

Spring 2005

Focal Spot, Spring 2005

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SPRING 2005

VOLUME 36, NUMBER 1

Endocrine Focus

RODENT INSTITUTE OF BIOLOGY



Osteoporosis:
THE BRITTLE **BONE** DISEASE

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*Treating
uterine
fibroids
used to mean giving
up a lot more than
a night in the hospital.*

While uterine fibroid tumors are benign, their impact on a woman's life is anything but—often resulting in a hysterectomy or other invasive surgeries. But today, many women are choosing procedures that spare the uterus.


Uterine Fibroid Embolization (UFE) is a minimally invasive procedure performed by an interventional radiologist. By blocking the blood flow to the tumors and causing them to shrink, the procedure is approximately 90% successful at alleviating the heavy bleeding and painful periods often associated with fibroids.

As compared with other fibroid treatments, UFE usually requires only an overnight stay in the hospital and has a quicker recovery time.

Established in 1998, the Washington University Comprehensive Fibroid Center has accumulated the largest experience with UFE treatment in St. Louis. Most major insurance carriers, Medicare, and Medicaid recognize UFE as an accepted alternative treatment for fibroids.

For more information about UFE or other minimally invasive interventional radiology procedures offered at Washington University Medical Center, call (314) 362-2353.



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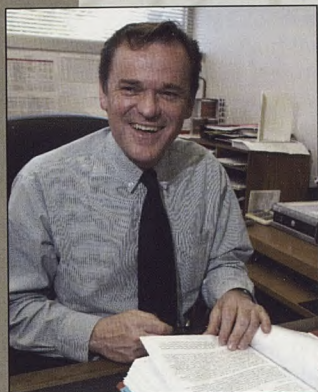
Physicians

MIR Mallinckrodt Institute
of Radiology

www.mir.wustl.edu/fibroid

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Simon Powell, an internationally known cancer physician-scientist, was named chairman of the Department of Radiation Oncology in July 2004. Now, nearly a year later, he discusses the challenges of leading the four-year-old department and outlines his goals for patient care, research, and education.

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Many of the 18 million Americans with diabetes suffer from foot problems, including a condition in which severely diminished sensation in the feet causes ulcers and can lead to amputation. Researchers from the Institute's Electronic Radiology Laboratory and from the School of Medicine's Program of Physical Therapy are using spiral CT to develop a three-dimensional model that they hope will revolutionize orthotic design.



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At around 30 years of age, men and women slowly begin to lose bone mass. And in the five years following the onset of menopause, bone density in women deteriorates rapidly. Nuclear medicine physicians at Mallinckrodt Institute are using Dual-Energy X-ray Absorptiometry to diagnose bone loss, enabling patients to begin treatment that will fight the advance of osteoporosis.



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ON THE COVER According to the National Institutes of Health, osteoporosis is a health threat for 44 million Americans, 68% of whom are women. It is estimated that one out of two women over the age of 50 will have an osteoporosis-related fracture in her lifetime. The disease can develop at any stage in a person's life, but osteoporosis can be prevented and treated. Illustration by Matt Kindt.

Visit the MIR web site at
www.mir.wustl.edu

SPOT NEWS

They are all winners...

Since 1989 the radiation oncology residents annually select the Teacher of the Year recipient by nominating and voting for the faculty member who makes a significant contribution to radiation oncology resident education during the academic year. The award is presented each year in December.

This year the residents broke from tradition. "The residents did not select a teacher of the year for 2004," says Parag Parikh, MD, radiation oncology assistant chief resident. "Many of the attendings [*physicians on faculty*] this year went above and beyond in their teaching responsibilities, from increased participation in the Patient Management Conference to their support of our new Management and Techniques sessions. We [*the residents*] did not think it was fair—nor could we come to a conclusion—to name one attending as the "Teacher of the Year."

Past award recipients

- Susan Shapiro, MD—1989
- Carlos Perez, MD—1990, 2003
- Perry Grigsby, MD, MBA—1991, 1995, 2000
- Jeff Michalski, MD—1992
- Russell Gerber, MS—1993
- Mary Graham, MD—1994
- James Purdy, PhD—1996
- Marie Taylor, MD—1997
- David Gius, MD, PhD—1998
- Jeffrey Bradley, MD—1999
- Joseph Simpson, MD, PhD—2001
- Imran Zoheri, MD—2002

37th Wilson Award presented

Yasha Kadkhodayan, a fourth-year medical student, received the 2004-2005 Hugh M. Wilson Award for Meritorious Work in Radiology. The award is presented in honor of Mallinckrodt Institute's second director, who was an advocate of the advancement of education.

Kadkhodayan earned an undergraduate degree, majoring in bioengineering, from the University of Illinois at Chicago (UIC). During his four years at UIC, Kadkhodayan participated in research projects involving the use of phase-contrast magnetic resonance imaging (MRI) to study the craniospinal system.

During his first year at Washington University in St. Louis School of Medicine (WUSM), Kadkhodayan voiced his interest in neuro-radiology and radiology to Colin Derdeyn, MD, associate professor of radiology and of neurology and neurological surgery. With Derdeyn's sponsorship, Kadkhodayan received an American Academy of Neurology summer research fellowship and worked closely with doctors Derdeyn, Christopher Moran, and DeWitte Cross—all members of the Institute's interventional neuroradiology service.

Kadkhodayan worked on several projects, including MRI measurements of brain temperature in stroke, and performed an exhaustive chart review study. His efforts resulted in a paper on "Yield of conventional angiography for primary angiitis of the central nervous system" being published in *Radiology* and a second paper—"Procedural complications of a carotid angioplasty and stenting without cerebral protection devices"—published in *Neurosurgical Focus*. Two additional papers have been accepted for publication by the *American Journal of Neuroradiology*.

Kadkhodayan will begin his first year of diagnostic radiology residency at Mallinckrodt Institute in July 2006, after completing a preliminary training year in medicine at Barnes-Jewish Hospital.

WUSM ranks third in nation

According to the April 2005 *U.S. News & World Report* survey, Washington University in St. Louis School of Medicine (WUSM) ranked third in the nation among research intensive medical schools. Among the top 10 schools, Harvard University took first-place honors and Johns Hopkins University placed second; following WUSM were the University of Pennsylvania, University of California-San Francisco, Duke University, University of Washington, Stanford University, University of Michigan, and Columbia University.

U.S. News & World Report initiated the professional and graduate school rankings in 1987. WUSM annually has placed in the top 10 schools and, since 1998, has ranked first in student selectivity. For the eighth consecutive year, WUSM's students have had the highest undergraduate grade-point averages and the highest scores on medical school entrance examinations.

Listings for all Washington University in St. Louis schools, departments, and programs are available at news-info.wustl.edu/rankings.

Miller elected ABNM chairman

Tom Miller, MD, PhD, professor of radiology and of biomedical engineering, has been elected to a one-year term as chairman of the American Board of Nuclear Medicine (ABNM). Founded in 1971, the ABNM was established to set education standards and to evaluate the competence of physicians providing nuclear medicine services in the United States. ABNM's responsibilities include setting the requirements for certification, conducting examinations leading to certification in nuclear medicine, and issuing certificates to those physicians who fulfill the requirements. From 1972 to 2004, the ABNM has certified 4,869 physicians. The 12 Board members serve three-year terms; officers, a one-year term.

Henry Royal, MD, professor of radiology, is the ABNM executive director, and Barry Siegel, MD, professor of radiology and of medicine, is designated as a life member of the Board.

Matching Program results announced

On July 1, 18 physicians will begin their first year of training in diagnostic radiology. These promising trainees come to MIR from excellent medical schools:

- Weill Medical College of Cornell University
- Duke University School of Medicine
- Emory University School of Medicine
- Georgetown University School of Medicine
- I.M. Sechenov Moscow Medical Academy
- Indiana University School of Medicine
- Johns Hopkins University School of Medicine
- Tulane University School of Medicine
- David Geffen School of Medicine at the University of California, Los Angeles
- University of Missouri-Columbia School of Medicine
- University of Pennsylvania School of Medicine
- Washington University in St. Louis School of Medicine.



David Johnson, MD, ASCO president, presented the award to Farria (left) and Darlene Bird, clinical research coordinator, at the 2005 ASCO Annual Meeting in Orlando, Florida.

Farria receives clinical trials award

On behalf of the Breast Imaging Team at Siteman Cancer Center (SCC), Dione Farria, MD, received the Clinical Trials Participation Award from The American Society of Clinical Oncology (ASCO), one of the world's leading organizations representing physicians who treat cancer. The award was created in 2003 to publicly honor practices and institutions that actively participate in clinical trials research. The award program is supported by a grant from the Coalition for National Cancer Cooperative Groups.

Farria and Katherine Jahnige Matthews, MD, assistant professor of obstetrics and gynecology, are directors of the SCC Program for the Elimination of Cancer Disparities (PECaD).

The SCC program works within existing community networks to build trusting relationships that ultimately help to attract patients to clinical trials. PECaD also provides the St. Louis-area community with health information and assistance in obtaining patient care. As the largest of the multidisciplinary clinical centers in the Center for Advanced Medicine, the SCC is a collaborative effort of Washington University in St. Louis School of Medicine and Barnes-Jewish Hospital.

As principal investigator, Farria received a Community Networks Program grant of \$1.2 million from the National Cancer Institute to support the PECaD work. Matthews is coinvestigator for the five-year grant.

SPOT NEWS

MIR researchers participate in nanotechnology grant

In a 2005 report on the nation's nanotechnology research efforts, the President's Council of Advisors on Science and Technology determined that the United States is the acknowledged international leader in nanotechnology research and development and recom-

mended that further steps be taken to facilitate technology transfer from the laboratory to the marketplace. The Council also called for continued research on environmental, health, and other societal issues and for support for education and workforce preparation.

Nanotechnology—working with matter that is one billionth of a meter—has been hailed as the “new industrial revolution.” Researchers across the nation are attempting to devise methods for imaging and constructing at the

atomic and molecular level.

As part of a new nanotechnology initiative, The National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health selected Washington University in St. Louis (WUSTL) as one of four universities designated as a Program of Excellence in Nanotechnology (PEN). The WUSTL program will serve as the administrative center for the national project.

The NHLBI awarded a five-year, \$12.5 million grant to Principal Investigator Karen Wooley, PhD, profes-

sor of chemistry, and Co-principal Investigator Michael Welch, PhD, professor of radiology, of chemistry, and of molecular biology and pharmacology, to focus on the “development of nanoscale agents that can be assembled, labeled, targeted, filled, and activated for eventual diagnosis and treatment of various diseases relevant to NHLBI.” Welch's expertise in the area of rapid synthesis of positron-labeled organic chemicals—a vital component in the development of positron emission tomography at the Institute in the 1970s—and his research on developing image enhancements ultimately used in clinical radiology techniques and procedures will play an important role in the PEN project.

Among the 13 WUSTL and School of Medicine PEN collaborators are Mallinckrodt Institute's Robert Gropler, MD, professor of radiology, of medicine, and of biomedical engineering; Pamela Woodard, MD, assistant professor of radiology; Daniel Schuster, MD, professor of medicine and of radiology. Also involved are Carolyn Anderson, PhD, associate professor of radiology; Robert Mach, PhD, professor of radiology; and Jason Lewis, PhD, assistant professor of radiology.

