Bone Cancer

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

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

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

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FORWARD

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

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

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

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

The Editors

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

CHAPTER 1. STUDIES ON BONE CANCER

Overview

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

The Combined Health Information Database

The Combined Health Information Database summarizes studies across numerous federal agencies. To limit your investigation to research studies and bone cancer, 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 "bone cancer" (or synonyms) into the "For these words:" box. Consider using the option "anywhere in record" to make your search as broad as possible. If you want to limit the search to only a particular field, such as the title of the journal, then select this option in the "Search in these fields" drop box. The following is what you can expect from this type of search:

- **Ewing's Sarcoma of the Mandible: Radiologic Features with Emphasis on Magnetic Resonance Appearance**

  Source: Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics. 91(6): 728-734. June 2001.

  Contact: Available from Mosby, Inc. 6277 Sea Harbor Drive, Orlando, FL 32887-4800. (800) 654-2452 or (407) 345-4000. Website: www.harcourthealth.com.

  Summary: Ewing's sarcoma is an uncommon malignancy that usually occurs in children. This article presents a case of Ewing's sarcoma of the mandible (lower jaw); the authors describe the radiologic appearance of the lesion with an emphasis on the magnetic resonance imaging (MRI) features. A 12 year old girl presented with fever and a 7 day history of facial swelling. On physical examination, the child showed facial

asymmetry with a tender and swollen mass in the right side of her face. A presumptive diagnosis of acute suppurative inflammation of the right parotid (salivary) gland was made. The patient was given antibiotics, but no change was seen in the swelling. Panoramic radiograph showed a permeative, poorly demarcated destructive lesion in the right ramus (branch) of the mandible; computed tomography (CT) scan was also performed. Biopsy confirmed diagnosis of Ewing's sarcoma (ES). The MRI allowed a better examination of the affected area and revealed the mass invasion of the mandibular condyle and the petrous part of the temporal bone. Once the diagnosis of ES with extension into the surrounding soft tissues was made, a chemotherapy protocol treatment was started. An MRI after the second chemotherapy session showed progression of the tumor; given the poor response of the tumor to chemotherapy, radiation therapy was added to the treatment protocol. After 6 weeks, MRI showed reduction in tumor size. After the 10th chemotherapy cycle, the patient underwent an autologous (using the patient's own tissue) bone marrow transplantation (BMT). Clinical follow up revealed that the patient is alive and symptom free, with no evidence of local recurrence or distant metastases and with normal laboratory parameters 36 months after diagnosis. The authors conclude that MRI is the diagnostic tool of choice in local staging of ES and is an imaging technique of great value in monitoring the effects of chemotherapy. MRI has also shown its superiority over other techniques for evaluating the medullary and soft tissue components of ES. 6 figures. 15 references.

- **Mesenchymal Chondrosarcoma of the Maxilla with Diffuse Metastasis: Case Report and Literature Review**

  Source: Journal of Oral and Maxillofacial Surgery. 60(8): 931-935. August 2002.

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

  Summary: Mesenchymal chondrosarcoma (MCS) is a rare variant of chondrosarcoma (cancer), characterized by widespread, late metastasis (spreading). There are 51 cases of maxillofacial MCS reported in the literature. This article reports an additional case of a maxillary (upper jaw) MCS with subsequent diffuse metastasis. 7 figures. 13 references.

- **Osteosarcoma of the Mandibular Condyle: Case Report**

  Source: Journal of Oral and Maxillofacial Surgery. 59(5): 574-577. May 2001.

