Focal Spot, Winter 2008/2009

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Marcus Kessler, MD,
Nuclear Medicine Chief Resident
2008-2009

Photograph by MIR Photography Lab
RSNA—Personal Learning in the Global Community

The Radiological Society of North America’s 94th annual meeting included nearly 70 presentations by Mallinckrodt Institute faculty and staff.

To Catch a Cancer: A New Era in Colorectal Cancer Screening

Published results of the National CT Colonography Trial show that virtual colonoscopy is as effective as conventional colonoscopy in the detection of early-stage colorectal cancers.

A Leg to Stand On

If an innovative procedure using image-guided catheters can successfully remove blood clots associated with deep vein thrombosis, it could be a powerful complement to anticoagulant therapy.

First MIR Research Poster Session

The Division of Radiological Sciences’ poster exposition highlighted imaging research from “molecule to mouse to man.”

Improving Medical Response to Stroke Symptoms

Washington University Medical Center is one of eight facilities that will establish a program (called SPOTRIAS) for earlier, more effective ways to diagnose and treat strokes.

The Traumatic Brain Injury Conference

Experts involved in the study and treatment of blast-related brain injury met in St. Louis to discuss their clinical and research experiences.
Raichle receives neuroscience award

Marcus Raichle, MD, professor of radiology, of neurology, of neurobiology, and of biomedical engineering, was one of two recipients of the 2009 Ralph W. Gerard Prize in Neuroscience, presented by the Society for Neuroscience (SfN). The award, named after Ralph Gerard, PhD, a neurophysiologist and behavioral scientist, recognizes Raichle’s outstanding contributions to the study of human brain function using positron emission tomography and magnetic resonance imaging. Raichle, widely considered the father of cognitive neuroscience, and his colleagues revolutionized the study of brain behavior through the development and use of functional brain imaging techniques.

With its membership of more than 38,000 basic scientists and physicians, SfN is the largest neuroscience organization in the world. SfN’s peer-reviewed Journal of Neuroscience is highly regarded as one of the preeminent publications in the field.

Hildebolt named AAAS fellow

Charles Hildebolt, DDS, PhD, professor of radiology and adjunct professor of anthropology, was one of six Washington University faculty members elected to fellowship in the American Association for the Advancement of Science (AAAS), the world’s largest general scientific society.

Hildebolt is internationally known for his scientific studies of morphometric variations in the skulls, brains, and teeth of contemporary humans and fossil hominids, with particular emphasis on the brain of Homo floresiensis—or Hobbit, as the 18,000 year-old specimen is commonly known.

AAAS is an international organization dedicated to advancing science, engineering, and innovation through education, leadership, and professional association. Science, the academic journal of the AAAS, is one of the world’s most prestigious scientific journals.

Welch twice honored

For Michael Welch, PhD, professor of radiology, of chemistry, and of molecular biology and pharmacology, September 2008 was a very good month.

In early September, Welch received the 2008 Distinguished Basic Scientist award from the Academy of Molecular Imaging (AMI) for his contributions to the field of molecular imaging.

In late September, he was one of three honorees who received Washington University School of Medicine’s Second Century Award. The award was initiated in 1991—the medical school’s 100-year anniversary—to celebrate the advent of the second hundred years of excellence in research, teaching, and patient care.

Faculty in leadership positions

Michael Darcy, MD, professor of radiology and of surgery, was elected to a two-year term as chairman of the Society of Interventional Radiology (SIR) Foundation. The Foundation fosters research and the advancing clinical needs of interventional radiology, which has emerged as a medical specialty over the past 30 years.

John Kotyk, PhD, research associate professor of radiology, was elected vice-chairman of the Society of Noninvasive Imaging in Drug Development, one of four councils of the Academy of Molecular Imaging (AMI). As vice-chairman, Kotyk also serves on the AMI Board of Directors.
Shriners Hospital returns to WUMC

Since 1922, Shriners Hospitals for Children, an international healthcare system, has been treating children—from birth to age 18—who have orthopaedic conditions, burns, spinal cord injuries, and cleft lip and palate. The Shriners Hospital in St. Louis, which first opened in 1924 on the Washington University Medical Center (WUMC) campus, is recognized throughout the Midwest as a leader in pediatric orthopaedics.

After more than four decades at its current location on Lindbergh Boulevard in west St. Louis County, Shriners Hospital has broken ground for a 147,000-square-foot facility on the WUMC campus, with plans for construction to begin in the fall of 2009. The hospital will continue to operate as a freestanding facility, but the location between Taylor and Newstead avenues will foster a closer collaboration with specialists at Washington University School of Medicine and St. Louis Children’s Hospital.

Journal recognizes reviewers

In the January 2009 issue of Radiology, Mallinckrodt Institute faculty were among those recognized by the journal’s Editorial Board for providing high quality, detailed, and scholarly reviews:

- William McAlister, MD, professor of radiology and of pediatrics—Editor’s Recognition Award with Distinction
- Christopher Moran, MD, professor of radiology and of neurological surgery—Editor’s Recognition Award with Special Distinction
- Franz Wippold, MD, professor of radiology—Editor’s Recognition Award with Distinction

University teaching awards presented

Annually, Washington University medical students present Distinguished Service Teaching Awards to faculty and house staff for their outstanding service in medical student education and the training of future physicians.

Sanjeev Bhalla, MD, associate professor of radiology, was one of 10 honorees selected by the Class of 2009 to receive a Clinical Teacher of the Year Award.

Allyson Zazulia, MD, associate professor of neurology and of radiology, was one of 10 recipients of the Class of 2010’s Distinguished Service Teaching Award.

WUSM facts

- The University’s medical department—as Washington University School of Medicine (WUSM) was first called—was established in 1891.
- Women were admitted as medical students in 1918.
- 17 Nobel laureates have been associated with WUSM.
- 14 faculty members are fellows of the National Academy of Sciences.
- 26 faculty members belong to the Institute of Medicine.
- WUSM has 1,727 faculty members; 6,180 staff; 789 fellows and trainees; and 982 house staff.
- With nearly 1,000 physicians, WUSM has one of the three largest academic clinical practices in the nation.
- The medical school has 20 departments; Mallinckrodt Institute serves as the Department of Radiology.
- The medical school has 12 graduate/teaching/research programs.
- More than 4,000 students applied for admission to WUSM’s 2008-2009 first-year class; 122 students were enrolled.
- Currently, there are 1,232 students enrolled at WUSM, with 594 of those students pursuing an MD, MD/PhD, or MA/MD degree.

Excerpted from Facts 2009, published by Washington University School of Medicine.
“Our work is more interconnected with the rest of the world than it has ever been. ... If we are to ensure that the world turns to us as leaders in imaging, we must be viewed as representing the highest level of subspecialized patient care.”

—from the welcoming message given by Teresa McCloud, MD, 2008 RSNA president

RSNA2008 Personal Learning in the Global Community

The 94th Scientific Assembly and Annual Meeting of the Radiological Society of North America

November 30-December 5, 2008 McCormick Place, Chicago, IL

Photographs by Mickey Wynn, MIR Photography Lab
MIR PRESENTATIONS AT RSNA 2008

EDUCATIONAL EXHIBITS AND SCIENTIFIC POSTERS

Meghan Lubner, MD; Constantine Raptis, MD; Rex Parker, MD; Kathryn Fowler, MD; Sanjeev Bhalla, MD; Christine Menias, MD,
"Vasculatures and vascular syndromes in the abdomen and pelvis: a pictorial review."
—MAGNA CUM LAUDE AWARD

Celine Buckley, MD; Christine Peterson, MD; Christine Menias, MD,
"Teratomas from head to toe: a multimodality review with pathologic correlation."
—CERTIFICATE OF MERIT

Cylen Javidan-Nejad, MD; Fernando Gutierrez, MD; Sanjeev Bhalla, MD; Cylen Javidan-Nejad, MD,
"The "outer space": pericardial anatomy and disease processes."
—CERTIFICATE OF MERIT

Cylen Javidan-Nejad, MD; Fernando Gutierrez, MD; Andrew Bierhals, MD; Gory Ballester, MD; Travis Hillen, MD,
"Cracking the chest: approaches to cardiothoracic surgery."
—CERTIFICATE OF MERIT

Goetika Khanna, MD; Takashi Sato; Polly Ferguson, MD,
"Chronic recurrent multifocal osteomyelitis: a pictorial review."

Aaron Berg, MD; Yukutaka Sato, MD; Geetika Khanna, MD; Toshio Moritani, MD, PhD;
Remyie Oral, MD; Patricia Kirby, MD,
"Subdural hematomas associated with nonaccidental head injury: neuroimaging of 40 nonaccidental head injury (NAHI) cases with subdural hematomas are reviewed and compared to age matched noninflicted head injuries in a university hospital setting."

Simon Kao, MD; Geetika Khanna, MD;
Michael D' Alessandro, MD; Yukutaka Sato, MD,
"Three-dimensional computed tomography (CT) in pediatric chest (excluding cardiac) diseases."

Janice Lee, MD; David Cipolle, MD; Jesse Chusid, MD; Deborah Reedo, MD; Sanjeev Bhalla, MD,
"Inflammatory diseases of the trachea."

Meghan Lubner, MD; Christine Menias, MD;
Vamsi Narra, MD,
"Spectrum of angiocentric tumors of the abdomen and pelvis with pathologic correlation."

Vincent Mellnick, MD; Constantine Raptis, MD;
Michael D'Alessandro, MD; Andrew Bierhals, MD; Susan Holley, MD, PhD; Sanjeev Bhalla, MD,
"You don't know JACC: describing valvular pathology in the language of the cardiologist."