More information on the PEN project is available on the Internet: NHLBI (www.nhlbi.nih.gov) or the National Nanotechnology Initiative (www.nano.gov/).



CCIR progress

The first step in the construction of the Center for Clinical Imaging Research (CCIR) was to completely gut the 9,000 square-foot area on 10 West Pavilion. The CCIR is part of the Institute's strategy for providing advanced imaging resources and support for clinical investigators whose biomedical research will facilitate better diagnosis and management of disease. Mark Mintun, MD, professor of radiology, is the CCIR director.

Interview

An Interview with Simon Powell, MD, PhD

In July 2001, Washington University School of Medicine (WUSM) established the Department of Radiation Oncology from what had been known as Mallinckrodt Institute's Division of Radiation Oncology. Carlos Perez, MD, was appointed interim chairman of the new department. After an extensive national search by WUSM, Simon Powell, MD, PhD, was named professor and department chairman in July 2004.

Here, Dr. Powell discusses the challenges and goals for the department, particularly in the areas of technology, patient care, research, and education.

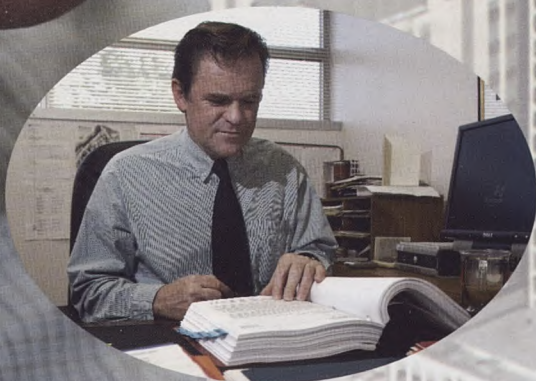
Focal Spot (FS): You came to Washington University Medical Center from one of the United States' healthcare giants—Harvard University and Massachusetts General Hospital. What were your first impressions of Washington University Medical Center?

Dr. Powell (SP): I was impressed by the size and range of activities in the Medical Center. My first and continuing impressions are that there are no limits to what can be achieved on this site.

FS: The Department of Radiation Oncology encompasses patient care, research, and teaching. What are the department's strengths in handling such a wide range of responsibilities?

SP: Excellent faculty. They drive everything. The faculty I inherited was already in good shape, although I am devoting a significant amount of time to new faculty recruitment.

FS: The radiation oncology residency training program is well-known nationally. How important do you think the department's mentoring program, research facilities, and affiliations with BJC HealthCare are in attracting residents to the training program?





An Interview



"Excellent faculty."

SP: I think prospective residents are looking for a well-balanced program. Good clinical experience, opportunities for research, and excellence in mentoring. The operation of our department's program in a large general medical center provides a realistic balance of the role of radiation oncology in the context of other medical specialties.

FS: Whether it can be attributed to the Internet, the media, or just to curiosity, patients are better informed regarding healthcare options. They expect to be actively involved in the health-related decision-making process and are proactive in seeking cancer care. How is this physician-patient partnership addressed in the department?

SP: We spend a lot of time with our patients at their first consultation. We gather as much essential information as possible prior to seeing the patient, so we can focus our time on answering their questions. Since radiation oncology often comes later in the medical process, our consultations provide an opportunity for patients to get a deeper perspective of their treatment options.

FS: What effect do you think rising technology costs and reduced Medicare and managed care reimbursements are having on cancer care?

SP: They clearly have an impact, but both are changing. New technology often starts with one level of CPT [*Current Procedural Technology*] code payment but, in time, the CMS-based [*Centers for Medicare and Medicaid Services-based*] Medicare payments tend to go down. What we must avoid is that payment policies start to dictate practice.

FS: In 1971, the United States government hailed the National Cancer Act as a "national battle plan to eradicate cancer in our lifetime." Nationally, what advancements do you think are bringing us closer to that cure?

SP: The major area of development is the recognition that site-specific cancers are a mixture of diseases, with different characteristics. These characteristics of the tumors can tell us how to treat individual tumors optimally. This will increasingly become a combination of a biological agent with a conventional cytotoxic agent, such as radiation and chemotherapy.

FS: In the past decade, there has been tremendous technological growth in radiation therapy, especially in computer-based systems. What advances do you foresee in the next decade? What role will WUSM radiation oncology play in the development of new technology?

SP: The last decade was characterized by the development of what is called "intensity modulated" radiation therapy. This allowed the delivery of radiation to all types of complicated tumor shapes. The next decade will be characterized by the introduction of image guidance. This new technology allows greater precision in the delivery of treatment and can allow what is called "adaptive therapy." Adaptive therapy takes into account the changes in the size and shape of the tumor during the course of treatment. By acquiring two new treatment machines that offer full-image guidance, WUSM hopes to play a key role in developing the new applications of image-guidance therapy.

"...there are no limits..."

FS: The department has a broad-based research program. Do you have plans for research expansion?

SP: Yes. We plan to expand our research mission in all divisions of the department. I have created a new Division of Bioinformatics and Outcomes Research. Computer-based data analysis is becoming increasingly important in oncology research. The biggest change will be in our biology division, where we are developing a program in DNA repair and genome stability for the Siteman Cancer Center.

FS: What effect will the increased competition for research dollars have on the department's research programs?

SP: The competition will apply more pressure on our faculty—and every research group in the country—to develop competitive research programs. We will have to focus our research on areas of clear strength and work on our grant submissions to make them as effective as possible.

FS: How important is interdisciplinary collaboration to the advancement of science and medicine? Does radiation oncology have interdisciplinary programs in place? Future plans?

SP: The DNA repair program will be interdisciplinary, like all Siteman Cancer Center programs. We also plan an interdivisional group under the umbrella of the Center for Molecular Targeted Radiotherapy. This center will integrate biology, physics, and clinical work with a strong translational initiative. We also see the interdisciplinary disease focus groups having a much stronger presence in the years to come.

FS: The current focus at most medical centers is on cost control. How can the department continue to drive progress while reducing cost?

SP: We have just completed a thorough review of our faculty and staff positions. We cannot afford to keep positions that are no longer needed in

the new formula for the department. Although it is never a favorite job to eliminate positions, we think the department will emerge stronger as a consequence. It will allow new initiatives at a time of being cost-conscious.

FS: What are your overall long-range goals for the Department of Radiation Oncology?


SP: Our long-range goals are to develop intradepartmental translational programs arising out of strong basic science research. In academic medicine, the goal is always to push the envelope of treatment. In concert with strong Siteman Cancer Center programs, this new vision for our department can flourish.

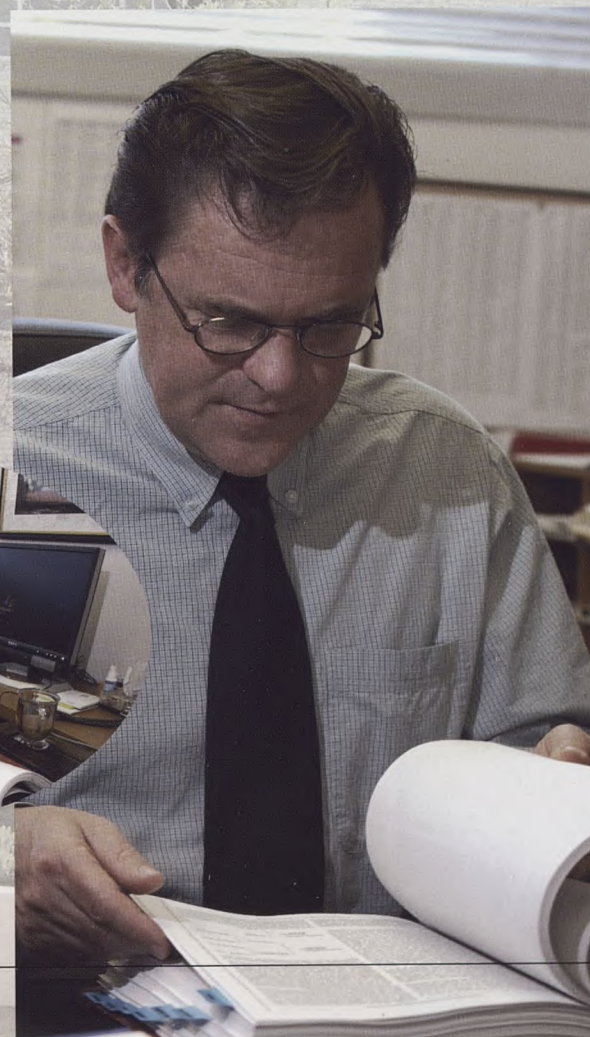
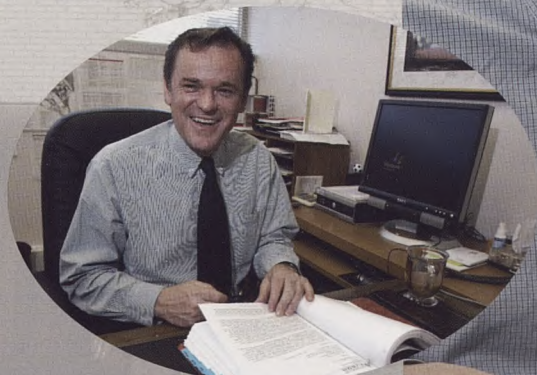
FS: Short-range goals?

SP: The short-range goals are to complete our new faculty recruitments successfully. As I stated earlier, faculty is the key to our strength in our academic mission. We have reorganized our administration to allow greater efficiency in supporting our new initiatives.

FS: Anything you would like to add?

SP: Yes. My first seven months have been very busy but very productive. All of the faculty and staff I have met have been extraordinarily supportive in helping this new department on the road to becoming the finest radiation oncology department in the country.

FS: Thank you, Doctor Powell. 





If The Shoe Doesn't Fit

PATIENTS WITH
DIABETIC NEUROPATHY
BENEFIT FROM 3-D CT

by Anne Kessen Lowell

A typically pleasant St. Louis spring beckons walkers, joggers, golfers, skaters, and bikers to the outdoors.

But for millions of people with diabetes and peripheral neuropathy, a simple stroll poses a hidden threat to future mobility. Many of the 18 million Americans with diabetes suffer from severe foot problems, including neuropathy, bone and joint deformities, and ulcers.

Diabetes damages the communication network from the brain and spinal cord to the extremities—a condition called diabetic peripheral neuropathy (DPN). Patients with DPN lose sensation in their feet, and any minor cut or blister can lead to a serious foot ulcer. DPN also causes weakness in certain muscles of the foot; the anatomy of the foot actually changes as people unknowingly adapt their gait to compensate for the loss of muscle. Pressure builds on the metatarsal heads (the joints under the ball of the foot), causing internal or external ulcers.

