially of a blood vessel. 2. any element or agent that effects the calibre of a blood vessel. [EU]

Warts: Benign epidermal proliferations or tumors; some are viral in origin. [NIH]

Zalcitabine: A dideoxynucleoside compound in which the 3'-hydroxy group on the sugar moiety has been replaced by a hydrogen. 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 at low concentrations, acting as a chain-terminator of viral DNA by binding to reverse transcriptase. Its principal toxic side effect is axonal degeneration resulting in peripheral neuropathy. [NIH]

General Dictionaries and Glossaries

While the above glossary is essentially complete, the dictionaries listed here cover virtually all aspects of medicine, from basic words and phrases to more advanced terms (sorted alphabetically by title; hyperlinks provide rankings, information and reviews at Amazon.com):

- **Dictionary of Medical Acronymns & Abbreviations** by Stanley Jablonski (Editor), Paperback, 4th edition (2001), Lippincott Williams & Wilkins Publishers, ISBN: 1560534605, **http://www.amazon.com/exec/obidos/ASIN/1560534605/icongroupinterna**
- **Dictionary of Medical Terms : For the Nonmedical Person (Dictionary of Medical Terms for the Nonmedical Person, Ed 4)** by Mikel A. Rothenberg, M.D, et al, Paperback - 544 pages, 4th edition (2000), Barrons Educational Series, ISBN: 0764112015, **http://www.amazon.com/exec/obidos/ASIN/0764112015/icongroupinterna**
- **A Dictionary of the History of Medicine** by A. Sebastian, CD-Rom edition (2001), CRC Press-Parthenon Publishers, ISBN: 185070368X, **http://www.amazon.com/exec/obidos/ASIN/185070368X/icongroupinterna**
- **Dorland's Illustrated Medical Dictionary (Standard Version)** by Dorland, et al, Hardcover - 2088 pages, 29th edition (2000), W B Saunders Co, ISBN: 0721662544, **http://www.amazon.com/exec/obidos/ASIN/0721662544/icongroupinterna**
- **Dorland's Electronic Medical Dictionary** by Dorland, et al, Software, 29th Book & CD-Rom edition (2000), Harcourt Health Sciences, ISBN: 0721694934, **http://www.amazon.com/exec/obidos/ASIN/0721694934/icongroupinterna**
- **Dorland's Pocket Medical Dictionary (Dorland's Pocket Medical Dictionary, 26th Ed)** Hardcover - 912 pages, 26th edition (2001), W B Saunders Co, ISBN: 0721682812, **http://www.amazon.com/exec/obidos/ASIN/0721682812/icongroupinterna/103-4193558-7304618**

- **Melloni's Illustrated Medical Dictionary (Melloni's Illustrated Medical Dictionary, 4th Ed)** by Melloni, Hardcover, 4th edition (2001), CRC Press-Parthenon Publishers, ISBN: 85070094X, **http://www.amazon.com/exec/obidos/ASIN/85070094X/icongroupinterna**
- **Stedman's Electronic Medical Dictionary Version 5.0 (CD-ROM for Windows and Macintosh, Individual)** by Stedmans, CD-ROM edition (2000), Lippincott Williams & Wilkins Publishers, ISBN: 0781726328, **http://www.amazon.com/exec/obidos/ASIN/0781726328/icongroupinterna**
- **Stedman's Medical Dictionary** by Thomas Lathrop Stedman, Hardcover - 2098 pages, 27th edition (2000), Lippincott, Williams & Wilkins, ISBN: 068340007X, **http://www.amazon.com/exec/obidos/ASIN/068340007X/icongroupinterna**
- **Tabers Cyclopedic Medical Dictionary (Thumb Index)** by Donald Venes (Editor), et al, Hardcover - 2439 pages, 19th edition (2001), F A Davis Co, ISBN: 0803606540, **http://www.amazon.com/exec/obidos/ASIN/0803606540/icongroupinterna**

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