Constantine Raptis, MD; Absar Ahmed, MBBS; Akash Sharma, MD; Cylen Javidan-Nejad, MD; Thomas Watson, MD; Sanjeev Bhalla, MD,
"Multimodality approach to the pulmonary nodule: a current review."

Nirvikar Dahiya, MD; Celine Buckley, MD; Christine Peterson, MD,
"3D ultrasound imaging of congenital uterine anomalies in the age of MRI."

Lance Reinsmith, MD; Michelle Miller-Thomass, MD; Franz Wippold, MD,
"Blue in the face: small round blue cell tumors of the sinonasal tract."

Anna Linda, MD; Marco Trovo, MD; Cylen Javidan-Nejad, MD; Jeffrey Bradley, MD,
"Radiation injury of the lung after stereotactic body radiation therapy (SBRT) for lung cancers: a timeline-based illustration of CT findings."

Ibrahim Saeed, MD; Sanjeev Bhalla, MD; Kristopher Cummings, MD; Ibrahim Saeed, MD; Fernando Gutierrez, MD; Sanjeev Bhalla, MD,
"Left ventricular outflow obstruction: more than just aortic stenosis."

FOCAL SPOT, WINTER 2008/2009

RSNA 2008
MEETING FACTS

The Radiological Society of North America has more than 42,000 members in 121 countries and 6 continents. The Society’s annual scientific assembly is the largest international medical meeting in the world.

Distribution
Approximately 60,000 attendees
• 726 technical exhibits, occupying 516,199 square feet
• 1,803 scientific papers presented in 16 subspecialties
• 252 refresher courses and 86 multisessions offered
• 1,667 education exhibits and 657 scientific posters displayed

For more information, visit RSNA.org.
MIR PRESENTATIONS AT RSNA 2008

EDUCATION EXHIBITS AND SCIENTIFIC POSTERS continued

Ibrahim Saeed, MD; Prakash Masand, MD; Sanjeev Bhalla, MD, “Non-atherosclerotic coronary artery disease: beyond sludge in the pipes.”

Travis Hillen, MD; Christine Menias, MD; Srinivasa Prasad, MD; Amy Hara, MD, “Carcinoid tumors: pictorial review with pathology correlation.”

Alexander Sevrukov, MD; Meghan Lubner, MD; Christine Menias, MD, “Inflammatory pseudotumor: the greatest mimicker.”

Arpit Nagar, MBBS; Srinivasa Prasad, MD; Christine Menias, MD; Venkateswar Surobhi Rao, MBBS; Rojeev Suri, MD; Vijayanadh Ojili, MD, “Imaging spectrum of bleeding tumors in the belly: the usual and the not so usual suspects.”

FOCUS SESSIONS

Ella Kazerooni, MD; Joel Fishman, MD, PhD; Paul Stein, MD; Pamela Woodard, MD; Diana Litmanovich, MD, “Imaging algorithms in pulmonary embolism: so many tests, so little time.”

David Rubin, MD; Carlo Martinoli, MD; Sherry Birchansky, MD, “Peripheral nerve imaging at the crossroads of musculoskeletal imaging and neuroimaging.”

Sharlene Teefey, MD, “Musculoskeletal US: Has the time come? Accuracy of shoulder US.”

INFORMATICS

Lawrence Tarbox, PhD; Gianluca Paladini, BEng; Patric Ljung, PhD, “XIP™: The extensible Imaging Platform—a platform for rapid application development and deployment.”

MULTISESSION COURSES

Pamela Woodard, MD; Vincent Ho, MD, “Cardiac CT mentored case review: Part I (in conjunction with the North American Society for Cardiac Imaging).”

Geoffrey Rubin, MD; Pamela Woodard, MD, “Cardiac CT mentored case review: Part II (in conjunction with the North American Society for Cardiac Imaging).”

Erik Paulson, MD; Daniel Boll, MD; William Small, MD, PhD; Douglas Katz, MD; Jay Heiken, MD, “Gastrointestinal/emergency series: imaging of the acute abdomen.”

Albert Nemcek, MD; William Stavropoulos, MD; Brian Funakki, MD; Michael Dorsey, MD, “Case-based review of interventional radiology: vascular diagnosis (in conjunction with the Society of Interventional Radiology).”

Marilyn Siegel, MD, “Pediatric CT angiography.”

PLENARY SESSION

Michael Welch, PhD, “Nontechnology in the future of imaging: prospects and pitfalls.”

— EUGENE P. PENDERGRASS NEW HORIZONS LECTURE

REFRESHER COURSES

Sanjeev Bhalla, MD, “State-of-the-art imaging for penetrating trauma thorax.”

Christine Menias, MD, “State-of-the-art imaging for penetrating trauma abdomen.”

Pamela Woodard, MD, “Cardiac—principles and techniques of cardiac CT angiography and MR imaging and reduction strategies: MR imaging.”

Lawrence Tarbox, PhD, “Integration strategies for radiology systems [advanced imaging informatics] DICOM WG23 plug-ins.”

Fernando Gutierrez, MD; Kristopher Cummings, MD; Sanjeev Bhalla, MD, “Multidetector CT and MR evaluation of congenital thoracic disease in the adult (noncardiac)—How-to Workshop.”

Marilyn Siegel, MD, “Practical pediatric vascular imaging. CT imaging.”

Christine Menias, MD, “Imaging of the gallbladder and bile ducts: malignant lesions (including gallbladder carcinoma).”

Sanjeev Bhalla, MD, “CT angiography of chronic pulmonary embolism.”

Will Palmer, MD; Louis Gilula, MD, “Musculoskeletal interventional procedures.”
Michael J. Welch, PhD

**RSNA2008**

**OF NOTE**

- **RSNA Research Medical Student Grant**—Guillermo Gonzalez, "Evaluation of hepatic steatosis on contrast-enhanced computed tomography scan." Mentors: Jay Heiken, MD; Kathryn Robinson, MD

- **RSNA Research Medical Student Grant**—Ephraim Parent, PhD, "Directed radiotherapy of MCF-7 cells using 16a-[77Br]-bromo-11b-methoxyestradiol-17β." Mentor: Michael Welch, PhD

- **Roentgen Resident/Fellow Research Award**—Jonathan McConathy, MD, PhD

  Barry Siegel, MD, "Update course in diagnostic radiology: clinical PET and PET/CT imaging—abdominopelvic PET/CT and the Medicare PET Registry, The National Oncologic PET Registry."

  **SCIENTIFIC SESSIONS**

  Stephanie Wilson, MD; Luigi Solbiati, MD; Sharlene Teaey, MD, "Gastrointestinal (ultrasound contrast: liver)."

  Richard Smelkew, MD; Thab Kamel, MD, PhD; Jay Heiken, MD, "Gastrointestinal (liver imaging: diffuse diseases)."

  Marcus Kessler, MD; Marilyn Siegel, MD, "Cytomegalovirus infection in pediatric lung transplant recipients."

  Mitchell Machtey, MD; Abbas Alavi, MD; Sudhoh Acharayya, PhD; Janet Saffar, PhD; Bradley Snyder, MS; Barry Siegel, MD, "ISP: Nuclear medicine (PET/CT of the neck and chest)—Local institution versus central review determination of SUV for stage III non-small cell lung cancer: preliminary analysis of ACRIN 6688/RTOG 0235."

  Barbara Manssees, MD; Constance Lehman, MD, "Breast imaging (interventional)."

  Cheryl Herman, MD; Mary Mahoney, MD, "Breast imaging (interventional)."

  "One of the most promising areas on the horizons of medical discovery involves the use of particles fifty-thousand times smaller than a human hair."—Michael Welch, PhD, the Eugene P. Pendergrass New Horizons Lecturer.

  Suresh Vedantham, MD, "ISP: vascular/interventional (venous interventions and dialysis)."

  Mark Murphey, MD; David Rubin, MD, "Musculoskeletal (soft-tissue tumors: quantitative and qualitative assessment)."

  Erik Paulson, MD; Christine Menias, MD, "Gastrointestinal (liver focal lesions): atypical imaging findings of pyogenic hepatic abscesses."

  Anna Linda, MD; Christine Peterson, MD; Kathryn Robinson, MD; Michael Lin, MD; Guillermo Gonzalez; Jay Heiken, MD, "Gastrointestinal (liver focal lesions): atypical imaging findings of pyogenic hepatic abscesses."

  Lauren Anderson; William Middleton, MD; Sharlene Teefey, MD; Carl Reading, MD; Jill Langer, MD; Terry Desser, MD; Margaret Sztabia, MD; John Cronan, MD; Susan Mandel, MD, "Neuroradiology/head and neck (sonography/elastography): analysis of sonographic features and recommendations for management of thyroid nodules in patients with a family history of thyroid cancer."

  Carol Andrews, MD; Daniel Wessell, MD, PhD, "Musculoskeletal/emergency (skeletal trauma)."

  Alok Jaju, MD; Marilyn Siegel, MD; Keith Fischer, MD, "Functional CT scans for bronchiolitis obliterans syndrome: correlation with ventilation-perfusion scans."

  Karen Tong, MD; Colm Berdeyn, MD, Lucien Levy, MD, PhD, "Neuroradiology (brain: techniques—susceptibility-weighted imaging)."

  In an Informatics session, Lawrence Tarbox, PhD, discussed an imaging platform for rapid application development and deployment.

  Dmitriy Yablonskiy, PhD; James Quirk, MD, PhD; Barbara Lutey; Jason Woods, PhD; Alex Sukstanskii, PhD; David Gierada, MD, PhD, "Chest (COPD: emphysema and quantification)—in vivo lung morphometry with hyperpolarized 3He diffusion MR identifies lung microstructure changes in the initial stages of emphysema."