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

  Summary: Osteosarcoma is one of the most frequently occurring malignant bone tumors. However, it is still a rather rare lesion, affecting only one in 100,000 people every year in the United States. Osteosarcoma of the jaws makes up approximately 5 to 6 percent of cases, with the tumor occurring in the mandible (lower jaw) as frequently as in the maxilla (upper jaw). This article reports a rare case of a temporomandibular joint (TMJ) osteosarcoma. The authors analyze the case's radiologic features, clinical and surgical treatment, the histologic findings, and the final outcome. Fifteen months after surgical treatment, no signs of recurrence were observed on a computed tomography (CT) scan. There was a progressive recovery of jaw mobility. The patient underwent postsurgical orthodontic treatment to reestablish a satisfactory occlusion in the sagittal and transverse dimensions by shifting the mandible posteriorly and to the left. The authors note that osteosarcoma of the jaw usually does not metastasize (spread). The most frequently used treatment procedure includes preoperative chemotherapy, radical surgery with reconstruction, and postoperative chemotherapy. Patients with

osteosarcoma of the jaws have a 5 year survival rate of 15 to 30 percent. 5 figures. 30 references.

- **Metastatic Osteosarcoma to the Maxilla: A Case Report and a Review of the Literature**

  Source: Quintessence International. 33(5): 397-399. May 2002.

  Contact: Available from Quintessence Publishing Co, Inc. 551 Kimberly Drive, Carol Stream, IL 60188-9981. (800) 621-0387 or (630) 682-3223. Fax (630) 682-3288. E-mail: quintpub@aol.com. Website: www.quintpub.com.

  Summary: This article reports a case of a patient with a successfully treated primary osteosarcoma (cancer) of the tibia who experienced an isolated maxillary (upper jaw) metastasis (spread of the cancer), an extremely rare entity. Once the jaw tumor was confirmed histologically, a total maxillectomy and adjuvant chemoradiation therapy were carried out. There has been no local recurrence or distant metastasis in this patient for 1 year. The authors stress that a multimodality therapeutic approach is essential when these patients are treated. Surgery is the gold standard of treatment in operable cases. Adjuvant treatment is required to prevent local recurrence and distant metastasis. 3 figures. 15 references.

Federally Funded Research on Bone Cancer

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

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

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

- **Project Title: BONE CANCER AND SKELETAL PAIN**

  Principal Investigator & Institution: Clohisy, Denis R.; Professor; Orthopedic Surgery; University of Minnesota Twin Cities 200 Oak Street Se Minneapolis, Mn 554552070

  Timing: Fiscal Year 2001; Project Start 20-MAR-2001; Project End 28-FEB-2006

  Summary: (Verbatim from the Applicant): **Bone cancer** pain decreases the quality of life of millions of patients each year in the United States. Because there has not been an experimental model appropriate for studying osteolytic **bone cancer** pain, very little is known about its etiology, and current treatments can be ineffective or have unwanted side effects. We have very recently developed an experimental model for studying **bone**

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

cancer pain. Features of this model are that it allows simultaneous quantitative evaluation of tumor growth, bone destruction, bone cell biology, painful behaviors, cellular biology of pain and neurochemistry of pain. Based on our unique capability to study **bone cancer** pain, we now propose to determine the cause of **bone cancer** pain in two types of bone cancers: those that stimulate bone destruction (osteolytic), and those that stimulate bone formation (osteoblastic). The long-range goal of our laboratories is to understand the pathophysiology of **bone cancer** and its sequelae and to use this knowledge to develop new treatments. The objective of this application is to determine the cause of bone cancer's most devastating sequalae: pain. To accomplish this, we will develop an experimental model for studying osteoblastic **bone cancer** pain and then use that model and our established osteolytic **bone cancer** model to determine the cause of **bone cancer** pain. The central hypothesis of this proposal is that **bone cancer** pain is caused by both the cancer itself and by cancer-induced bone loss. To test this hypothesis, the following Aims will be pursued: (1) establish the role of osteoclasts in the development of osteoblastic cancers; (2) define the characteristics of osteoblastic **bone cancer** pain; (3) determine if osteoblastic and/or osteolytic **bone cancer** tumors cause pain; and (4) determine if cancer-induced bone loss (osteoblastic and/or osteolytic) causes pain. At the completion of these Aims we expect to define the bone cell biology and neurochemical basis of pain from osteoblastic **bone cancer** (Aims 1 & 2), and we expect to prove for the first time that pain from osteoblastic and osteolytic bone cancers is caused both by tumors themselves, and by cancer-induced skeletal destruction (Aims 3 & 4). The results will be significant because they will provide rationale and direction for developing novel, mechanistically based treatments of **bone cancer** pain.