Successful treatment and prevention of foot ulcers requires specially fitted shoes and orthotic devices, such as a special shoe insert, that redistribute pressure away from parts of the foot that are ulcerated or may develop ulcers. However, even with orthotic devices, ulcers recur in more than 50 percent of cases. Unless they diligently examine their feet for subtle changes in skin appearance, patients may not realize that an orthotic device is not functioning properly until an ulcer reappears. A severely infected foot may have to be amputated. More than 80,000 lower-limb amputations are performed on diabetic patients in the United States every year, at a cost of \$30,000 to \$60,000 per operation. According to the American Diabetes Association, up to 85 percent of these amputations could be prevented with better diagnosis and treatment.

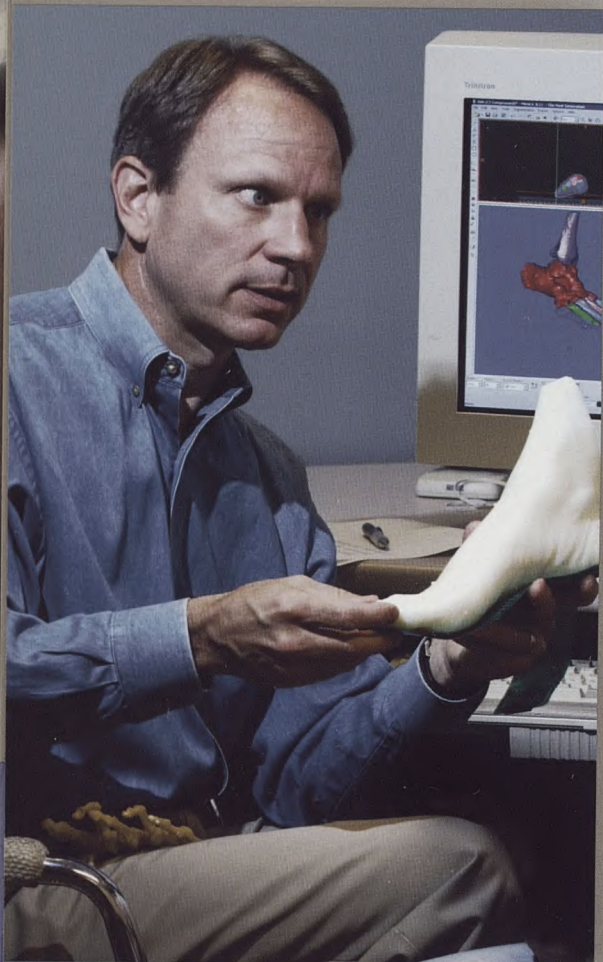
Mallinckrodt Institute of Radiology (MIR) scientists are collaborating with a team of researchers and technicians, looking at new ways to assess severe foot problems in diabetic patients and to provide the best orthotic device for any patient as quickly as possible. Kirk Smith, an MIR senior research engineer, explains, "We are using spiral CT [*computed tomography*] technology to portray the structure of a diabetic patient's foot in a way that has not been done before. Our goal is to help clinicians match the best orthotic device with a patient's unique foot structure and prevent the all-too-common recurrence of ulcers."



Kirk Smith

A remarkable interdisciplinary collaboration has advanced research into the causes and treatment of a diabetic patient's foot problems from the discovery phase to potential practical application. The latest in a series of research studies by the team will be published soon in the *Journal of Biomedical Engineering*. The paper will describe a working three-dimensional model of foot problems caused by diabetes. The team hopes the research will revo-

If The Shoe Doesn't Fit



lutionize orthotic design—a field in which methods have changed little in the 30 years since the advent of modern orthotics.

Michael Mueller, associate professor of physical therapy, emphasizes the advantages of the interdisciplinary research: “This team has the expertise to evaluate all the complex variables that can affect the development of foot problems in the diabetic patient, such as the physiological structure of the foot, the effect of gait on pressure points, and the material properties of the orthotic devices. And we are using advanced computational modeling techniques to test the reliability of our predictions. Orthotic design today is more art than science, and good design is largely a function of the experience of the pedorthist. We’re trying to bring science into the picture to improve orthotic design.”

This is not the first collaboration between physical therapy clinicians and MIR researchers.

Michael Mueller, PhD

In the late 1990s, Smith and a research team developed better-fitting prosthetic devices for patients who had an amputated limb. As CT technology advanced, and lower-dose scans became the norm, Mueller asked Smith if spiral CT could be used to develop a better understanding of the underlying causes of foot problems caused by diabetes. The team embarked on a series of studies that would give a complete picture of foot structure and peak plantar pressures, the measure of pressure on the foot that eventually causes ulcers to form.

Before CT, evaluating the structure of the foot was like putting together a jigsaw puzzle—with only half the pieces. X rays could display bones but only in a single plane. Viewed in profile, only the first or fifth metatarsal could be examined in detail, as the interior views were obscured. Ultrasonography lent information about soft tissue but not in connection with bone detail. Research involving

THE RESEARCH TEAM

Washington University

*Department of Radiology
(Mallinckrodt Institute)*

- Kyongtae Bae, MD, PhD, associate professor of radiology
- James Blaine, DSc, emeritus professor of radiology
- Paul Commean, BEE, senior research engineer
- Tom Pilgram, PhD, instructor in radiology
- Fred Prior, PhD, research associate professor of radiology
- Kirk Smith, AAS, senior research engineer

Program in Physical Therapy

- Mary Hastings, DPT, instructor in physical therapy
- Joseph Klaesner, PhD, research assistant professor of physical therapy
- Donovan Lott, MS, PT, predoctoral trainee
- Michael Mueller, PhD, associate professor of physical therapy
- Dequan Zou, DSc, research assistant professor of physical therapy

Department of Orthopaedic Surgery

- Jeffrey Johnson, MD, associate professor of orthopaedic surgery
- Matthew Silva, MD, associate professor of orthopaedic surgery

Department of Mechanical Engineering and Aerospace

- Ricardo Actis, DSc, adjunct professor of mechanical engineering
- Barna Szabo, PhD, professor of mechanical engineering and aerospace

Other collaborators

- Liliana Ventura, Engineering Software Research & Development, Inc.
- pedorthist consultants

MIR scientists and Mueller has demonstrated spiral CT's many advantages over these earlier methods. With CT, bone structure and soft tissue can be evaluated together and can use the same scale, and three-dimensional views allow greater detail examination. The team was able to take accurate measurements of such key attributes as toe angle for each metatarsal, severity of "hammer toe" deformity, bone density, and hallux valgus angle.

The team also used CT to understand how soft tissue is affected by pressure from standing and walking. Using a specially designed seat, a plate to provide pressure, and special sensors taped to a person's foot, the team simulated standing, push-off, and walking pressures on the foot. By recording soft tissue thickness, peak plantar pressure, and contact area between foot and plate, Smith and his colleagues were able to complete the puzzle of the foot problems caused by diabetes

and to understand the major risk factors potentially leading to amputation.

Now, with the assistance of Barna Szabo, professor of mechanical engineering and aerospace, the research team is building a three-dimensional model of a foot with the typical features of a person suffering from DPN. "Our goal," explains Smith, "is to predict the characteristics of the orthotic device so that the first fit is the best fit. If we are successful, the recurrence rate of ulcers in a patient's foot will drop, new ulcers will not form, and patients will be spared amputation."

Three-dimensional modeling uses data collected through spiral CT from actual patients and a complex theoretical mathematics technique called finite element analysis, which was originally used in the aerospace industry and now

CT Loading Device. A pressure sensor is attached to the study volunteer's foot, which is placed flat against a force plate.

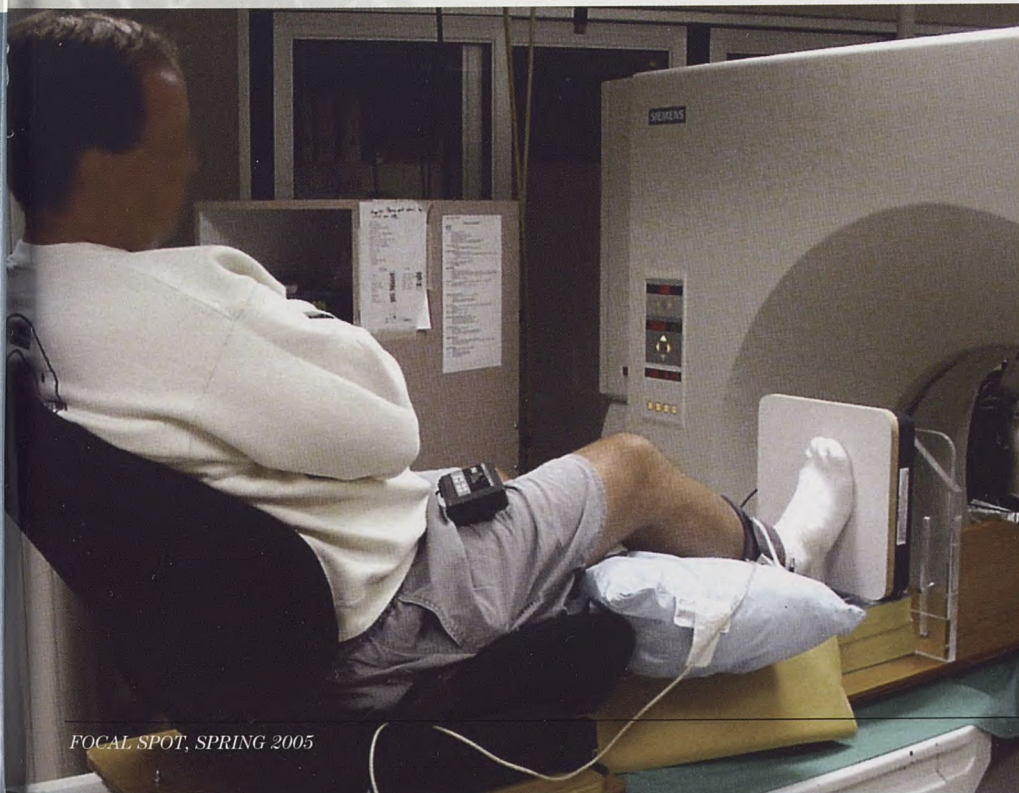


Some patients with foot ulcers wear specially fitted shoes equipped with an insert that alleviates pressure on the affected area.

STATISTICS

- 18.2 million (6.3%) Americans have diabetes.
- 60% to 70% of people with diabetes have mild to severe forms of nervous system damage, including impaired sensation in the feet.
- Severe forms of diabetic nerve disease are a major contributing cause of lower-extremity amputations.
- 1 in 4 people with diabetes will develop a foot ulcer in their lifetime.
- In the St. Louis metro area, 5.4% of the population has diabetes.
- In a 2003 survey of diabetic patients in the St. Louis-area, 14% reported having sores or irritations on their feet that took more than four weeks to heal.