  Pascal Satl, PhD; Anne Gross, MD; Adil Bashir, PhD; Dmitriy Yablonskiy, PhD, "Gradient Echo Plural Contrast Imaging: a novel MRI technique for evaluating multiple sclerosis."

  Daniel Wessell, MD, PhD, and (right) David Rubin, MD
The Annual
MIR
Reception at
RSNA 2008

December 1, 2008
Chicago Cultural Center

Right: Ariel Kruger, MD, MIR alumnus, and Brian Ghoshalpa, MD

Above: Alumnus Bruce Hauser, MD

Left: Jeffrey Brown, MD, chief of the Clinical Research Lab and codirector of the Body MRI service (second from left) with MIR alumnus Gilbert Cheung, MD; Harald Bennett, MD; and Meghan Lubner, MD.

Above: Gilbert Jost, MD, director of the Institute, shared MIR news and some RSNA trivia

Right: Michael Darcy, MD, chief of the Interventional Radiology section, and Susan Darcy are shown with former MIR faculty members David Hovsepian, MD (left) and Daniel Brown, MD (right).

Left: (left to right) Meredith Ragsdale; Edward Ragsdale, MD; Miriam Hussey; and David Hussey, MD, 2005 RSNA president.
TO CATCH A CANCER: A new era in colorectal cancer screening

by Amy Thomas, MD, FAAP

The story is familiar to most: Uncle Charles was tired this past month. Then he had a bloody stool, which prompted him to see a doctor. Uncle Charles was diagnosed with colon cancer that had spread throughout his body, leaving him with less than six months to live. Wouldn’t we all enjoy the alternative scenario in which Uncle Charles underwent a simple radiographic test and the cancer that was found was small enough to be removed later that same day? A new screening test called computed tomography colonography (CTC), or virtual colonoscopy, may increase the likelihood of the second scenario.
TO CATCH A CANCER:

a new era in colorectal cancer screening

IN collaboration with researchers across the country, physicians at Mallinckrodt Institute of Radiology at Washington University recently published the results of a landmark study that could overcome common barriers to colorectal cancer screening—barriers that annually claim nearly 700,000 lives worldwide. Through virtual colonoscopy, doctors hope to increase the number of people getting screened for colorectal cancer, improving survival rates for people with the disease.

Detecting colorectal cancer

Though it’s one of the most curable cancers when diagnosed early, the most common symptom of colorectal cancer (cancer of the colon or rectum) is no symptom at all, so the disease is often discovered too late for effective treatment. Colorectal cancer can grow for many years before a person has any physical indication that something is wrong. Once the cancer spreads beyond the colon, it is much more difficult to treat. Until recently, the most effective way to catch colorectal cancer early was colonoscopy—an examination in which a five-foot-long, fiber-optic camera is inserted into the rectum and moved throughout the colon to look for suspicious growths.

Though this test could be quite effective in reducing deaths from colorectal cancer, many people avoid the procedure for fear of having an invasive examination of the bowel, undergoing sedation, and losing a full day away from work or daily routines. As a result, less than 40 percent of people comply with screening recommendations, leaving colorectal cancer as the second leading cause of cancer death in the United States.

An alternative method

CT colonography is a less-invasive examination to diagnose colorectal cancer in its early stages, when treatment is simple and curative. The test enables doctors to visualize the inside of the entire colon by taking pictures from outside of the patient’s body, making the test less intrusive and much more patient-friendly. For some time CTC has been recognized as an alternative colorectal cancer-screening test, but the results of past scientific investigations were inconclusive as to whether imaging would detect early cancers as well as colonoscopy does.

For Left: 2-D computed tomography image of an adenomatous polyp in the cecum

Left: 3-D computed tomography image of the same adenomatous polyp in the cecum, as seen in the 2-D image...
In 2003, a groundbreaking study demonstrated that CTC was as effective as standard colonoscopy for screening colorectal cancer. These results, in part, led to the launch of the National CT Colonography Trial—the largest multicenter study to evaluate the effectiveness of state-of-the-art CTC (virtual colonoscopy) in detecting colorectal cancer and precancerous polyps. Christine Menias, MD, assistant professor of radiology at Mallinckrodt Institute, served as the principal investigator at Washington University—one of fifteen sites throughout the country.

Study results

In the fall of 2008, researchers released the results of this landmark study: CTC is as effective as colonoscopy in the detection of early-stage colorectal cancers. The findings, published in the September 18th issue (volume 359, number 12) of the New England Journal of Medicine, could be the cornerstone of future colorectal cancer-screening recommendations.

Jay Heiken, MD, professor of radiology, served on the executive committee of the National CT Colonography Trial. “CT colonography provides individuals with a relatively noninvasive option for colorectal cancer screening,” he says. “At this time fewer than half of those recommended for screening are having it done, so people are putting themselves at risk. People are dying who needn’t be—fatal cancers can be prevented by early detection through screening.”
In the Spring 2006 Focal Spot magazine coverage of the National CT Colonography Trial at Mallinckrodt Institute, Ruth Holdener, RT, (seated) and Christine Menias, MD, reviewed images of the colon obtained by a 64-detector CT scanner.

The test is minimally invasive, takes about 10 to 15 minutes, and can detect as many precancerous and cancerous growths as does a standard screening colonoscopy.

During the procedure, the patient lies supine on a table, and a small plastic tube is used to pump carbon dioxide through the rectum to distend the bowel. Then, the patient is moved on the table through a CT scanner for about 10 to 15 seconds while images are obtained; the process is repeated with the patient lying face down.

The images taken by the CT scanner are transferred to a computer that generates 2-D and 3-D images of the colon and rectum, which are interpreted by an experienced radiologist. If a suspicious polyp is found, the patient is referred for a standard colonoscopy to have the polyp removed. By using CTC as the initial screening test, nearly 80 percent of patients could avoid the more invasive procedure and its associated risks.

In the past, some patients reported preferring colonoscopy because they would rather be sedated for the exam and that bowel insufflation for the CTC caused moderate cramping. But now, radiologists are using carbon dioxide to fill the bowel, which is reabsorbed quickly and is much

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**National CT Colonography Trial**

Funded by the National Cancer Institute and coordinated by the American College of Radiology Imaging Network, the trial involved 2,600 asymptomatic individuals who were screened at these 15 sites:

- **ARIZONA**
  - Mayo Clinic Scottsdale
  - Scottsdale Medical Imaging

- **CALIFORNIA**
  - University of California Los Angeles Medical Center
  - San Francisco VA Medical Center
  - University of California San Diego Medical Center

- **COLORADO**
  - Radiology Imaging Associates

- **CONNECTICUT**
  - Yale University/VA Connecticut Healthcare System

- **ILLINOIS**
  - University of Chicago Hospital
  - Clinical Radiologists SC at Memorial Medical Center

- **MARYLAND**
  - Johns Hopkins Hospital and Health Center

- **MASSACHUSETTS**
  - Beth Israel Deaconess Medical Center

- **MINNESOTA**
  - Mayo Clinic

- **MISSOURI**
  - Mallinckrodt Institute of Radiology, Washington University Medical Center

- **TEXAS**
  - The University of Texas, MD Anderson Cancer Center

- **VIRGINIA**
  - Medical College of Virginia Hospitals
more comfortable than was the room-air insufflation used in the past. With the new technique, cramping is mild and has typically resolved by the time the patient is walking out the door—usually within five minutes. Because of the need for bowel insufflation, CTC carries a small risk of bowel perforation (a small break in the bowel wall), but the risk is significantly less than the likelihood of perforation from a colonoscopy. And while sedation for a colonoscopy might be more attractive than staying awake for the CT scan, even light contraindication to colonoscopy (such as dependence on blood thinners), and those with a medical condition making them unsuitable candidates for sedation. Insurance also is starting to cover patients who refuse colonoscopy for personal reasons but are at an increased risk of colorectal cancer as compared to the general population.

In June 2008, the American College of Radiology, the Society of Gastrointestinal Radiologists, and the Society of Computed Body Tomography and Magnetic Resonance sent a joint comment letter to the Centers for Medicare and Medicaid (CMS), requesting reimbursement for CTC providers and stating that sufficient data and clinical evidence support the request. In February 2009, the CMS will make a decision on the coverage of routine CTC screening for the general population. "My hope is that the decision to provide insurance coverage for CT colonography will encourage more people to participate in routine screening and, as a result, many lives will be saved," says Heiken.

**For more information**

- American Cancer Society—[www.cancer.org](http://www.cancer.org)
A LEG TO STAND ON

A national, multidisciplinary trial spotlights a promising treatment of deep vein thrombosis

For nearly 50 years, physicians have prescribed anticoagulants for patients with deep vein thrombosis (DVT) to keep blood clots in their legs and groins from breaking loose and travelling to the lungs, where they can block an artery and cause death.

Unfortunately, it’s only a partial triumph of medicine. Anticoagulants work well in preventing a pulmonary embolism, but not so well in preventing a chronic condition in DVT patients called post-thrombotic syndrome, which leaves their legs swollen, painful, tired, and sometimes useless. Suresh Vedantham, MD, associate professor of radiology and of surgery, has witnessed their suffering in his clinics.

“Patients with post-thrombotic syndrome [PTS] can’t live the lives they want to,” says Vedantham, an interventional radiologist. “Walking is a struggle. If they have small children, they find it hard to care for them or to play with them. Many can’t hold down a job.”