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

- **Project Title: EFFECTS OF ACUPUNCTURE ON BONE CANCER PAIN IN MICE**

  Principal Investigator & Institution: Zhang, Ruixin; Family Medicine; University of Maryland Balt Prof School Baltimore, Md 21201

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

  Summary: (provided by applicant): Cancer pain, particularly **bone cancer** pain, is a major symptom that significantly affects the quality of life of cancer patients. Clinical trials have demonstrated that acupuncture can alleviate cancer pain, but as yet evidence from basic scientific research is absent. An animal model of femur **bone cancer** pain, which mimics clinical cancer pain, has been established in our lab. We propose to use this model to evaluate the effects and mechanisms of electroacupuncture (EA) at acupoint G30 (Huan Tiao) on femoral cancer pain. The proposed hypotheses are: 1) EA of acupoint G30 at the optimal sets of parameters will significantly inhibit femur bone cancer-induced hyperalgesia. 2) Activity of the central neurons during cancer pain will be modulated by EA. The specific aims of this proposal are: Aim I: Evaluate the effects of EA on cancer-induced thermal hyperalgesia by measuring hindpaw withdrawal latency. Various combinations of frequencies (10 and 100 Hz) and stimulation durations (10, 15, 20 min) at the maximum tolerable electrical current of 1 mA will be administered to study the anti-hyperalgesic effects of EA in a mouse model of **bone cancer** pain. Aim II- Determine the optimal treatment protocol. With the optimal sets of parameters determined in Aim I, various EA treatment regimens will be conducted to establish how often treatments should be administered to achieve the greatest anti-hyperalgesic effects. Aim lll: Investigate the central mechanisms of action of EA on cancer pain. The modulation of EA on the activities of central neurons in the spinal cord will be investigated by characterizing Fos protein and dynorphin peptide expression with immunohistochemical staining. These studies will advance our knowledge of EA in

control and management of cancer pain and provide useful information for designing future clinical trials using optimal EA parameters for patients with cancer pain. These studies will set a stage for further studying the mechanisms of EA in the control and management of cancer pain.

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

- **Project Title: INDIVIDUAL PREDOCTORAL DENTAL SCIENTIST FELLOWSHIP**

  Principal Investigator & Institution: Mach, David B.; Restorative Sciences; University of Minnesota Twin Cities 200 Oak Street Se Minneapolis, Mn 554552070

  Timing: Fiscal Year 2003; Project Start 13-JUN-2003

  Summary: (provided by applicant): The proposal that David Mach is submitting will help define the origin of **bone cancer** pain and begin to dissect out mechanism that are involved in the generation and maintenance of this pain. The experiments that David presented in the Research Training Proposal employ cutting-edge technologies and will position David to be a leader in the field of cancer pain research. A critical feature of David's past and future success has been his ability to closely interact with both basic and clinical scientists and to focus on issues in basic science that will have a direct impact on patient care. Thus, using the first animal model of **bone cancer** pain that he was involved in generating David will be examining sensory and sympathetic innervation of bone as tumor growth and bone remodeling occur. He will study the extent to which the C-fiber sensory innervation or sympathetic innervation of bone is involved in the regulation of tumor growth, tumor angiogenesis, osteoclast proliferation, and bone destruction/remodeling. David will define the cellular and neurochemical changes that occur in the spinal cord, dorsal column nuclei, dorsal ganglia, and sympathetic ganglia as the bone is destroyed/remodeling. David will define the cellular and neurochemical changes that occur in the spinal cord, dorsal column nuclei, dorsal root ganglia, and sympathetic ganglia as the bone is destroyed/remodeled. These studies should provide David with both the training and the publications so that at the end of his fellowship he will be recognized as a highly productive and innovative clinical-scientist.