Sources: State of Missouri Department of Health and Senior Services (www.dhss.mo.gov); American Diabetes Association (www.diabetes.org)



If The Shoe Doesn't Fit

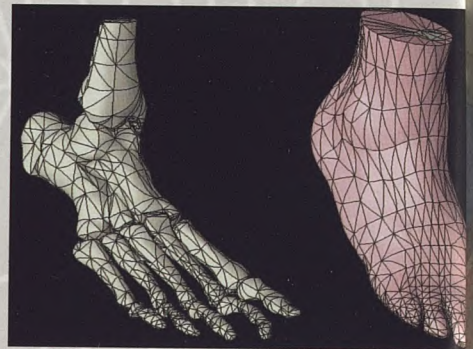
DEFINITIONS

- **Hallux valgus:** a painful condition in which the big toe rotates toward the second toe at the first metatarsal head
- **Hammer toe:** a deformity of the toe in which the end of the toe is bent downward and the middle joint is bent at a severe angle
- **Pedorthist:** a specialist in evaluating and designing foot orthoses and shoes for patients requiring protective support or correction
- **Plantar pressure:** pressure on the sole of the foot

is applied in every engineering field from industrial design to biomedical engineering. Working with CT images and data collected by MIR researchers, Szabo's team constructed a model of the bones, cartilage, tissue, and tendons of a diabetic patient's foot. Using finite element analysis the team solved a system of nonlinear equations representing the deformation of the foot under load. The procedure requires the construction of a mesh of tetrahedral shapes (elements) describing the topology of each object. A tetrahedral is a polyhedron composed of four triangular faces; one of the MIR models used 78,112 tetrahedrons to create the 3-D foot model.

Smith and the team are still refining this complex model. Once tested and validated, it could use patient-specific data to reflect that patient's bone structure and tissue properties. Initially Smith expects to obtain these details via CT scan but eventually hopes to employ a less expensive method such as X ray. Combined with the patient's weight, the model then could "try on" different orthotics and take a virtual walk. Simulating pressure from standing, pushing off, and walking, the model will show whether the device distributes pressure away from areas at risk for ulceration. By adjusting the

type or thickness of the virtual orthotic's material, or its placement or shape, researchers can find the best orthotic design quickly and with minimal modification. One day, if all of the pieces come together, treating foot problems caused by diabetes will be just a walk in the park. **MIR**



3D Model: 21,444 Tetrahedral Elements



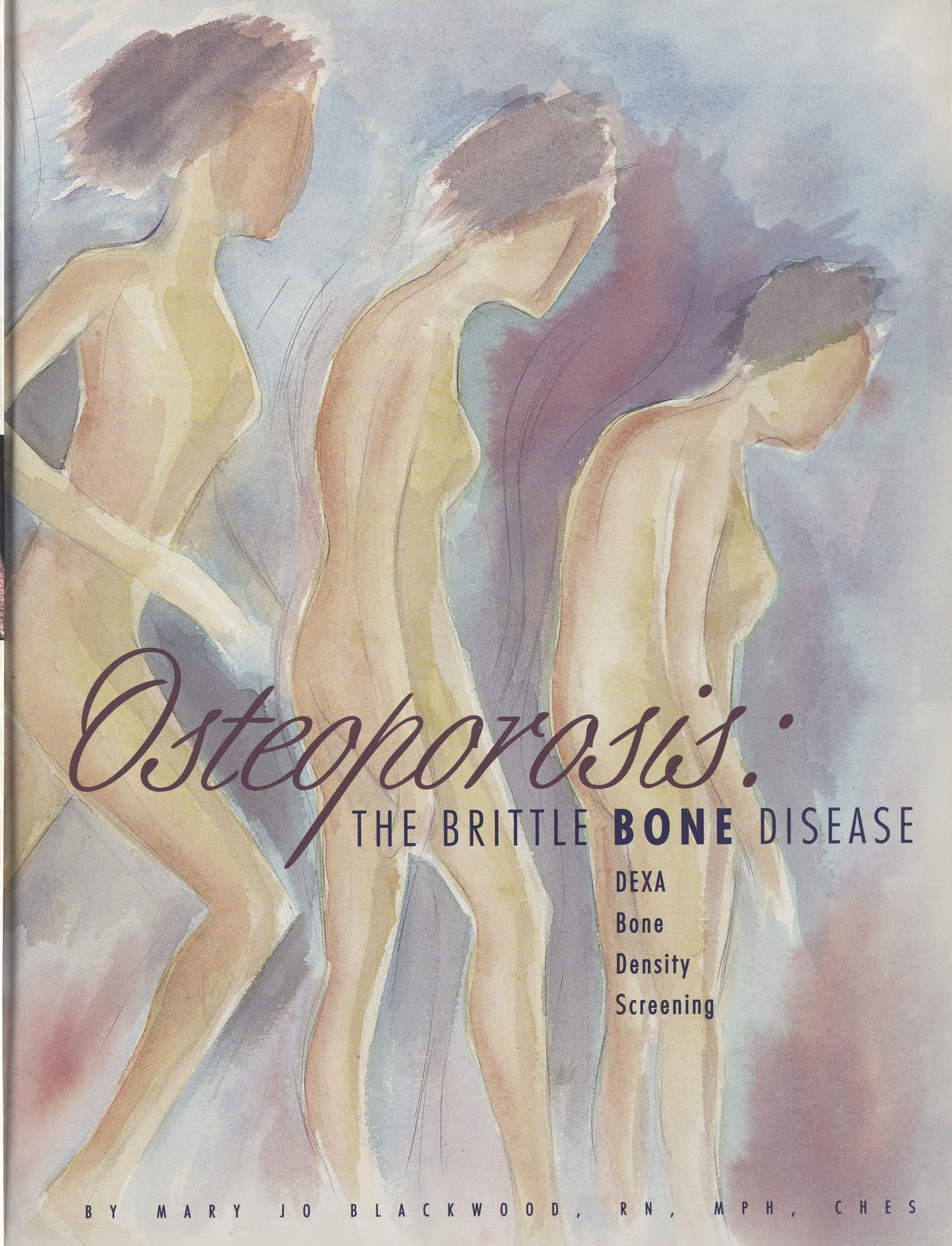
3D image of foot and angled tendon.

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Osteoporosis: THE BRITTLE **BONE** DISEASE

DEXA
Bone
Density
Screening

BY MARY JO BLACKWOOD, RN, MPH, CHES



Osteoporosis:
THE BRITTLE **BONE** DISEASE

It's no accident that people around the world tend to be preoccupied with bones. Among the most devastating effects of the postmenopausal retreat of estrogen is the loss of bone density. "Peak bone mass occurs at about age thirty. Bone mass falls off slowly, but in the five years after menopause women lose bone mass more rapidly," says Keith Fischer, MD, an associate professor of radiology and a nuclear medicine physician at Mallinckrodt Institute of Radiology (MIR). He

Osteoporosis

is not an inevitable part of aging: it is preventable. So it is vital that all of us, of all ages, start taking care of our bones now, before it is too late."

— THE DUCHESS OF CORNWALL, PRESIDENT OF
GREAT BRITAIN'S NATIONAL OSTEOPOROSIS SOCIETY

uses Dual-Energy X-ray Absorptiometry to diagnose bone loss in his patients. DEXA, as it is sometimes called, is the established standard for measuring bone mineral density and tracking bone loss. It is used most commonly to diagnose osteoporosis, a condition in which a gradual loss of calcium causes the bones to become thinner, more fragile, and more likely to break.



"Ideally, a baseline bone density study is performed on a woman when she is perimenopausal and first starts to experience menopausal symptoms. That way, if she is already osteopenic, her physician can initiate treatment," says Fischer.

Osteopenia is a mid-point value of bone density, between the normal range and the range designated as osteoporosis. Fischer says that men also can develop osteoporosis, but they seem to lag behind women by 10 years. Men over 70, especially if they have a high risk of fractures, should have bone density testing.

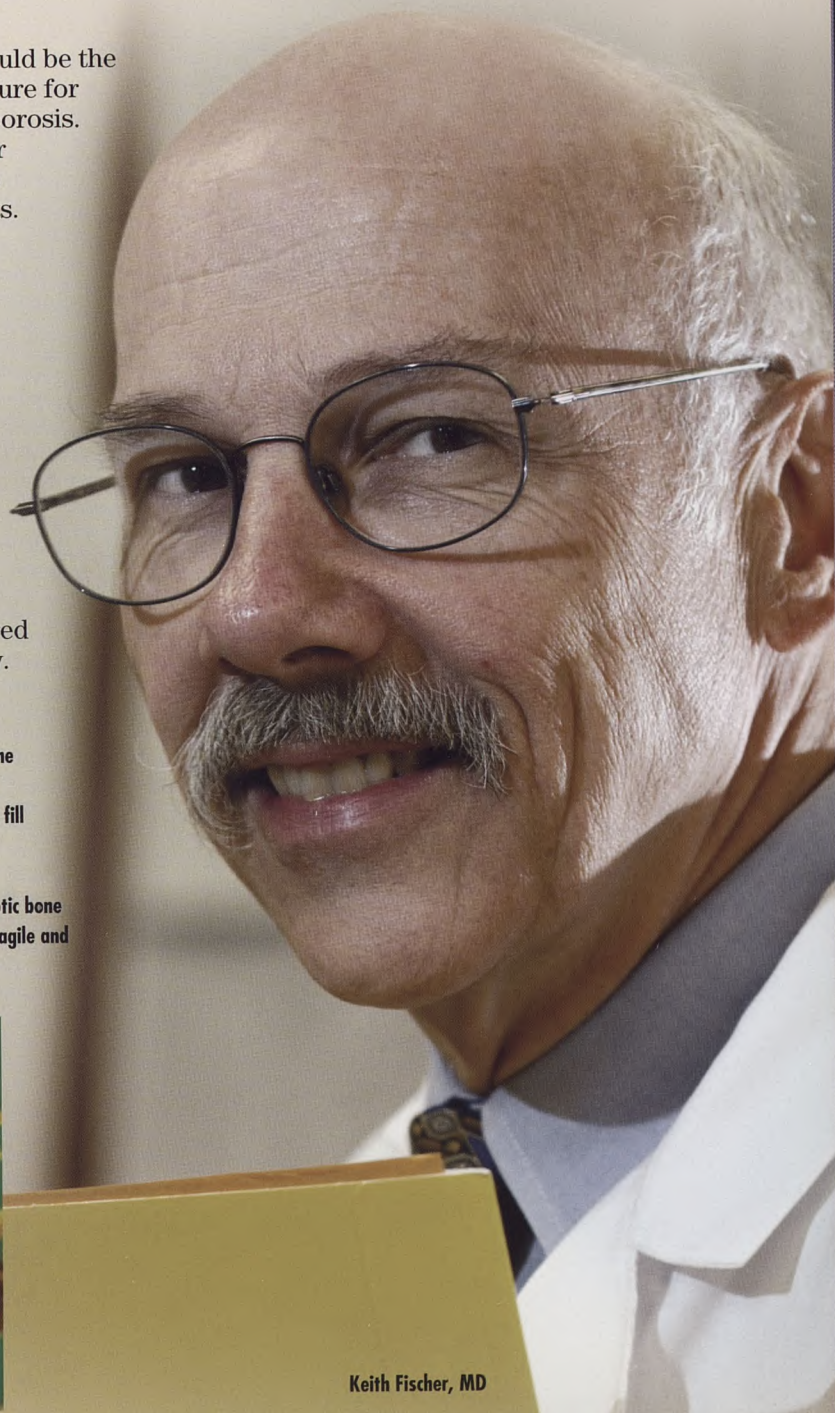
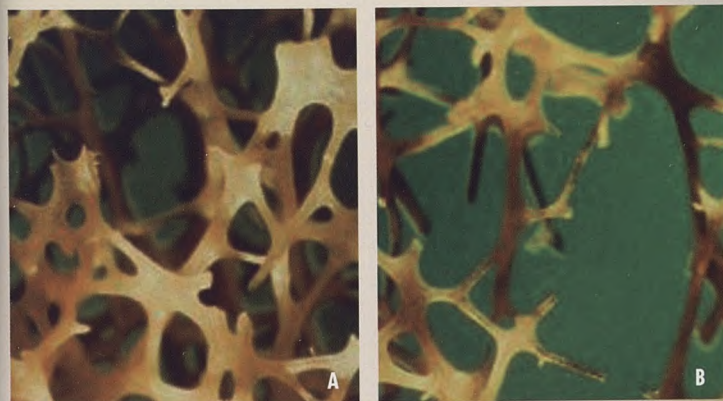
How DEXA Works