For the next five years, Vedantham will direct 150 researchers across the country in a $10 million, government-funded clinical trial to determine whether an innovative procedure for removing those vexing clots can prevent PTS, and safely so. Using image-guided catheters, investigators will deliver clot-busting medicine directly to clots as well as assault them mechanically with micro-tools.
Vedantham anticipates that the procedure will prove itself as a powerful complement to anticoagulant therapy, but regardless of the outcome, the trial is already off to a successful start. That’s because Vedantham has reached beyond his specialty of interventional radiology—and its penchant for catheter-based treatments—and recruited DVT experts from other fields to participate in the study for the sake of scientific rigor. What this multidisciplinary team shares in common is a passion for vanquishing a disorder that causes so much misery.

An improvement on compression stockings

Vedantham is the sponsor and national principal investigator in a trial called ATTRACT (Acute Venous Thrombosis: Thrombus Removal with Adjunctive Catheter-Directed Thrombolysis) that will involve between 25 and 50 hospitals and almost 700 patients. Funding comes primarily from the National Heart, Lung and Blood Institute, a branch of the National Institutes of Health (NIH), with a smaller component from industry sponsors. Patient enrollment is scheduled to begin in February 2009 and end sometime in 2011.

The size of the trial testifies to the enormous health threat posed by deep vein thrombosis, which Acting U.S. Surgeon General Steven Galson, MD, targeted in a “Call to Action” in September 2008. Roughly 250,000 new cases are diagnosed each year, with pulmonary embolisms accounting for 100,000 deaths annually. One of two DVT patients experience painful PTS, which in severe cases can result in ulcerated, infected legs.

The number of DVT cases stands to increase in an aging nation, since being over age 60 is one risk factor. Other risk factors include recent surgery, major trauma, pregnancy, cancer and some of its treatments, obesity, use of birth-control pills, and slow blood flow from lack of movement due to medical illness. Even slowed blood flow caused by sitting during a long trip can cause DVT—which explains why DVT is also known as “Economy Class Syndrome.”

Blood thinners like warfarin and heparin usually keep a clot from throwing off a deadly embolism, but don’t eliminate the clot itself, which explains why PTS is such a lingering scourge for patients and a costly burden on the nation’s health-care system, says Vedantham. “PTS has been a forgotten story,” he says. “We’ve focused so much on preventing death that we haven’t paid as much attention to preventing disability and restoring a patient’s quality of life.”
It’s not as if physicians haven’t attempted to tackle PTS. The simplest way to prevent or to lessen swelling and pain is wearing graduated compression stockings that tighten as they go down the leg. Their pressure can keep blood from pooling and clotting. However, PTS occurs in 25 to 50 percent of DVT patients despite the use of compression therapy and anticoagulant drugs. In addition, many patients find the tight-fitting garments to be too uncomfortable or inconvenient to wear on a daily basis.

Instead of controlling a thrombus with an anticoagulant, why not destroy it with the same thrombolytics used to treat heart attack and stroke victims? It’s a tantalizing option, but when such drugs have been administered systemically, serious bleeding occurs too frequently to warrant this therapy except in the direst DVT cases when loss of limb is likely. Moreover, this approach requires a slow drip of thrombolytics over two days, with back and forth trips from the procedure lab to the ICU. “It’s a cumbersome process and a strain on precious hospital resources,” says Vedantham.

Fortunately, interventional radiologists have learned how to decrease the incidence of bleeding by administering thrombolytics directly into the clot with a catheter, which allows them to achieve the same results with smaller dosages. They’ve gone a step further and incorporated other catheter technologies that mechanically tear into the clot and, in the process, improve drug dispersion. That, in turn, permits even smaller drug dosages and minimizes bleeding even more. With one technique, an oscillating wire chews up the clot while it’s simultaneously injected with a thrombolytic. With another, a catheter squirts a thrombolytic into the clot at a high enough pressure to fragment it. Once the drug has softened the clot in either method, the catheter sucks it out.

This pharmacomechanical, catheter-directed thrombolysis (PCDT) has lowered the risk of major bleeding—defined as an episode requiring blood transfusion—to between four to eight percent in a number of studies. Plus, PCDT often can be performed in two or three hours, dramatically reducing hospital costs. Such progress convinced the American College of Chest Physicians in its latest consensus guidelines on DVT to suggest catheter-directed treatment, including PCDT, for patients with extensive, acute cases in the iliac and femoral veins, and not just those with extreme cases, provided they have a low risk of bleeding.

Quality of life counts

While PCDT has gained cautious acceptance, the community of physicians treating DVT and PTS—which includes internists, vascular surgeons, cardiologists, hematologists, obstetrician-gynecologists, family physicians, and pulmonologists in addition to interventional radiologists—have sought firmer evidence that this treatment is safe enough
to warrant widespread use, says Vedantham. That’s the rationale for ATTRACT, the first randomized, multi-site study of PCDT. It will target patients with new cases of DVT in the iliac and femoral veins who have symptoms of pain and swelling. The trial will exclude patients who have experienced actual PTS or a massive pulmonary embolism, or who aren’t safe candidates due to a history of stroke, for example.

All patients will go on standard anticoagulant therapy and wear graduated compression stockings. Half of the patients will be assigned to the study’s control arm and will only receive anticoagulant therapy; the other half will be treated by one of several PCDT methods. If any clot remains, proceduralists will reinsert catheters and try to remove the clot.

Physicians will monitor patients for 24 months for signs of PTS using the Villalta PTS Scale (a clinical measurement for rating the severity of PTS symptoms). In addition, patients will complete a quality-of-life questionnaire that asks, among other things, if a leg problem limits them in housework or interferes with social activities. A data-coordinating center at McMaster University in Hamilton, Ontario, will crunch the numbers.

One number that Vedantham and others will watch carefully is the risk of major bleeding with PCDT. “I’m guessing it will be between three and five percent,” he says. “That would be an acceptable rate if we can reduce the risk of PTS by half. Three to five percent compares favorably to the risk of major bleeding with anti-coagulants, which is one to two percent initially, and one percent each year afterwards.” In addition, researchers will study how the treatment affects the occurrence of pulmonary embolisms and the recurrence of vein clotting and whether it’s more cost effective than standard DVT therapy.

**Crossing specialty lines**

In seeking NIH funding for his study, Vedantham was well aware of the problem of specialty tunnel-vision that psychologist Abraham Maslow summed up in a famous saying: “When the only tool you have is a hammer, everything looks like a nail.” In other words, someone views a favorite tool—in the case of interventional radiolo-
A LEG TO STAND ON

gists, a catheter—as a universal solution, often to the dismay of honest skeptics and funding agencies like the NIH.

“To get the whole picture, you must go out of your way to listen to people from other fields,” says Vedantham.

He’s done just that. The steering committee for ATTRACT is dominated by DVT experts from outside the ranks of interventional radiology. Its chairman, for example, is internist Samuel Goldhaber, MD, a professor of medicine at Harvard Medical School and chair of the national Venous Disease Coalition (with Vedantham as vice-chair and chair elect). And each trial site fields a team that’s just as multidisciplinary—an emergency medicine physician to identify trial candidates, the physician who directs the vascular ultrasound lab where DVT is diagnosed, a proceduralist to perform PCDT, and a medical physician to supervise anticoagulant therapy.

This collaborative approach is a winning formula, says Lawrence Lewis, MD, associate professor of emergency medicine at Washington University School of Medicine, who sits on the ATTRACT steering committee. “The diversity will help to convince people that the trial isn’t biased in favor of physicians who want to make a catheter-based procedure look good,” says Lewis. ATTRACT already enjoys credibility, having been endorsed by not only the Society of Interventional Radiology, but also by the American Venous Forum (composed mostly of vascular surgeons) and the multidisciplinary American College of Phlebology (for which Vedantham formerly served as a board member).

Vedantham, a member of the Executive Council of the Society of Interventional Radiology, is happy to prove to his colleagues that using catheters to attack DVT pharmaceutically and mechanically can dramatically reduce the incidence of post-thrombotic syndrome, and let patients live the lives they want. The way he sees it, the ability to take a walk with your child is a good outcome.

Editor’s Note: For more information about the ATTRACT Trial, call 1-800-974-CLOT (2568).
POSTER AUTHORS AND TITLES

Matthew Budde; Sheng-Kwei Song, PhD, “Axial diffusivity is the primary correlate of axonal injury in the EAE spinal cord: a quantitative pixelwise correlation analysis.”

Xiang He; Dmitriy Yablonskiy, PhD, “Quantitative BOLD: mapping of human cerebral deoxygenated blood volume and oxygen extraction fraction.”

Jason Hill; David Van Essen, PhD; Terrie Inder, MD; Andrew Knutson; Jeffrey Neil, MD, PhD, “Surface based analysis of cortical development in preterm infants.”

Ravi Namani, PhD; Philip Bayly, PhD, “Dynamic stiffness of brain tissue measured in vivo by magnetic resonance elastography.”

Joel Garbow, PhD; Andrew Hope, MD; Erich Kiehl; Sarah Travers; Enrique Izaguirre, PhD; Sarah Jost, MD, “A novel murine model for localized radiation necrosis.”

David Piwnica-Worms, MD, PhD; Britney Moss, “Real-time bioluminescence imaging of ligand-induced IkK_b signal transduction in live cells.”

David Piwnica-Worms, MD, PhD; Kelly Flentie, “Non-destructive, bioluminescence monitoring of salmonella invasion of eukaryotic cells.”

Scott Harpstrite, MS; Julie Prior; David Piwnica-Worms, MD, PhD; Vijay Sharma, PhD, “Preclinical development of a 47/48 Ga-labeled radiopharmaceutical for monitoring MDR1 P-glycoprotein-mediated transport at the blood-brain barrier.”