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

- **Project Title: INHIBITORS OF RANK AND RANKL IN OSTEOPOROSIS TREATMENT**

  Principal Investigator & Institution: Singh, Sujay K.; Imgenex 11175 Flintkote Ave Ste E San Diego, Ca 92121

  Timing: Fiscal Year 2003; Project Start 10-JUL-2003; Project End 30-JUN-2004

  Summary: (provided by applicant): Osteoporosis is a major health problem affecting nearly 1.5 million people every year. The reduction of sex hormone levels in both men and women increase production of certain factors that lead to osteoporosis. One-third of all post-menopausal Caucasian women experience at least osteoporotic fracture during their lifetime. In addition, more than 70 percent of patients with advanced breast or prostate cancer have skeletal metastases leading to bone degradation due to osteoclastogenesis. Ongoing osteoclast activity appears to be involved in the generation and maintenance of ongoing and movement-evoked pain. Blockade of ongoing osteoclast activity appears to have the potential to reduce **bone cancer** pain in patients with advanced tumor-induced bone destruction. Recent studies have shown that RANKL, a member of the tumor necrosis factor superfamily, by acting through its receptor RANK can induce osteoclast formation leading to osteoporosis. In the present

study, we propose to identify peptide inhibitors by screening peptide display libraries. The ability of these peptides to interfere with RANKL induced osteoclast formation will be tested. The inhibitory effect of selected peptides in animal models will be tested in the Phase II study. The selected peptides can be used to design even smaller peptides or small molecule non-peptide mimetics, which can be used as therapeutic drugs.

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

- **Project Title: PERIPHERAL NOCICEPTORS IN PERSISTENT PAIN**

  Principal Investigator & Institution: Mantyh, Patrick W.; Professor; Polymer Science & Engineering; University of Minnesota Twin Cities 200 Oak Street Se Minneapolis, Mn 554552070

  Timing: Fiscal Year 2001; Project Start 01-APR-1987; Project End 30-NOV-2005

  Summary: (Adapted from the Investigator's Abstract) A viable model of **bone cancer** has been developed in which lytic sarcoma cells are injected into the intramedullary space of the mouse femur. The cells are confined within the bone by an amalgam plug produce extensive bone destruction and pain behaviors similar to that observed in patients with **bone cancer.** A breast cancer cell line bone pain model will also be developed. With these models the cellular and neurochemical pathophysiology that generates and maintains cancer-induced bone pain can be studied. These studies are proposed to define the distribution and time course of tumor invasion in bone, tumor angiogenesis, osteoclast proliferation, bone destruction, remodeling and **bone cancer** nociceptive behaviors (Aim 1). The studies will define sensory and sympathetic innervation of bone as the interosseus mass grows and nociceptive state changes assessing tumor growth and bone destruction (Aim 2). Neurochemical changes in the spinal cord, dorsal column nuclei, and sympathetic and dorsal root ganglia will be monitored (Aim 3). Pharmacological manipulation of the generation and maintenance of **bone cancer** nociceptive events will be attempted (Aim 4). The information generated by these studies should significantly expand our understanding of the cellular and molecular mechanisms involved in the generation of **bone cancer** pain and may lead to effective therapies for treating **bone cancer** pain.