According to Fischer, DEXA measures the amount of calcium phosphate absorbing X rays. Bone mineral loss accelerates after menopause and affects the trabecular bone that forms the body's internal supports. The vertebrae are made up of 75% trabecular bone and the hips are

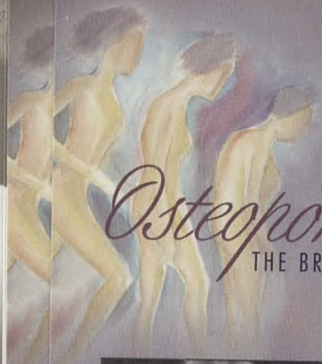
50%, so the spine should be the more sensitive structure for first detecting osteoporosis. However, in the older patient, other factors complicate the results. There are calcium deposits in plaque in the aorta that runs through the same area and in the facet joints between the vertebrae where osteoarthritis is more pronounced. This calcium can be measured as bone mineral, thus falsely elevating the measured bone mineral density.

Figure A (below): A healthy bone includes protein, calcium, blood vessels, and bone marrow that fill in the interior spaces.

Figure B (below): An osteoporotic bone has large "holes," making it fragile and more likely to break.

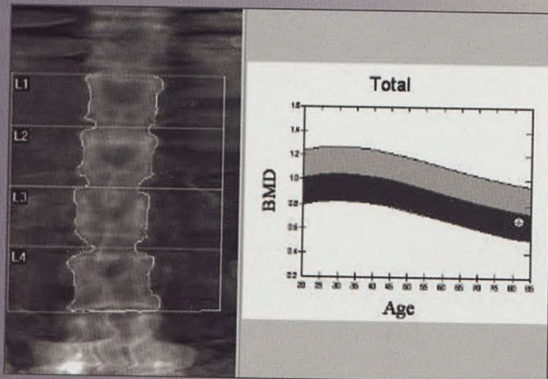
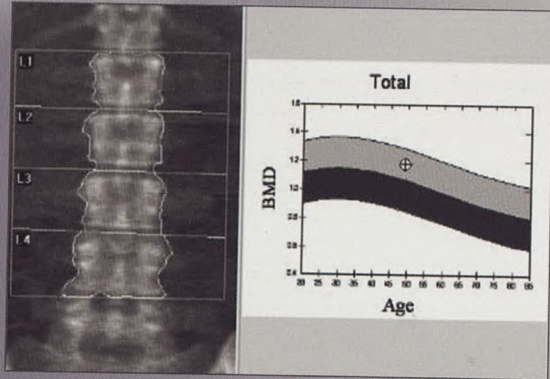


Keith Fischer, MD



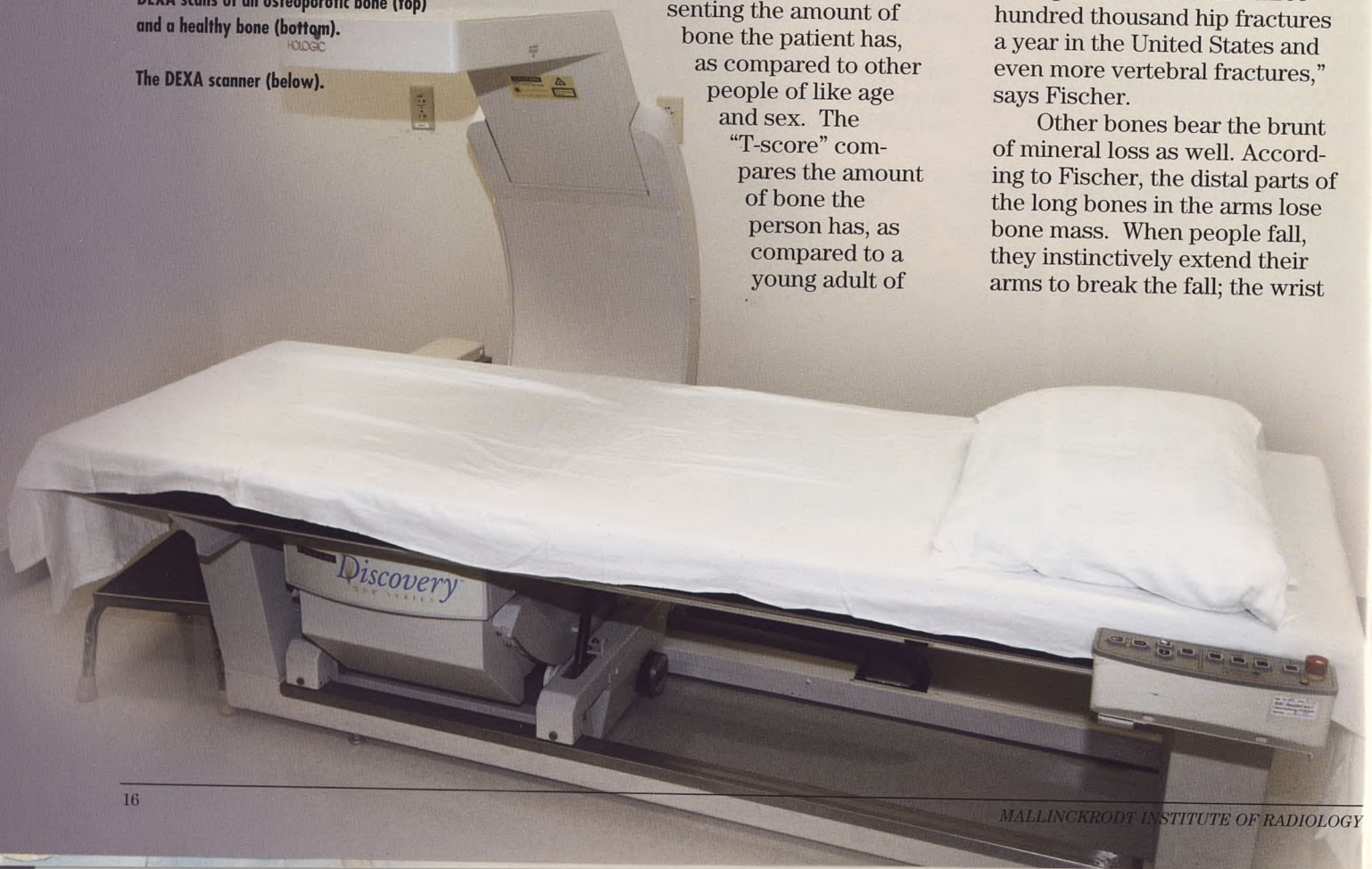
Osteoporosis:

THE BRITTLE BONE DISEASE



DEXA scans of an osteoporotic bone (top) and a healthy bone (bottom).

The DEXA scanner (below).



“DEXA doesn’t differentiate between sources of calcium. It counts them all. That’s why we also study the hip because it doesn’t have those confounding characteristics,” says Fischer. “The patient is defined as being osteoporotic if either of those measurements is more than two point five standard deviations, or SD, below the peak normal bone mineral density.”

DEXA works by focusing an X-ray beam on the bone and measuring how much of the beam penetrates the bone. More mineral present in the bone equates to less penetration of the X-ray beam. Different scores have been developed to describe various levels of bone loss by comparing them to established standards. Two scores are calculated and communicated in a report to the referring physician. The “Z-score” is a number representing the amount of bone the patient has, as compared to other people of like age and sex. The “T-score” compares the amount of bone the person has, as compared to a young adult of

the same sex at peak bone mass. If either the hip or the spine has a T-score of 2.5 SD below peak bone mass, the diagnosis is osteoporosis.

“However, even before a patient develops osteoporosis, they have lost some bone mass,” says Fischer. According to Fischer, patients whose readings are 1.0 to 2.5 SD below peak are designated as having osteopenia, or low bone density. If a patient already is osteopenic, therapy may be appropriate to head off osteoporosis.

Low DEXA scores indicate the need for treatment to prevent fractures and subsequent disability. “At Mallinckrodt Institute, we are interested in the central structures such as the spine and hips—bones that suffer the ravages of osteoporosis. There are three hundred thousand hip fractures a year in the United States and even more vertebral fractures,” says Fischer.

Other bones bear the brunt of mineral loss as well. According to Fischer, the distal parts of the long bones in the arms lose bone mass. When people fall, they instinctively extend their arms to break the fall; the wrist

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takes the full impact of the body's weight and breaks, resulting in approximately 250,000 wrist fractures annually.

"Part of a physician's evaluation of fracture risk has to include, in addition to bone mineral measurements, extrinsic risk factors, such as the patient's balance and safety risks in the home for patients with osteoporosis. Throw rugs, unlighted stairways, and uneven floors must be factored into fracture risk. Also important to consider are the intrinsic risk factors, like calcium and vitamin D intake, medications that could contribute to bone loss, and a patient's overall nutritional status—considerations that make people more likely to suffer a fracture," says Fischer.

Other uses for DEXA

DEXA devices also can image the whole spine, measure the height of the vertebrae, and over time track a patient's bone density loss and detect early vertebral fractures. "It's called high-definition, instant vertebral assessment," says Fischer. "By comparing sequential images of the spine, we can determine if there has been a vertebral fracture. Based on a recent study, patients who have had a vertebral fracture have a three-fold to eleven-fold greater risk of having another fracture." This vertebral height measurement can be done at the same time as conventional bone density testing to add more



CASE STUDIES

The typical candidate for osteoporosis is a postmenopausal woman with one or more risk factors. DEXA is utilized both to detect bone mineral loss and to follow patients to assess the effectiveness of therapeutic interventions. The following cases are illustrative.