Scott Harpstrite, MS; Julie Prior; N. Cairns; David Piwnica-Worms, MD, PhD; Vijay Sharma, PhD, “Novel SPECT agent for imaging β-amyloid in the brain.”

Andrea Pichler, PhD; Jayne Marasa; David Piwnica-Worms, MD, PhD, “Small molecule inhibition of mutant p53 transactivation of MDR1.”

Brian White; Joseph Culver, PhD, “Functional connectivity in adult humans revealed with diffuse optical tomography of oxy-, deoxy-, and total hemoglobin.”

Mai Xu, PhD; Yuan Yuan; Yang Xia; Samuel Achilefu, PhD, “Monoclonal antibody CC188 binds carbohydrate epitope expressed on the surface of both colorectal cancer stem cells and their differentiated progeny.”

Maria Trissal; Walter Akers, PhD; Barry Edwards, PhD; Yunpeng Ye, PhD; Carolyn Anderson, PhD; Samuel Achilefu, PhD, “Monomolecular multimodal imaging agents (MOMIA) for optical and nuclear imaging.”

Reece Goiffon; Walter Akers, PhD; Mikhail Berezin, PhD; Hyeron Lee, PhD; Samuel Achilefu, PhD, “Fluorescence lifetime imaging as a novel assessment of renal function.”

Jinda Fan; Mikhail Berezin, PhD; Walter Akers, PhD; Soubir Basak; Pratim Biswas, PhD; Samuel Achilefu, PhD, “Tantalum oxide nanoparticles, a novel computed tomography (CT) contrast agent.”

Sushil Sonavane, MD; Madelyn Stasz, MD; Paul Austin, MD, “Prenatal fetal MRI imaging in genitourinary abnormalities.”
RESEARCH POSTER SESSION

Donna Lesniak, RN; Brian Seeck, MD; George Chrysant, MD; John Mohart, MD; Cynel Javidan, MD; Glenn Foster, RT; Robert Gropler, MD; Pamela Woodard, MD, “Clinical safety of magnetic resonance imaging on recently placed coronary artery stents.”

Ibrahim Saeed, MD; Pilar Herrero, MS; Linda Peterson, MD; Carol Recklein; Andrew Coggan; Amanda DeMoss; Carmen Dence, MS; Janet McGill, MD; Robert Gropler, MD, “Impact of gender on changes in myocardial substrate metabolism in the transition from obesity to diabetes mellitus.”

Kyle McCommis; Dana Abendschein, MD; Robert Gropler, MD; Jie Zheng, PhD, “Correlation of myocardial perfusion and oxygenation: noninvasive assessment via MRI.”

Zulfia Kisrieva-Ware, MD, PhD; Andrew Coggan; Terry Sharp; Carmen Dence, MS; Robert Gropler, MD; Pilar Herrero, MS, “Assessment of myocardial triglyceride turnover with PET and 1-11C-Palmitate.”

Suraj Kurup, MD; Huie Lin, MD; Pilar Herrero, MS; Samuel Klein, MD; Robert Gropler, MD; Scott Weber, Amanda Demoss; Linda Peterson, MD, “Myocardial oxygen consumption (MVO2) and myocardial insulin sensitivity are improved after modest weight loss (WU) in obese humans.”

Robert O’Connor, PhD; Adil Bashir, PhD; Robert Gropler, MD, “In vivo 1H-magnetic resonance spectroscopy assay for intramyocellular lipid in human myocardium.”

Curtis Carey, Michael Welch, PhD, “Non-standard PET radionuclides.”

Robert Gropler, MD; Kooresh Shoghi, PhD; Richard Laforest, PhD; Terry Sharp; Michael Welch, PhD, “Cyclotron-produced isotopes in biology and medicine.”

Terry Sharp; Kooresh Shoghi, PhD; Richard Laforest, PhD; Nicole Fettig; James Kozlowski; Michael Welch, PhD, “Advances in small animal PET imaging: MIR MicroPET facility.”

Yongjian Liu; Aviv Hagooly; Tetsuya Mori; Raffaella Rossini; Michael Welch, PhD, “Assessment of the efficacy of diabetes therapies on myocardial biodynamics in an animal model of type 2 diabetes with small animal PET.”

Dongyang Zhang, Abraham Snyder, PhD, MD; Michael Fox; Mark Sansbury; Joshua Shimony, MD, PhD; Marcus Raichle, MD, “Functional connectivity within the human thalamocortical system.”

Dongyang Zhang; Abraham Snyder, PhD, MD; Michael Fox; Tracy Nolan, Linda Larson-Prior, PhD; Marcus Raichle, MD, “Subject variability of spontaneous BOLD functional connectivity.”

Kelly Botteron, MD; Tomoyuki Nishino; Melissa Hunn, MPE; J. Alexopolous; Casey Balb; Abraham Snyder, PhD, MD; Robert McKinstry, MD, PhD, “Decreased amygdala anisotropy by DTI in early onset MDD: an epidemiologic twin study.”

Kelly Botteron, MD; Casey Bab; Tomoyuki Nishino; Elizabeth Lobos, PhD; Alexandre Todorov, PhD; Tilak Ratnanather, DPhil; Michael Miller, PhD; Richard Todd, PhD, MD, “Lifetime trauma exposure, early onset MDD and 5-HTTLPR genotype influence on hippocampal volume in a young female twin sample.”

Kelly Botteron, MD; Donna Dierker; Richard Todd, PhD, MD; J. Alexopolous; Dong Han, PhD; Tomoyuki Nishino; Erin Reid; Alexandre Todorov, PhD; David Van Essen, PhD, “Human vs. computer algorithm choices in identifying identical twin pairs based on cortical shape characteristics: who’s better?”

Kooresh Shoghi, PhD; Yi Su; Jun He; Douglas Rowland, PhD; Joel Garbow, PhD; Zhude Tu, PhD; Robert Mach, PhD; Ming You, MD, PhD, “Multi-modality evaluation of sigma-2 ligand radiopharmaceutical [18F]OS-1 as an imaging marker of tumor proliferation with response to therapy.”

Kooresh Shoghi, PhD; Yi Su; Richard Laforest; Michael Welch, PhD, “Advances in the quantification of small animal PET images.”

Xiaodong Liu; Richard Laforest, PhD, “microPET imaging with non-standard PET nuclides.”

Thaddeus Wadas; Martin Eiblmaier; Alexander Zheleznyak; Riccardo Ferdani; Kexian Liang; Christopher Sherman; Samuel Achileiu, PhD; Carolyn Anderson, PhD, “Evaluation of a somatostatin analog for the PET imaging of somatostatin receptor-positive tumors.”

Ashley Fiamengo; Monica Shokeen; Raffaella Rossin; Aviv Hagooly; Nicholas Ramos; Adah Almutairi; Yunpeng Ye, PhD; Samuel Achileiu, PhD; Jean Fréchet, PhD; Michael Welch, PhD; Carolyn Anderson, PhD, “Binding affinity and cellular internalization of αvβ3 targeting ligands and nanoparticles.”

Kelly Botteron, MD; Donna Dierker; Richard Todd, PhD, MD; J. Alexopolous; Dong Han, PhD; Tomoyuki Nishino; Erin Reid; Alexandre Todorov, PhD; David Van Essen, PhD, “Human vs. computer algorithm choices in identifying identical twin pairs based on cortical shape characteristics: who’s better?”

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Robert Mach, PhD; Zhude Tu, PhD; Jinbin Xu; Suwanna Vangveravong; Shihoft Li; Lynne Jones; Ryuji Higashikubo, PhD; Delphine Chen, MD, “[18F]ISO-1: a novel radiotracer for imaging cell proliferation in tumors.”

Robert Mach, PhD; Dong Zhou, PhD; Wenhua Chu; Zhude Tu, PhD; Justin Rothfuss; Chenbo Zeng, PhD; Delphine Chen, MD; Carmen Dence, MS; Robert Gropler, MD; Michael Welch, PhD, “PET imaging of cellular death.”

Yvette Sheline, MD; Abraham Snyder, PhD, MD; Suzhi Wang; Denise Head, PhD; Marcus Raichle, MD; John Morris, MD; Mark Mintun, MD, “Alzheimer’s Disease differs in default network spontaneous connectivity.”

Andrei Vlassenko, MD, PhD; Dena Sacco; Neil Vaishnavi; Melissa Rundle; Lars Couture; Abraham Snyder, MD, PhD; Yvette Sheline, Robert Mach, PhD; Marcus Raichle, MD; John Morris, MD; Mark Mintun, MD, “Spatial correlation between beta-amyloid deposition and aerobic glycolysis.”

Benjamin Shannon, PhD; Abraham Snyder, MD, PhD; Cindy Lustig; Randy Buckner, PhD; Marcus Raichle, MD, “Brain functional activity predicts subsequent structural atrophy in Alzheimer’s Disease but not normal aging.”

Tamara Hershey, PhD; Meghan Campbell; Tom Videen, PhD; Samar Tabbal, MD; Morvarid Karimi, MD; Joel Perlmutter, MD, “Defining functional areas in individual human brains using resting functional connectivity MRI.”

Neil Vaishnavi; Justin Vincent; Abraham Snyder, MD, PhD; Michael Fox; Felice Ghilardi, MD; Giulio Tononi, MD; Marcus Raichle, MD, “Effect of motor learning on spontaneous fMRI fluctuations.”