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

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

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

  Timing: Fiscal Year 2001; Project Start 30-SEP-1988; Project End 31-MAY-2006

  Summary: The Connective Tissue Oncology Program (CTOP) studies two populations of patients with cancer of the connective tissues: the skeleton and its supporting soft tissues. It is composed of 26 members from 11 department with more than $3.3 million in annual direct support. The cancers studied are either primary or metastatic to these groups of tissues. Sarcomas, or primary cancers of connective tissues, are uncommon forms of malignancy, particularly in comparison to the epithelial cancers, yet represent a raison d'etre of cancer centers: multi-disciplinary oncology. All current practice guidelines underscore the need to have multi- disciplinary teams of physicians and other professionals to care for patients with these uncommon malignancies. Success has been clearly achieved with the approach of combining the medical or pediatric oncologist with the surgeon to produce markedly improved cure rates for **bone cancer** (osteosarcoma, Ewing's sarcoma), and to a lesser extent, of soft tissue sarcomas. While cancers of the connective tissue are much more common in soft tissue than in bone, the

reverse is true when one considers metastatic cancers where metastasis to the skeleton is far more common that metastasis to the soft tissue supporting that skeleton. Metastasis to the skeleton is a very common phenomenon associated with human cancer. The prevalence and predilection of metastasis to the bones, despite its commonality, is one of the more poorly understood processes associated with cancer. Even more devastating are the symptoms caused by the metastasis and the relative ineffectiveness of current treatments. The research areas related to sarcomas and metastatic bone tumors represent a common research foci. For example, the bone microenvironment primarily consists of mesenchymal cells similar to the cells from which sarcomas originates from. Additionally, the biology of sarcomas and metastatic cancers is similar in terms of growth characteristics (e.g. slow growth). Accordingly, we think combining these two areas of concern into a single program makes good sense, and in particular, unifies the strengths at this Cancer Center.

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

E-Journals: PubMed Central[3]

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

- **An activity specified by the osteosarcoma line U2OS can substitute functionally for ICP0, a major regulatory protein of herpes simplex virus type 1.** by Yao F, Schaffer PA.; 1995 Oct;
  http://www.pubmedcentral.gov/articlerender.fcgi?tool=pmcentrez&rendertype=abstract&artid=189522

The National Library of Medicine: PubMed

One of the quickest and most comprehensive ways to find academic studies in both English and other languages is to use PubMed, maintained by the National Library of Medicine.[6] The advantage of PubMed over previously mentioned sources is that it covers a greater number of domestic and foreign references. It is also free to use. If the publisher has a Web site that offers full text of its journals, PubMed will provide links to that site, as well as to

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

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

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

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

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

- **"Systemic radioisotopic therapy of primary and metastatic bone cancer".**
  Author(s): Robinson RG.
  Source: Journal of Nuclear Medicine : Official Publication, Society of Nuclear Medicine. 1990 August; 31(8): 1326-7.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=2384799&dopt=Abstract

- **A case with extraosseous Ewing's sarcoma: a late effect related to bone marrow transplantation for thalassemia or a component of a familial cancer syndrome?**
  Author(s): Mutafoglu Uysal K, Olgun N, Sarialioglu F, Kargi A, Cevik N.
  Source: Pediatric Hematology and Oncology. 2000 July-August; 17(5): 415-9.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10914053&dopt=Abstract

- **A comparative study of samarium-153-ethylenediaminetetramethylene phosphonic acid with pamidronate disodium in the treatment of patients with painful metastatic bone cancer.**
  Author(s): Wang RF, Zhang CL, Zhu SL, Zhu M.
  Source: Medical Principles and Practice : International Journal of the Kuwait University, Health Science Centre. 2003 April-June; 12(2): 97-101.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12634464&dopt=Abstract

- **Adolescent bone cancer: is the growth spurt implicated?**
  Author(s): Dix D, McDonald M, Cohen P.
  Source: Eur J Cancer Clin Oncol. 1983 June; 19(6): 859-60. No Abstract Available.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=6683652&dopt=Abstract

- **Analysis of the human tumour necrosis factor-alpha (TNFalpha) gene promoter polymorphisms in children with bone cancer.**
  Author(s): Patio-Garcia A, Sotillo-Pieiro E, Modesto C, Sierrases-Maga L.
  Source: Journal of Medical Genetics. 2000 October; 37(10): 789-92.
  http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11183184&dopt=Abstract

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