Case A

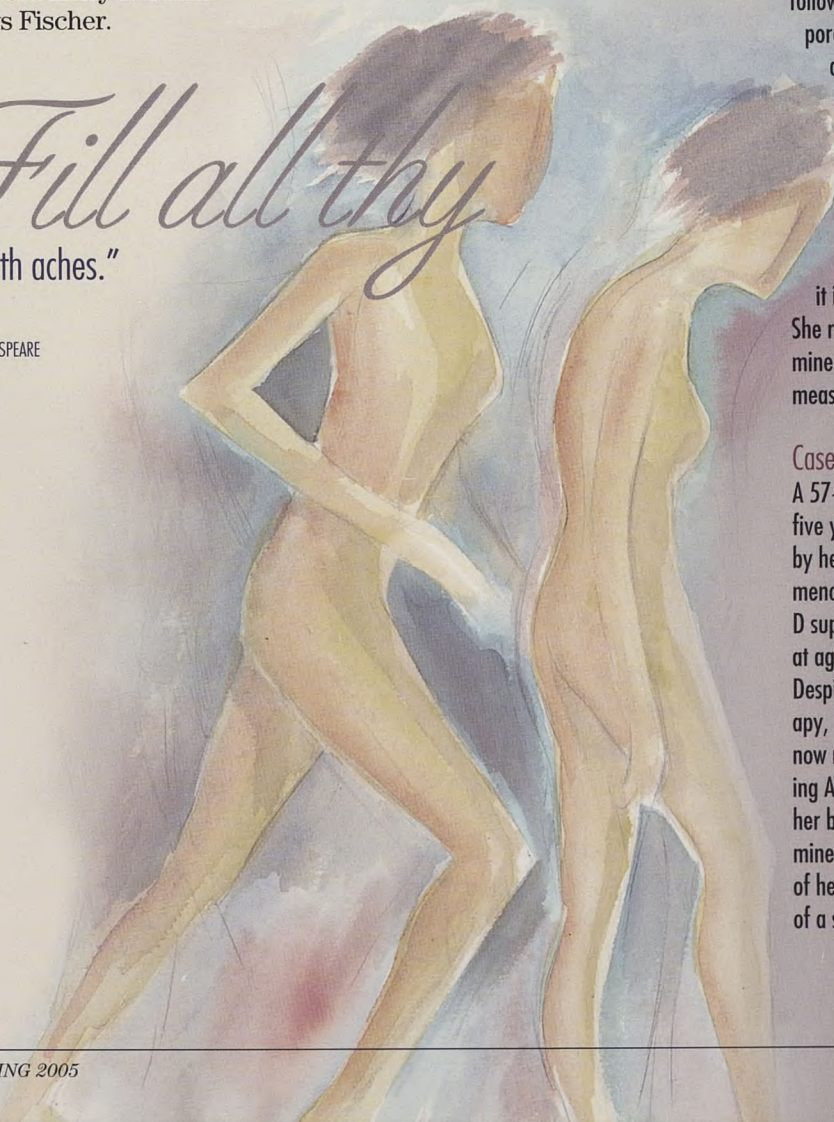
A 63-year-old postmenopausal woman presents for a follow-up examination. A spine DEXA detected osteoporosis at age 61. She was post total hysterectomy at age 38. She was begun on therapy with Vitamin D and bisphosphonates. Her bone mineral density, which was 0.746 gm/cm² at age 61, is now 0.767 gm/cm². Although this is an increase, it is not considered statistically significant; ie, the increase is within the variability of the test and it is uncertain whether it is a real increase. She remains in the osteoporotic range of spine bone mineral density and needs surveillance bone mineral measurements yearly.

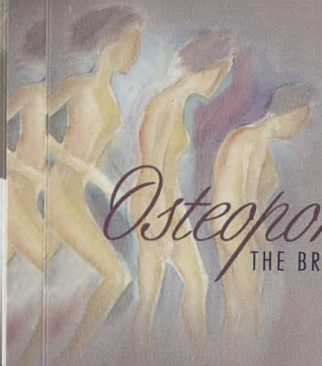
Case B

A 57-year-old woman with breast cancer presents five years after osteopenia of the spine was detected by her initial DEXA performed when she was perimenopausal. She was started on calcium and Vitamin D supplementation, but a follow-up study of the spine at age 56 showed mild decrease in bone density. Despite the initiation of bisphosphonate medical therapy, she continues to lose bone mineral density and now measures in the osteoporotic range. She is taking Aromasin® (exemestane tablets) for treatment of her breast cancer—a further risk factor for bone mineral loss. Referral for more intensive monitoring of her calcium metabolism and perhaps introduction of a structured exercise program is warranted.

*"Fill all they
bones with aches."*

—WILLIAM SHAKESPEARE






Osteoporosis:

THE BRITTLE BONE DISEASE

information to the assessment of the need for pharmacologic intervention.

DEXA devices can be used to measure body fat with whole-body scans as a part of research protocols. A full-body scan measures body composition, including percentage of body fat and lean body mass in addition to determining bone mineral density of all bones. DEXA tends to be more accurate for body-fat analysis than is bio-electrical impedance analysis (BIA) but less accurate than is water displacement, the standard criterion for body-composition analysis.

DEXA bone density referrals

The referring physician should fax an order to the nuclear medicine physician or give an order to the patient to take to the exam. Bone density examinations at Mallinckrodt Institute can be scheduled by calling 314-362-7111. Referring physicians who wish to confer with a nuclear medicine physician can call 314-454-7997. 

OSTEOPOROSIS RISK FACTORS FOR MEN AND WOMEN

Indicates need for bone density testing

- Diagnosed with insulin-dependent diabetes, liver disease, kidney disease, or hyperthyroidism
- Family history of osteoporosis
- Asian or white
- Advanced age
- High bone turnover, which shows up as excessive collagen in the urine
- Past vertebral fractures or fracture from mild trauma
- Use of certain drugs that cause bone loss, such as some barbiturates, high-dose thyroid replacement drugs, anticonvulsants, or steroids
- Cigarette smoking
- Excessive alcohol use
- Poor nutrition
- Low calcium intake/vitamin D deficiency
- Inactive lifestyle

Additional risk factors for men

- Thin or small build
- Anti-testosterone drug treatment for prostate cancer

Additional risk factors for women

- Weight under 125 pounds
- Height over 5'7"
- Small-boned
- Menopausal and not on hormone replacement therapy



Websites

HELPFUL WEB SITES

- National Institutes of Health Osteoporosis and Related Bone Disease—National Resource Center: www.osteoporosis.nih.gov
- National Osteoporosis Foundation: www.nof.org
- Radiological Society of North America: www.rsna.org/content/dexa.htm

MARK YOUR CALENDAR...

RSNA2005

Connecting for Lifelong Learning



91ST SCIENTIFIC ASSEMBLY AND ANNUAL MEETING

NOVEMBER 27 – DECEMBER 2, 2005

MCCORMICK PLACE • CHICAGO

FYI

In this section, the names of employees who are full-time faculty or staff or who have an appointment in the Department of Radiology or Department of Radiation Oncology are highlighted in boldface type.

PROMOTIONS

Carmen Dence, MS, research scientist of radiology, was promoted to research associate professor of radiology, Division of Radiological Sciences, Department of Radiology.

Issam El Naqa, PhD, research associate, was promoted to research instructor in radiation oncology, Division of Radiation Physics, Department of Radiation Oncology.

Jacqueline Esthappan, PhD, instructor in radiation oncology, was promoted to assistant professor of radiation oncology, Division of Radiation Physics, Department of Radiation Oncology.

Pilar Herrero, MS, research scientist of radiology, was promoted to research associate professor of radiology, Division of Radiological Sciences, Department of Radiology.

Eric Klein, MS, associate professor of radiation oncology, was promoted to professor of radiation oncology, Division of Radiation Physics, Department of Radiation Oncology.

Robert McKinstry, MD, PhD, assistant professor of radiology, was promoted to associate professor of radiology, Division of Diagnostic Radiology, Department of Radiology.

Eduardo Moros, PhD, associate professor of radiation oncology, was promoted to professor of radiation oncology, Division of Radiation Physics, Department of Radiation Oncology.

Abraham Snyder, MD, PhD, research scientist of radiology, was promoted to research associate professor of radiology, Division of Radiological Sciences, Department of Radiology.

Suresh Vedantham, MD, assistant professor of radiology, was promoted to associate professor of radiology, Division of Diagnostic Radiology, Department of Radiology.

Sally Wagner-Schwarz, RPh, MS, research scientist of radiology, was promoted to research associate professor of radiology, Division of Radiological Sciences, Department of Radiology.

Senturia Lecture

On February 21, Robert Hattery, MD, executive director of The American Board of Radiology, presented the Eleventh Annual Hyman R. Senturia Lecture. He spoke on "The paradigm shift from lifetime to 10-year time-limited certificates: the ABR Maintenance of Certification Plan."

Hattery (right) received a commemorative plaque from Gilbert Jost, MD, chairman of the Department of Radiology and director of Mallinckrodt Institute.



NEW FACULTY

Wilson Edwards, PhD, research instructor in radiology, Division of Radiological Sciences, Department of Radiology.

Lakshmi Santanam, PhD, instructor in radiation oncology, Department of Radiation Oncology.

JOINT APPOINTMENT

Denise Head, PhD, assistant professor of psychology, was appointed assistant professor of radiology, Division of Radiological Sciences, Department of Radiology.

Yoram Rudy, PhD, professor of biomedical engineering, was appointed research professor of radiology, Division of Radiological Sciences, Department of Radiology.

GRANTS

Jason Lewis, PhD, assistant professor of radiology, as principal investigator, received a one-year, \$249,000 grant from the National Institutes of Health for his research on "Beta imager 2000Z digital imaging system."

Wen Ping Li, PhD, research instructor of radiology, as principal investigator, received a Molecular Imaging Center Pilot Research Project grant of \$20,000 for research on "PET imaging of pancreatic cancer via EGF receptor."

Buck Rogers, PhD, assistant professor of radiation oncology and of radiology, received a \$1.2 million grant from the National Institutes of Health for work on "Somatostatin receptor based PET imaging of gene transfer." Coinvestigators for the four-year grant are **Nobuo Horikoshi, PhD**, assistant professor of radiation oncology, and Gregory Adams, PhD, Fox Chase Cancer Center. Collaborators for the project include **Carolyn Anderson, PhD**, associate professor of radiology; **David Piwnica-Worms, MD, PhD**, professor of radiology, and **Michael Welch, PhD**, professor of radiology.

Sheng-Kwei Song, PhD, assistant professor of radiology, as principal investigator, received a \$925,000 grant from the National Institutes of Health/National Institute of Neurological Disorders and Stroke for research on

"Evaluation of spinal cord white matter injury using DTI." Coinvestigators for the four-year grant are Anne Cross, MD, Department of Neurology; John Russell, PhD, Department of Molecular Biology and Pharmacology; Philip Bayly, PhD, Department of Mechanical Engineering and Aerospace; and Robert Schmidt, MD, PhD, Department of Pathology and Immunology.

Jie Zheng, PhD, assistant professor of radiology, as principal investigator, received a \$1.5 million grant from the National Institutes of Health/National Heart, Lung, and Blood Institute for work on "Quantification of regional myocardial oxygenation by MRI." Coinvestigators for the four-year grant are **Robert Gropler, MD**, professor of radiology; **Joseph Deasy, PhD**, associate professor of radiation oncology; and **Pamela Woodard, MD**, assistant professor of radiology; and Michael Jerosch-Herold, PhD, Oregon Health and Science University, Portland.

APPOINTMENTS/ELECTIONS

Samuel Achilefu, PhD, associate professor of radiology, was appointed to a three-year term as a member of the Microscopic Imaging Study Section, Center for Scientific Review, United States Department of Health and Human Services, National Institutes of Health.