Micheline Burack, MD, PhD; M. Campbell; Erin Foster, OTR, OTR/L; Nima Golchin; Johanna Hartlein, NP; Tamara Hershey, PhD; Joel Perlmutter, MD, “Relationship of cortical Pittsburgh Compound B (PIB) binding and clinical features in Parkinson’s Disease dementia.”

Carlo Sestieri; Vittorio Pizzella; Francesco Gianfalone; Gian Luca Romani; Maurizio Corbetta, MD, “Sequential neuronal activation of human oculomotor centers during planning of visually-guided eye movements: a combined fMRI-MEG study.”

Melanie Kotys, DSc; Erbil Akbudak, PhD; Thomas Conturo, MD, PhD, “Relative SNR benefits and optimal dosing of Delta Phi and Delta R25 AIFs determined by simulations at 1.5T and 3T.”

Alexander Cohen; Damien Fair; Fran Miezis; Nico Dosenbach; Bradley Schlaggar, MD, PhD; Steven Petersen, PhD, “Defining functional areas in individual human brains using resting functional connectivity MRI.”

Neil Vaishnavi; Justin Vincent; Abraham Snyder, MD, PhD; Michael Fox; Felice Ghilardi, MD; Giulio Tononi, MD; Marcus Raichle, MD, “Effect of motor learning on spontaneous fMRI fluctuations.”
Suddenly,
your side is numb,
you feel confused or
your speech is slurred.
If you are in bed, the
worst thing you can
do is drift back to
sleep, hoping you
will feel better in
the morning.

The best thing is to call “911”
or head immediately to a primary
stroke center, like Barnes-Jewish
Hospital at Washington University
Medical Center (WUMC), where a
trained response team will quickly
recognize that you are one of the
750,000 Americans each year who
have suffered a stroke. And, if your
case warrants, the response team
will also see that you get a life-saving
injection of tissue plasminogen
activator (tPA), a powerful clot-
dissolving agent. But there’s a
catch: tPA works best if given
quickly, within two to three hours
after symptoms begin.
The tPA treatment is relatively underutilized because it is often difficult to get people to the hospital in time, it's hard to recognize a stroke that quickly, it's hard to grease all the skids to give the drug as fast as possible," says Colin Derdeyn, MD, professor of radiology, of neurology, and of neurological surgery, and director of an innovative program that studies more efficient and effective treatment for stroke patients.

SPOTRIAS programs
The medical community has long agreed that earlier, more effective ways to diagnose and treat strokes are urgently needed. Experience with tPA has proven that the earlier the therapy, the more likely the patient will make a good recovery. Clinicians and scientists at the National Institute of Neurological Disorders and Stroke (NINDS) recognized that the best place to initiate studies with this goal in mind is at centers that already are proficient in treating strokes. And Washington University School of Medicine neurologists and emergency medicine staff have one of the best “door-to-needle” times in the nation: only 45 minutes from the emergency department door to the start of a potentially lifesaving infusion of tPA.

In July 2008, NINDS awarded Washington University $9 million over five years to establish a Specialized Program for Translational Research in Acute Stroke (SPOTRIAS) center, one of eight such programs in the country. The other centers in the network are at the University of Cincinnati, University of Texas at Houston, University of California campuses in San Diego and Los Angeles, Columbia University, Massachusetts General Hospital/Harvard University, and the National Institutes of Health in Washington DC.

Nationally, the SPOTRIAS program began five years ago when the NINDS decided to support, as it said, “a collaboration of clinical researchers from different specialties whose collective efforts will lead to new approaches to early diagnosis and treatment of acute stroke patients.” To receive a SPOTRIAS grant, an institution had to prove that it had treated at least 12 patients a year within two hours of symptom onset. Such a response time is only possible if all staff members—from first responders to emergency medicine staff—have been well trained in diagnosing and treating strokes.

In 2007, the Washington University/Barnes-Jewish Hospital team treated 45 stroke patients, including 20 who were treated in two hours or less. These patients come in from the immediate area and from more distant community hospitals that routinely transfer suspected stroke patients for advanced monitoring and treatment. Once the patients arrive, says Derdeyn, treating them is a “big, big team effort. Everyone is very motivated for a successful outcome.”
Improving Medical Response to STROKE SYMPTOMS

The WUMC edge

This excellence in the treatment of patients with acute stroke only allowed Washington University to apply for a SPOTRIAS center grant. Grant funding depended on the scientific merit of the projects proposed in the application. Washington University was chosen to join this elite group in large part because of its extraordinary neuroimaging capability and its track record in research, explained Scott Janis, NINDS SPOTRIAS program officer, on a recent site visit to St. Louis. “Since we are providing funds for infrastructure, we were looking for more than that,” he said. “We are funding centers that are top-rated in science. It was science that got you [Washington University] in the door.”

One of the key WUMC facilities for the SPOTRIAS projects is Mallinckrodt Institute of Radiology’s (MIR’s) Center for Clinical Imaging Research (CCIR), led by Mark Mintun, MD, professor of radiology and of psychiatry. This research-dedicated, comprehensive imaging center is the only one of its kind in the nation and, possibly, the world. The CCIR is an innovative, biomedical imaging environment that links basic science and discovery efforts to clinical practice. The magnetic resonance (MR) imaging for patients enrolled in two of the SPOTRIAS projects will be performed using the CCIR scanners.

Another is Barnes-Jewish Hospital’s nationally recognized neurology-neurosurgery intensive care unit (NNICU), headed by Michael Diringer, MD, professor of neurology. More than 1,700 patients are admitted annually to the 20-bed NNICU. The facility is the only neurological intensive care unit in the United States with its own on-site positron emission tomography (PET) scanner, which is used to measure brain blood flow and metabolism.

“Big projects like SPOTRIAS are possible at only a few places,” says Derdeyn. “The marriage of a big, private, full-service hospital like Barnes-Jewish with a huge research institution like Washington University School of Medicine gives us a rare opportunity. There are really very few places that have the resources for doing these kinds of projects.”

Studying new approaches

Under Derdeyn’s overall direction, Washington University’s SPOTRIAS team has embarked upon three projects:

- STUDY 1: Focuses on the effectiveness of cholesterol-lowering statin agents in reducing the impact of vasospasm after aneurysm rupture. This aftereffect, which occurs seven to 10 days after the rupture, causes blood vessels to constrict dangerously. For those who survive the initial stroke, which is caused by a ruptured aneurysm, vasospasms are one of the major causes of death or long-term disability. In this pilot study, physicians will measure blood flow in the brains of 50 stroke patients, randomly assigned to receive either statin or placebo therapy. To do this measurement, physicians will use the PET scanner in the NNICU.

- STUDY 2: Targets new ways to determine what brain tissue survives after stroke. Right now, MR imaging is often used to measure blood flow, as a way to see what tissue is still salvageable. But studies in Europe have recently shown that MR measurements of perfusion are not necessarily an accurate predictor of outcome.

“There are definitely patients—although they have received tPA within the first hour of their stroke—for whom nothing is going to help,” says Derdeyn, who is also program director of MIR’s endovascular surgical neuroradiology service. “And there are definitely...
people who, at even six hours following stroke onset, are probably going to benefit from opening the blood vessel with tPA. Right now, we don’t have a way to definitively make that prediction."

So, physicians are testing a new method of measuring brain oxygen use with MR scanning as a better predictor of whether or not brain tissue will survive when reperfused. MR scans are taken of patients at 3.5 hours, six hours, and three months after a stroke to assess reperfusion and tissue outcome. So far, they have tested more than 20 patients and acquired some exciting preliminary data. "This could be explosively important," says Derdeyn. "It could really change the whole field. If we can reliably say ‘Below this level, you are irreversibly injured; above it, the tissue has good potential,’ then the next step is to treat patients—even those who are six, eight, or twelve hours out from their stroke—and see how they do.”

• STUDY 3: Focuses on the cerebellum or brain stem, where 10 to 20 percent of ischemic strokes occur. Some evidence indicates that this area may have greater tolerance for low blood flow than do other parts of the brain, especially the cortex, so that tPA may have a beneficial effect well outside of the normal window of opportunity. In this study, the investigative team will randomly assign 60 patients, all of whom have had cerebellar strokes more than three hours earlier, into control groups or tPA-treatment groups. In follow-up MR studies,
Along with the work of the study participants, the work of six “cores” is also crucial to SPOTRIAS.

- Career Development Core: headed by Mark Goldberg, MD, professor of neurology, of neurobiology, and of biomedical engineering; director of the Hope Center for Neurological Disorders. Is training Andria Ford, MD, a neurology fellow, in stroke research. One-year research fellowships are available to residents who have completed training in radiology, neurology, neurological surgery, or emergency medicine.

- Biospecimen Core: led by Mark Watson, MD, PhD, associate professor of pathology and immunology. Will store genomic and proteomic samples collected from patients enrolled in the three projects. This information will be linked to bioinformatic and imaging archives for future analysis, as well as shared across the network.

- Administrative Core: headed by Colin Derdeyn, MD, professor of radiology, of neurology, and of neurological surgery; with support from Robert Grubb, Jr., MD, professor of neurological surgery. Acts as internal safety monitor.

- Internal Advisory Committee: with Ralph Dacey, MD, professor of neurological surgery and head of the Department of Neurological Surgery; Marcus Raichle, MD, professor of radiology, of neurology, and of neurobiology; John Morris, MD, professor of neurology and of pathology and immunology, and director of the Alzheimer’s Disease Research Center; and Lawrence Lewis, MD, associate professor of emergency medicine and of medicine. Will advise the Administrative Core.

- Patient Access Core: headed by Abdullah Nassief, MD, associate professor of neurology; director, Clinical Stroke Center, and David Tan, MD, assistant professor of emergency medicine. Will support patient recruitment into the studies and the collection of biospecimens and clinical outcome information.