Jeffrey Bradley, MD, assistant professor of radiation oncology, was elected to a three-year term as member-at-large of the Executive Committee of the American College of Radiology's (ACR's) Radiation Therapy Oncology Group. He also was elected as a member of the ACR's Lung Cancer Expert Panel (appropriateness criteria).

Craig Glaiberman, MD, instructor in radiology, was appointed to the Professional Education Committee of the Society of Interventional Radiology.

Sean Higginson, MD, third-year diagnostic radiology resident, is the first resident physician to be appointed to the Board of Directors for RADPAC, the political action committee of the American College of Radiology Association.

APPOINTMENTS/ ELECTIONS

Continued from page 21

Eric Klein, MS, professor of radiation oncology, was appointed as chair of the American Association of Physicists in Medicine Subcommittee on Quality Assurance for Radiation Therapy.

Jason Lewis, PhD, assistant professor of radiology, was elected to a two-year term as treasurer of the Radiopharmaceutical Science Council of The Society of Nuclear Medicine.

Robert McKinstry, MD, PhD, associate professor of radiology, was appointed to the Trans-National Institutes of Health Panel on Incidental Findings: Detection and Disclosure of Incidental Findings in Neuroimaging Research. He was appointed to the External Advisory Committee of the Comprehensive Sickle Cell Center, St. Jude Children's Research Hospital, Memphis, Tennessee.

Jeff Michalski, MD, associate professor of radiation oncology, was appointed to the Board of Directors of the Missouri Radiological Society.

Pamela Woodard, MD, assistant professor of radiology, was appointed to a three-year term on the Scientific Program Committee of the American Heart Association and as chair of the association's Program Committee for the Cardiovascular Radiology and Intervention Council.

HONORS/AWARDS

Louis Gilula, MD, professor of radiology and of surgery, received the 2005 Outstanding Presentation Award for "Complications of fluoroscopically guided extraforaminal cervical nerve blocks: an analysis of 1,036 injections" at the 37th Annual Diagnostic Course in Davos Musculoskeletal Diseases, Davos, Switzerland, April 2-8. As visiting professor, he was a member of the Board Review on Musculoskeletal Radiology, Oregon Health and Science University, Portland, April 22-25.

LECTURES

Carolyn Anderson, PhD, associate professor of radiology, presented "Chemistry, imaging and therapy application of copper-64 radiopharmaceuticals" to the Department of Chemistry, Florida State University, Tallahassee, February 24. She spoke on "Molecular imaging of cancer with copper-64 radiopharmaceuticals" at Florida Atlantic University, Boca Raton, March 25.

Jeffrey Brown, MD, professor of radiology, presented "MR contrast agents" at Vanderbilt University, Nashville, Tennessee, February 15. He spoke on "MR imaging of the indeterminate renal mass" at Radiology Grand Rounds: MRI of Cholangiocarcinoma and Gallbladder Cancer, Wake Forest University, Winston-Salem, North Carolina, March 16.

Colin Derdeyn, MD, associate professor of radiology and of neurology and neurological surgery, presented "Subarachnoid hemorrhage: clip versus coil" and "Neurointerventional procedures for the practicing intensivist" at the 34th Critical Care Congress, Society of Critical Care Medicine, Phoenix, Arizona, January 17. He spoke on "Overview of cerebral hemodynamics" at the 5th Annual International Meeting on Cerebral Revascularization, St. Louis, Missouri, January 20. He spoke on "Ongoing carotid stent trials" and "Selection of patients for cerebral revascularization: the role of hemodynamic assessment" at the 8th Annual Joint Meeting of the American Association of Neurological Surgeons/Congress of Neurological Surgeons Joint Section on Cerebrovascular Disease and American Society of Interventional and Therapeutic Neuroradiology, New Orleans, Louisiana,

February 3 and 4. Derdeyn presented "Thrombolytic therapy for acute stroke" at the 30th Annual International Stroke Conference, New Orleans, Louisiana, February 4. He spoke on "Clip versus coil for aneurysm debate: pro coils" at the NeuroCritical Care Society Annual Meeting, Phoenix, Arizona, February 25.

Louis Gilula, MD, professor of radiology and of surgery, spoke on "Complications in 1036 cervical nerve blocks" at the American Society of Spine Radiology 2005 Annual Symposium, San Juan, Puerto Rico, February 27. He presented "Wrist imaging entities to know that often are not" at Balgrist Hospital, Zurich, Switzerland, March 5. He presented "Wrist and hand" at the 37th Annual Diagnostic Course in Davos Musculoskeletal Diseases, Davos, Switzerland, April 2-8.

Perry Grigsby, MD, professor of radiation oncology and of radiology, spoke on "Radiation therapy for thyroid cancer" at the Greater St. Louis Society of Radiologists meeting, St. Louis, Missouri, February 15. He presented "Adjuvant treatment of thyroid cancer" at the 13th Annual Refresher Course and Update in General Surgery, Washington University in St. Louis, Missouri, February 24.

Jay Heiken, MD, professor of radiology, spoke on "CT evaluation of small bowel obstruction" and "CT of the abdominal aorta: aneurysm rupture and post-operative complications" at Indiana University, Indianapolis, January 12. He presented "Contrast administration and scan timing for MDCT: single to 4, 8, and 16 row" and "CT evaluation of suspected abdominal aortic rupture" at Practical Radiology at Whistler, sponsored by the University of British Columbia, Whistler, February 6-11. He presented "Scan and contrast administration principles of MDCT" at the MDCT Imaging: New Challenges for Scan and Contrast Optimization Symposium, European Congress of Radiology, Vienna, Austria, March 4-8. He spoke on "Contrast administration and scan timing for multidetector CT," "CT evaluation of small bowel obstruction," and "Tough liver cases: take the challenge!" at the International London Course in CT, MRI, and PET, Auchterarder, Perthshire, Scotland, March 20-24. He presented "Contrast optimization in MDCT," "Liver imaging with MDCT," and "Pancreatic MDCT" at MDCT: A Practical Approach, sponsored by the Society of Computed Body Tomography and Magnetic Resonance, Scottsdale, Arizona, April 2, and Dallas, Texas, April 16.

Richard Laforest, PhD, assistant professor of radiology, spoke on "Measurements of input functions in rodents: challenges and solutions" at the Third La Jolla Conference: The Magic Bullet, a Century Later, La Jolla, California, February 26.

William McAlister, MD, professor of radiology, presented a workshop on "Skeletal dysplasia" at the 48th Annual Meeting of the Society for Pediatric Radiology, New Orleans, Louisiana, May 5.

Jeff Michalski, MD, associate professor of radiation oncology, spoke on "The role of external RT, brachytherapy, adjuvant/neoadjuvant hormonal therapy for localized disease and following RP" at the Israel Society for Clinical

Biello Lecture

Daniel Silverman, MD, PhD, associate professor of molecular and medical pharmacology, is head of the neuronuclear section and associate director of the Alzheimer's Disease Center Imaging Core at the David Geffen School of Medicine at the University of California, Los Angeles. As guest speaker for the Nineteenth Annual Daniel R. Biello Memorial Lecture on March 14, Silverman spoke on "FDG-PET in the evaluation of mild cognitive impairment, Alzheimer's disease, and related disorders."

Shown with Silverman (left) is Barry Siegel, MD, chief of the Institute's Division of Nuclear Medicine and coordinator of the Biello Lecture.



LECTURES

Continued from page 23

Oncology and Radiation Therapy Conference, Eilat, Israel, January 12-14. He presented "Radiation therapy for prostate cancer, from 3D CRT to IMRT" at the 15th Annual Meeting of the American College of Radiation Oncology, Las Vegas, Nevada, February 24-27.

Jeffrey Neil, MD, PhD, professor of neurology, of pediatrics, and of radiology, presented "Survey and current status of research on biophysical issues in diffusion MRI of brain. Progress since the last workshop in St. Malo" at the International Society for MR in Medicine Workshop on Methods for Quantitative Diffusion MRI of the Human Brain, Lake Louise, Alberta, Canada, March 13-16.

Fred Prior, PhD, research associate professor of radiology, spoke on "Digital modalities, study acquisition, distribution and storage requirements" and "Storage hardware and infrastructure" at the PACS 2005 Conference, San Antonio, Texas, March 9-12.

David Rubin, MD, associate professor of radiology, spoke on "Knee" at the 37th Annual Diagnostic Course in Davos Musculoskeletal Diseases, Davos, Switzerland, April 2-8.

Barry Siegel, MD, professor of radiology and of medicine, presented "Breast cancer: solutions" and "Gynecological malignancies: solutions" at the PET/CT and SPECT/CT Imaging of Cancer for Radiologists and Nuclear Physicians, sponsored by Johns Hopkins University, Baltimore, Maryland, March 18 and 19. He spoke on "PET and PET/CT in lung cancer" and "PET in gynecologic cancer" at Imaging 2005: Hot Topics and Current Issues, sponsored by The New York Roentgen Society, New York City, New York, March 30-April 2. He presented "PET and PET/CT in lung cancer and breast cancer" at Radiology Grand Rounds as well as "PET artifacts and variants" and "Endocrine nuclear medicine imaging" at Eastern Virginia Medical School, Norfolk, Virginia, April 18. Siegel presented "Applications of PET and PET/CT in clinical oncology" at Nuclear Medicine Grand Rounds, State University of New York at Buffalo, April 27.

Marilyn Siegel, MD, professor of radiology and of pediatrics, spoke on "CT/MRI of focal hepatic masses in children" and "CT of common thoracic lesions in children" at Oregon Health and Science University, Portland, February 3. She presented "Pediatric CT angiography," "CT angiography of adult mediastinal arterial anomalies," and "CT angiography of adult mediastinal venous anomalies" at the Advanced

Topics in CT Scanning: CT Angiography, 3D Imaging, Virtual Imaging Course, sponsored by Johns Hopkins University, Los Angeles, California, April 1-3 and Baltimore, Maryland, April 7-9. She spoke on "MDCT of adult mediastinal vascular anomalies," "CT/MR of pediatric mediastinal lesions," and "CT of pediatric congenital lung anomalies" at North Shore University Hospital, Manhasset, New York, April 13.

Joseph Simpson, MD, PhD, professor of radiation oncology, presented "Image guided radiation therapy" at the Carle Clinic, Urbana, Illinois, January 29.

Franz Wippold, MD, professor of radiology, spoke on "Lumbar spine: the herniated disk" at the 2005 Annual Meeting of the American Academy of Orthopaedic Surgeons, Washington, DC, February 24.

SYMPOSIA

In this section of FYI, only those faculty and staff who have Department of Radiology or Department of Radiation Oncology appointments are listed.

THE SOCIETY OF GASTROINTESTINAL RADIOLOGISTS/ THE SOCIETY OF URO RADIOLOGY

*Abdominal Radiology Course 2005
San Antonio, Texas
February 27-March 4, 2005*

Dennis Balfe, MD, program director.

Jay Heiken, MD, moderator, Plenary Session: Abdominal Emergencies.

Christine Menias, MD, panelist, Unknown Case.