- Imaging and Biostatistical Cores: Will offer needed support.

physicians will look for signs of the drug’s efficacy up to three months later; they will also measure drug safety by examining its risk of causing bleeding as an adverse effect. Since brainstem strokes often produce more subtle symptoms than do other kinds, the physicians hope to develop better ways of recognizing them.

Looking to the future

With the staffing provided by SPOTRIAS’ funds—especially a new group of stroke-research nurse coordinators—Washington University physicians will be able to take on still more projects as time goes on. “The core infrastructure provided by the SPOTRIAS grant has already allowed us to take on several other clinical trials of acute intervention for patients with strokes,” says Derdeyn. “We now have a critical mass of stroke-research nurse coordinators to provide twenty-four/seven coverage for clinical trials.” As other SPOTRIAS centers develop promising projects, Washington University physicians will be able to participate in those trials, creating a multicenter approach.

Though the grant has a five-year timeline, Derdeyn and his colleagues hope to complete their work even more quickly. “The sooner we get all the information analyzed, the better able we are to move on to the next question, and that’s what we would like to do,” says Derdeyn. “We are committed to completing these three projects and getting answers, but we’re equally committed to being in position in five years for the next five years.”
The severity of traumatic brain injury (TBI)—also called intracranial injury—can vary greatly, depending on which portion of the brain is affected and the extent of the damage. TBI affects approximately 2 million people in the United States each year and is a major cause of death and disability worldwide. The use of improvised explosive devices (IEDs) by terrorists and insurgents is causing an alarming increase in blast-related brain injuries suffered by military men and women as well as by civilians.

On October 1, 2008, experts involved in the study and treatment of blast-related brain injury met in St. Louis to discuss their clinical and research experiences. The workshop—“Blast-related brain injury: imaging for clinical and research applications”—was hosted by Mallinckrodt Institute. The meeting provided an opportunity for participants to explore current knowledge about TBI, to identify those areas relating to blast-related brain injury in which clinicians and researchers need more information, and to discuss the use of new imaging techniques to improve prevention, diagnosis, and treatment of TBI.
NEW FACULTY

Nirvikar Dahiya, MD, assistant professor of radiology, Division of Diagnostic Radiology.

Suzanne Lapi, PhD, assistant professor of radiology, Division of Radiological Sciences.

Hyeran Lee, PhD, instructor in radiology, Division of Radiological Sciences.

James Woods, PhD, assistant professor of radiology, Division of Radiological Sciences.

Richard Laforest, PhD, associate professor of radiology, received a one-year grant in the amount of $888,523 from the National Center for Research Resources, National Institutes of Health, for "Acquisition of the Inveon small animal PET/CT system."

Yoram Rudy, PhD, professor of biomedical engineering, cell biology, and physiology, of medicine, and of pediatrics, and research professor of radiology, received a five-year grant of $271,356 from Fondation Leducq in Paris, France, to study "Alliance for CaMK2 signaling in heart disease."

Yuan-Chuan Tai, PhD, assistant professor of radiology, as principal investigator, received a $703,000 grant from the United States Department of Energy to study "Detector technologies for sub-500 micron high-sensitivity PET imaging via a novel PET insert approach."

APPOINTMENTS/ELECTIONS

Geetika Khanna, MD, assistant professor of radiology, was appointed to the Institutional Participants' Committee of the American College of Radiology Imaging Network.

Joel Perlmutter, MD, professor of neurology, of radiology, of physical therapy, and of occupational therapy, was appointed to the Advisory Board of the Bandier Center for Business Medical Ethics at Saint Louis University.

Honors/Awards

Louis Gilula, MD, professor of radiology, of orthopaedic surgery, and of plastic and reconstructive surgery, organized the 24th International Wrist Investigators Workshop, Chicago, Illinois, September 17.

Scott Lecture

On October 22, Gary Becker, executive of the American Board of Radiology, presented the Thirty-seventh Annual Wendell G. Scott Memorial Lecture. He spoke on "Quality tsunami in American medicine: the role of board certification and maintenance of certification."

Pamela Woodard, MD, associate professor of radiology, was appointed by the American Heart Association as vice chair of the Cardiovascular Radiology and Intervention Committee. She was appointed by the American College of Radiology (ACR) as chair of the ACR Appropriateness Criteria, Cardiac Imaging Committee.

Lawrence Tarbox, PhD, research assistant professor of radiology, was elected chair of the Organizing Committee for the 2010 International Digital Imaging and Communications in Medicine Conference and Workshop.

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Gilbert Jost, director of Mallinckrodt Institute, presented Becker (right) with a commemorative plaque. 
Lectures

Carolyn Anderson, PhD, professor of radiology, of molecular biology and pharmacology, of chemistry, of biochemistry, presented “The Copper-64-labeled biomolecules for molecular imaging of cancer metastasis” to the Department of Chemistry, the University of Missouri, Columbia, September 28.

Colin Derdeyn, MD, professor of radiology and of neurology and neurosurgery, spoke on “Acute stroke intervention: new disease” at VIVA™ (Vascular Interventional Advances) 2008, Las Vegas, Nevada, September 24. He spoke on “Endovascular neurointervention” at the Comprehensive Brain Anatomy and Neurological Assessment Course, St. Louis, Missouri, October 9.

Igor Efimov, PhD, professor of biomedical engineering and of radiology, presented “3D structure of the AVJ” possible new perspective on the function of the atrioventricular junction at the Annual International Symposium on Ventricular Arrhythmias in Children, Moscow, October 6. He presented “Pathogenesis of ventricular arrhythmias in dilated cardiomyopathy: insights from optical mapping studies” at the 3rd Annual International Symposium on Ventricular Arrhythmias: Pathophysiology and Therapy, Miami, Florida, October 24. Efimov spoke on “Functional anatomy of the AV node: from rabbit to human” at the Cardiac Electrophysiology Society, New Orleans, Louisiana, November 8. He spoke on “Cardiac protection in hibernating ground squirrels: the role of connexins and cadherens” at the University of Missouri, Springfield, November 21. He presented “Human pacemaking and conduction system: from reductionism to integration,” as part of the Nora Eccles Treadwell Distinguished Lecture Series, at the Nora Eccles Harrison Cardiovascular Research and Training Institute, University of Utah, Salt Lake City, December 4.


Bennett Greenspan, MD, instructor in radiology, presented “Read with the experts” at the annual meeting of the Missouri Valley Chapter of the Society of Nuclear Medicine, Omaha, Nebraska, October 5.

Thomas Hermann, MD, associate professor of radiology, spoke (in Ukrainian) on “Embryonal tumors of childhood” and “Imaging of the mediastinum in children, role of CT and MRI” at the Conference of the Ukrainian Society of Radiology and the Danylo Halytsky L’viv State Medical University, participants in the 8th Scientific Congress of the World Federation of Ukrainian Medical Associations, L’viv, Ukraine, August 19-17.

Geetika Khanna, MD, assistant professor of radiology, spoke on “Imaging of CRMO” at the CRMO/SAPHO and Behçet’s Conference, sponsored by the National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health, Bethesda, Maryland, September 3.

John Kotyk, PhD, research associate professor of radiology, presented “Translational imaging research in the CCIR at WUSM” and “The development of the Center for Clinical Imaging Research at WUSM” at the H. Lee Moffitt Cancer Center and Research Institute, Tampa, Florida, December 12 and 18, respectively.

Robert McKinstry, MD, PhD, associate professor of radiology and of pediatrics, presented “MRI in term infants—interpretation” at the second Newborn Brain Symposium, sponsored by the Department of Pediatrics and St. Louis Children’s Hospital, St. Louis, Missouri, September 10 and 11.

Joel Perlmutter, MD, professor of neurology, of radiology, of physical therapy, and of occupational therapy, spoke on “Diagnostic testing in PD: Is it useful?” at the Course on De Novo Parkinson Disease: Diagnosis and Treatment, Movement Disorder Society, San Francisco, California, September 13.

He presented “Dystonia: symptoms and pathophysiology” at the St. Louis Community Educational Forum, sponsored by the Dystonia Medical Research Forum, St. Louis, Missouri, September 28.

Marcus Raichle, MD, professor of radiology, of neurology, of neurobiology, of psychology, and of biomedical engineering, as keynote speaker, presented the Klaus Hofmann Lecture, “Two views of brain function,” at Science 2008, sponsored by the University of Pittsburgh, Pennsylvania, October 2 and 3.
LECTURES

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Yoram Rudy, PhD, professor of biomedical engineering, cell biology, and physiology, of medicine, and of pediatrics, and research professor of radiology, as the Hein Wellens Distinguished Professor in Cardiology, presented the keynote lecture “Computational biology and ECG imaging in the study of cardiac electrophysiology and arrhythmia” to the Cardiac Rhythm Management Lab, University of Alabama, Birmingham, December 4.

Nasir Siddiqi, MD, assistant professor of radiology, spoke on “Interventional radiology approach to hepatic brachytherapy” and conducted an hepatic brachytherapy practical workshop at the 4th Annual Brachytherapy Review, sponsored by the Department of Radiation Oncology, Brigham and Women’s Hospital, Boston, Massachusetts, September 12 and 13.

Barry Siegel, MD, professor of radiology and of medicine, presented “PET and PET/CT: artifacts and variants,” “PET in oncology—diagnosis and staging I,” “PET in oncology—diagnosis and staging II,” “Gynecology—PET in gynecological cancer,” “PET in oncology—monitoring and predicting response to treatment,” and “PET/CT in breast cancer” at the 24th Inter-American Brazilian Congress of Radiology/37th Brazilian Congress of Radiology, Belo Horizonte, October 9-11. He spoke on “PET and PET/CT: basic principles, variants and artifacts” and “Clinical applications of PET and PET/CT in oncology” at the 23rd National Congress of Diagnostic and Therapeutic Imaging, sponsored by the Mexican Federation of Radiology and Imaging, Guadalajara, October 29-November 1.

Marilyn Siegel, MD, professor of radiology and of pediatrics, spoke on “CT congenital lung lesions,” “Pediatric renal masses,” “CT congenital mediastinal vascular anomalies,” “CT/MR mediastinal masses,” “CTA thoracic vascular lesions,” and “CT/MR pediatric pelvic masses” at the 23rd National Congress of Diagnostic and Therapeutic Imaging, sponsored by the Mexican Federation of Radiology and Imaging, Guadalajara, October 29-November 1.

Lawrence Tarbox, PhD, research assistant professor of radiology, presented “The evolution of DICOM—past, present, future” at the Joint Conference on Medical Informatics in Taiwan 2008, Taipei, November 22.

Michael Welch, PhD, professor of radiology, of chemistry, and of molecular biology and pharmacology, presented the keynote lecture “New radiopharmaceuticals for PET: current status and challenges” at the 48th Annual Scientific Meeting of the Japanese Society of Nuclear Medicine, Chibi, Japan, October 24-26.

Jeffrey Zacks, PhD, assistant professor of psychology and of radiology, presented “Event perception and memory: a mind-brain perspective” at Johns Hopkins University, Baltimore, Maryland, September 25.
In this section of FYI, only those faculty and staff who have Department of Radiology appointments are listed.

**SOCIEy FOR molecular imaging**

*World Molecular Imaging Congress*

Nice, France

September 10-13, 2008

Grainne Biddlecombe, MS; William Spees, PhD; Joel Garbow, PhD, “Imaging extracellular pH in prostate tumor with Cu-64-DOTA-pHILF: correlation between PET-CT, MRS and acute biodistribution.”

Delphine Chen, MD; Dong Zhou, PhD; Wenhua Chu, PhD; Phillip Herrbrich; Lynne Jones; Justin Rothfuss; Mark Mintun, MD; Michael Welch, PhD; Robert Mach, PhD, “In vivo evaluation of radiolabeled isatin analogs for imaging caspase-3 activator with positron emission tomography.”

Barry Edwards, PhD; Walter Akers, DVM, PhD; Philip Cheney; Yunpeng Ye, PhD; Richard Laforest, PhD; Samuel Achilefu, PhD, “Monitoring receptor targeted tumor therapy with a multi-modal imaging agent.”

Barry Edwards, PhD; Walter Akers, DVM, PhD; Samuel Achilefu, PhD; Buck Rogers, PhD, “Evaluation of an adenoviral vector encoding a SSTR2:EGFP chimera using optical and nuclear imaging.”

Riccardo Ferdani; Carolyn Anderson, PhD, “Comparison of [64Cu]Cu-LLP2A-DOTA and [64Cu]Cu-LLP2A-CB-TE2A as conjugates for in vivo imaging of αβ integrin.”

Riccardo Ferdani; Carolyn Anderson, PhD, “Targeted molecular imaging of integrin αβ; with 64Cu- and 99mTc-labeled peptide tracers.”

Kelly Fleentine; David Piwnica-Worms, MD, PhD, "Non-destructive, bioluminescence monitoring of salmonella invasion of eukaryotic cells.”

Joel Garbow, PhD; Joseph Ackerman, PhD, “Hydrochalarones: a novel endo-redal metallofulleren platform for the development of targeted MRI contrast agents.”

Scott Harpstrite, MS; Julie Prior; David Piwnica-Worms, MD, PhD; Vijay Sharma, PhD, “Preclinical development of a Cu-111radiochemical for monitoring MDR1 P-glycoprotein-mediated transport at the blood-brain barrier (BBB).”

Ralph Nothdurft, MS; Walter Akers, DVM, PhD; Joseph Culver, PhD; Samuel Achilefu, PhD, “High precision fluorescence lifetime tomography of a targeted optical probe in a living mouse.”

David Piwnica-Worms, MD, PhD, “Real-time bioluminescence imaging of ligand-induced L1β; signal transduction in live cells”;

“Optical in vitro molecular imaging assays”: “Molecular imaging captures the highs and lows of endogenous Cdc25A in mice and MEFs.”

Kooresh Shoghi, PhD; Joel Garbow, PhD; Zhude Tu, PhD; Robert Mach, PhD, “Multi-modality evaluation of sigma-2 ligand radiopharmaceutical as a predictive marker of tumor proliferation with response to therapy.”

Thadeus Wadas, PhD; Alexander Zheleznyak; Christopher Sherman; Riccardo Ferdani; Kexian Liang; Samuel Achilefu, PhD; Carolyn Anderson, PhD, “Preparation and biological evaluation of [Cu]Cu-TE2A-sst>ANT, a somatostatin antagonist for PET imaging of somatostatin receptor positive tumors.”

Michael Welch, PhD, “Dual-modality nanoparticles for PET/MRI imaging in vivo.”

Mai Xu, PhD; Samuel Achilefu, PhD, “Monoclonal antibody CC188 binds carbohydrate epitope expressed on the surface of both colorectal cancer stem cells and their differentiates progeny.”

Yunpeng Pe, PhD; Samuel Achilefu, PhD, “Efficient transformation of dicarboxyl acid-containing carbocyanine dyes into their mono-acid analogs.”

Yunpeng Ye, PhD; Baogang Xu; Samuel Achilefu, PhD, “Novel chimerical fluororescent probes for optical imaging of amyloid β-peptide aggregates.”

Alexander Zheleznyak; Thadeus Wadas, PhD; Julie Prior; Lynne Collins; David Piwnica-Worms, MD, PhD; Carolyn Anderson, PhD, “Imaging αβ; in bone metastases using 64Cu-CB-TE2A-c(RGDyK).”

IEEE/NUCLEAR AND PLASMA SCIENCES SOCIETY

2008 Nuclear Science Symposium and Medical Imaging Conference

Dresden, Germany

October 19-25, 2008

Sergey Komarov, PhD; Heyu Wu, PhD; Tae Song, PhD; Joseph O’Sullivan, PhD; Yuan-Chuan Tai, PhD, “System modeling of a DOI-capable half-ring PET insert device for breast cancer imaging.”

Richard Laforest, PhD, “Cascade calculation and removal for dirty PET nuclides.”

Joseph O’Sullivan, PhD; Sergey Komarov, PhD; Yuan-Chuan Tai, PhD, “System modeling of a DOI-capable half-ring PET insert device for breast cancer imaging.”

Yi Shu, PhD; Kooresh Shoghi, PhD, “ROI based input function estimation with deconvolution based partial volume correction for small animal PET dataset: a simulation study.”

Tae Song, PhD; Heyu Wu, PhD; Sergey Komarov, PhD; Yuan-Chuan Tai, PhD, “Sub-millimeter resolution PET detector module using multi-pixel photon counter array.”

Heyu Wu, PhD; Tae Song, PhD; Sergey Komarov, PhD; Joseph O’Sullivan, PhD; Yuan-Chuan Tai, PhD, “A high resolution PET insert system for clinical PET/CT scanners.”
In September, the Radiological Society of North America (RSNA) announced that Barry Siegel, MD, professor of radiology and of medicine, and Franz Wippold, MD, professor of radiology, would be travelling to the Socialist Republic of Vietnam in September as part of the RSNA’s International Visiting Professor Program, which works with international radiology societies to assist with medical education in developing and newly developed nations. In Hanoi, Siegel and Wippold spoke at the 14th SEAN Association of Radiology Congress, sponsored by the Vietnamese Society of Radiology and Nuclear Medicine.

Siegel and Wippold and Marilyn Siegel, MD, professor of radiology and of pediatrics, who was an invited lecturer at the 14th Congress, toured facilities, gave lectures, and reviewed cases with the staff and residents at Bach Mai Hospital, Hanoi, and other hospitals in the northern province. They also lectured at Cho Ray Hospital, Ho Chi Minh City (Saigon), and other hospitals in the southern province.

PRESENTATIONS—14TH SEAN ASSOCIATION OF RADIOLOGY CONGRESS

Barry Siegel, MD, “Current status of PET and PET-CT in clinical practice”; “PET and PET-CT in oncology: beyond FDG”; “PET and PET-CT in thoracic oncology”; “PET and PET-CT in women’s cancers.”

Marilyn Siegel, MD, “CT angiography: congenital mediastinal vascular anomalies”; “CT angiography: congenital lung lesions: neonates to adults”; “Neonatal cranial ultrasound”; “Ultrasound neonatal spine.”

Franz Wippold, MD, “Emergent viral infection,” “Cerebellopontine angle lesions,” “Cystic lesions of the neck,” “Cervical lymphadenopathy.”

Above: Marilyn Siegel, MD, (right) answers questions from attendees at the 14th Congress.

Left: (left to right) Doctors Franz Wippold, Barry Siegel, and Eric Stern (an RSNA visiting professor from Harborview Medical Center, Seattle, Washington) at Cho Ray Hospital.
A close-up shot of the 40 illuminated spokes—spanning a diameter of 140 feet—forming the Ferris wheel at Chicago’s Navy Pier. This 150-foot-high amusement-park ride was modeled after one built for Chicago’s 1983 World’s Columbian Exhibition.

Photographs taken by Mickey Wyman, MR Photography Lab, while attending the 146th annual RSNA meeting.