WORKSHOPS

Jay Heiken, MD, "Small bowel obstruction."

Elizabeth McFarland, MD, "CT colonography: technique and avoiding pitfalls."

Christine Menias, MD, "CT of RLQ pain."

PLENARY SESSION

Sharlene Teefey, MD, "Complicated cholecystitis."

AMERICAN COLLEGE OF CARDIOLOGY

54th Annual Scientific
Session Exposition
Orlando, Florida
March 6-9, 2005

Robert Gropler, MD,
cochair, Advances in
SPECT/PET for Risk
Stratification; moderator,
Read with the Experts...
Imaging Perfusion and
Metabolism with PET,
SPECT, and PET/CT.

Madelyn Stazzone, MD;
Pamela Woodard, MD;
Michael Pasque, MD;
Glenn Foster, RT; Philip
Ludbrook, MD, "Myocardial
scarring and fibrosis in the
failing single ventricle after
Fontan operation: a new
insight by MRI studies."

Victor Davila-Roman, MD,
"Cardiac resynchronization
therapy improves left ven-
tricular diastolic function in
nonischemic heart failure."

SOCIETY OF COMPUTED BODY TOMOGRAPHY AND MAGNETIC RESONANCE

28th Annual Course
South Beach, Florida
March 21-25, 2005

REFRESHER COURSE

Marilyn Siegel, MD, "Medi-
astinal masses and congenital
lung lesions in children."

FOCUS SESSIONS

Kyongtae Bae, MD, PhD,
"Principles and practice of
contrast material delivery for
MDCT" and "PET/CT basic
principles."

Stuart Sagel, MD, "CT of
thoracic vascular masses."

CARDIOVASCULAR IMAGING SESSION 2

Marilyn Siegel, MD,
"MDCT of adult congenital
heart disease"

SPOTLIGHT ON PROTOCOLS: PERIPHERAL MRA

Stuart Sagel, MD, "CT
angiography for pulmonary
embolism: technique
interpretation and role."

Purdy Lecture

The Department of Radiation Oncology sponsored the Third Annual James A. Purdy Physics Lecture on April 22. Clifton Ling, PhD, chairman of the Department of Medical Physics at Memorial Sloan-Kettering Cancer Center, presented the keynote address: "pO₂ - C135 - D3 and back."

(Left to right): Simon Powell, MD, PhD, chairman of the Department of Radiation Oncology; Ling; and James Purdy, PhD.



SYMPOSIA

Continued from page 25

SOCIETY OF INTERVENTIONAL RADIOLOGY

*30th Annual Scientific Meeting
New Orleans, Louisiana
March 31–April 5, 2005*

Daniel Brown, MD, panelist, Lessons Learned: Chest Interventions; comoderator, Visceral Arteries/Solid Organ Intervention; coordinator, Gastrointestinal IR: Techniques and Management.

Michael Darcy, MD, panelist, Case Based Review: Vascular Interventions II; comoderator, Portal Hypertension.

David Hovsepian, MD, comoderator, Fibroid Embolization.

Thomas Vesely, MD, coordinator, Venous Access.

WORKSHOPS

Daniel Brown, MD, “Regional cancer therapy,” “The IR approach.”

Craig Glaiberman, MD, “Venous access,” “Gastrointestinal interventions.”

Suresh Vedantham, MD, “Thrombolytic therapy for venous disease.”

Thomas Vesely, MD, “Hemodialysis access.”

PLENARY SESSIONS

Daniel Brown, MD, “What the IR needs to know—HCC.”

Michael Darcy, MD, “Ambulatory phlebectomy: indications and techniques.”

Colin Derdeyn, MD, “Stroke management: acute stroke imaging.”

Thomas Vesely, MD, “Angioplasty: POBA and beyond.”

SCIENTIFIC PRESENTATIONS

David Hovsepian, MD, “Comparison of adjunctive use of rofecoxib (Vioxx) vs. ibuprofen in the management of postoperative pain after UFE.”

Suresh Vedantham, MD; Gregorio Sicard, MD; Brian Rubin, MD; Thomas Pilgram, PhD; Thomas Vesely, MD; Michael Darcy, MD, “Iliofemoral DVT: pharmacomechanical thrombolysis with early stenting versus conventional pharmacologic thrombolysis.”

Thomas Vesely, MD, “Measurement of air flow through a valved peelable introducer sheath,” “Use of stent grafts to repair hemodialysis graft related pseudoaneurysms.”

SOCIETY FOR THERMAL MEDICINE

*2005 Annual Meeting
Bethesda, Maryland
April 1-3, 2005*

Eduardo Moros, PhD, comoderator, Engineering/Physics Workshop.

Petr Novak, PhD, recipient, Young Investigator Travel Award; comoderator, Engineering/Physics Symposium: Image Guided Thermal Therapy, Treatment Monitoring, and Tissue Assessment.

Joseph Roti Roti, PhD, member, Organizing Committee.

William Straube, MS, comoderator, Engineering/Physics Symposium: Treatment Planning, Control, and Thermal Modeling.

PLENARY SESSIONS

Eduardo Moros, PhD, “SURLAS,” “Highlights of engineering/physics.”

SCIENTIFIC PRESENTATIONS

Bibianna Cha; Eduardo Moros, PhD; William Straube, MS; Robert Myerson, MD, PhD; Petr Novak, PhD, “Final design and preliminary testing of a Linac-SURLAS-patient transport for simultaneous thermoradiotherapy.”

Eduardo Moros, PhD; James Alaly; Konstantin Zakaryan, PhD; Joseph Deasy, PhD; Petr Novak, PhD, "Integrated thermoradiotherapy treatment planning system—a computational environment for long-term developments and initial results."

Eduardo Moros, PhD, "Basic bio-heat transfer considerations and effective heating of tumors in animal models."

Robert Myerson, MD, PhD, "Simultaneous radiation therapy and hyperthermia in the elective treatment of subclinical disease in high risk breast carcinoma: a phase III comparison of post treatment normal tissue effects in heated and unheated portions of the chest wall."

Petr Novak, PhD; Eduardo Moros, PhD; William Straube, MS, "The impact of ultrasound nonlinear propagation on SURLAS design and performance."

Joseph Roti Roti, PhD, "Changes in nuclear DNA organization and DNA repair proteins that lead to radiosensitization by 41°C hyperthermia."

William Straube, MS, "An in vivo system for the determination of the effect of temperature on backscattered ultrasound."

Robert VanderWaal, PhD, "Heat induced 'masking' of protein disulfide isomerase, a redox sensitive nuclear component of the DNA-nuclear matrix anchoring complex."

Mai Xu, MD, PhD, "Enhancement of thermal radiosensitization by Indomethacin and related compounds."

Konstantin Zakaryan, PhD; James Alaly; Petr Novak, PhD; Joseph Deasy, PhD; Eduardo Moros, PhD, "Simple acoustic beam model for thermoradiotherapy implemented in an open source treatment planning research system."

AMERICAN RADIUM SOCIETY

*87th Annual Meeting
Barcelona, Spain
April 30–May 4, 2005*

Perry Grigsby, MD, "Functional imaging, translational science, and clinical outcome in carcinoma of the cervix"; "Advances in GYN malignancies"; "Assessing tumor hypoxia in cervical cancer by positron emission tomography with ⁶⁰Cu-ATSM"; "Pre-treatment metabolic activity in cervical cancer."

Lilie Lin, MD, "Sequential FDG-PET brachytherapy treatment planning in carcinoma of the cervix."

Parag Parikh, MD, "Inspiration gating reduces lung cancer treatment volumes and potential irradiation treatment toxicities," "The use of radiation in the treatment of Hodgkin's disease."

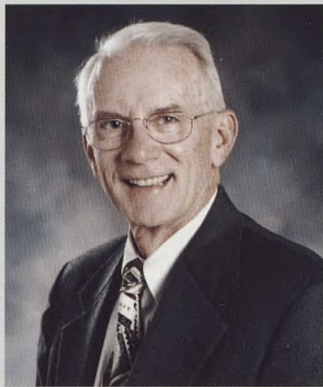
In the Winter 2004/2005 issue of *Focal Spot* magazine, Barry Brunsten was inadvertently omitted from the list of Hobbit research team members (page 19). We regret the error. As a research engineer, Brunsten is an important part of the Hobbit team as well as other research conducted in the Institute's Electronic Radiology Laboratory.

IN MEMORIAM

We sadly report the death of John Christian Mason, PhD, who died suddenly on April 24. He was 34 years old. Dr. Mason joined the Division of Radiological Sciences in October 2004 as a postdoctoral research associate in the Institute's Optical Radiology Laboratory. He is survived by his wife, Hyeran, and four-year-old daughter Brooke. Donations may be made to the Mason Family Trust, Pulaski Bank, 12300 Olive Boulevard, St. Louis, Missouri 63141. Send to the attention of Chuck Carpenter, senior vice president.

ALUMNI NEWS

Ronald Evens, MD, former chairman of the Department of Radiology and director of Mallinckrodt Institute of Radiology (1971-1999), retired May 1, 2005, as president of Barnes-Jewish Hospital in St. Louis. He maintains a senior-level role with BJC HealthCareSM, where he will lend his experience and expertise on special projects.



Gary Shackelford, MD, emeritus professor of radiology, retired from Mallinckrodt Institute in June 2002. But the Shackelfords (wife Penny was a physician in the Department of Pediatrics) are working harder than ever to restore their rural property in southern Wisconsin (Fair Meadows) to its natural condition of woods, prairies, and wetlands. They are the recipients of three state and federal grants to assist in their restoration efforts. In 2001, Fair Meadows was named Wisconsin's Outstanding Tree Farm by the American Tree Farm System and, in 2003, the Shackelfords received the Natural Roadside Award from the Rock County Conservationists, a local group that promotes conservation. They also have been the recipients of a Wildlife Conservation Award from the Rock County Land Conservation Department.



(left to right) Drs. Gary and Penny Shackelford and Beverlee Sagel.
Photo courtesy of Stuart Sagel, MD, professor of radiology.



- CONCERNED ABOUT THE HIGH RISK OF COLON CANCER?
- SCHEDULED FOR A SCREENING COLONOSCOPY WITHIN THE NEXT 12 MONTHS?
- AGED 50 YEARS OR OLDER?

Colorectal cancer is the second most common cause of cancer-related deaths in the United States. If colorectal cancer is diagnosed in its early stages, the survival rate is 90%.

Help fight colon cancer by volunteering for the National Colon Cancer Screening at Mallinckrodt Institute of Radiology at Washington University in St. Louis.

This study is part of a National Cancer Institute-funded effort to determine whether computed tomography (CT) colonography can provide the necessary information for doctors to diagnose colon cancer in its early stages.

CT colonography, also called virtual colonoscopy, is faster (takes about 20 minutes) and less invasive than standard colonoscopy. Eligible study participants will receive a CT colonography (free of charge) in addition to your regularly scheduled colonoscopy (billed to your insurance carrier or to you).

Christine Menias, MD, a board-certified radiologist, is the principal investigator of the Washington University segment of the study. For more information, call Ruth Holdener, RT, at (314) 747-2034.



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