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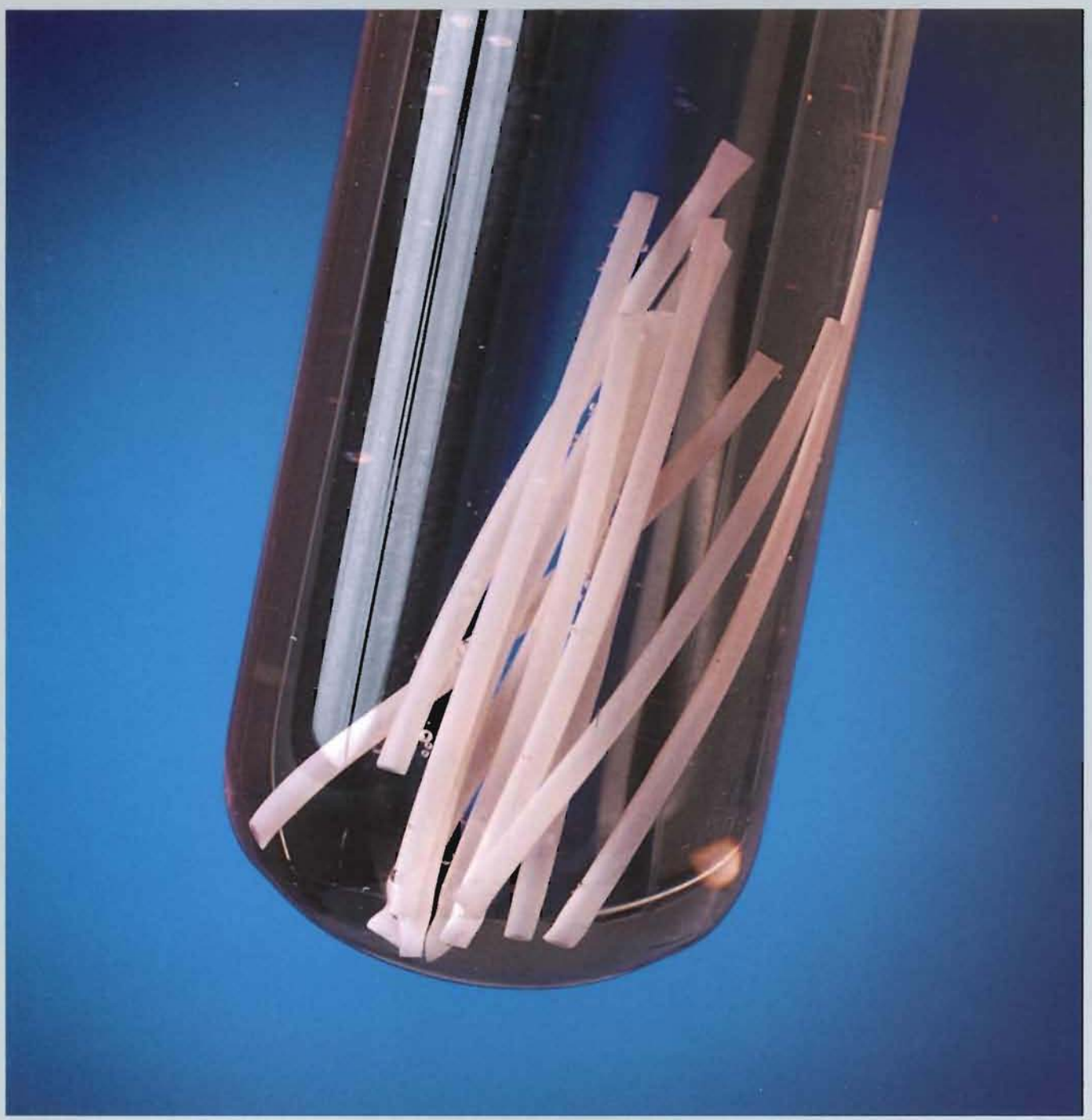
Outlook

Washington University School of Medicine Fall 1993



Electronic Atlases • Diabetes Therapy • Pediatric Trauma

Before MetroLink — St. Louis' new light rail system — debuted on July 31, officials asked the Medical Center to assign a name to one of the train cars. The "Carl V. Moore, M.D." now carries passengers on a line from 5th and Missouri in East St. Louis across the river to Busch Stadium, to a stop at the medical school and on north and west. Soon, the line will be extended to the airport. Moore, Class of '32, was head of the Department of Medicine (beginning in 1955), the first president of the Medical Center, the first vice chancellor for medical affairs (1964) and an outstanding clinician, scholar and teacher.

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FEATURES

DEPARTMENTS

THE COVER

A test tube provides scale to tiny implants containing insulin-producing islet cells suspended in gel and protected inside a semi-permeable membrane. The implants are in trial at the medical school, and if they meet expectations, enlarging them to a clinically relevant size is the next step. For more about the approach to diabetes therapy of Paul Lacy, M.D., Ph.D., and David Scharp, M.D., see the story beginning on page 12. Photograph by Tom Heine.

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Volume XXX, Number 3, Fall 1993. **Associate Vice Chancellor, Medical Public Affairs,** Don Clayton; **Editor,** Steve Kohler; **Assistant Editor,** Kleila Carlson; **Designer,** John Williams; **Photographer,** Tom Heine; **Circulation,** Kathi Law. Volume XXX, Number 3, Outlook (ISSN 1042-2897) is published quarterly by the Washington University School of Medicine at 660 S. Euclid, Campus Box 8065, St. Louis, MO 63110. Second-class postage paid at St. Louis, MO. POSTMASTER: Send address changes to Circulation, Outlook, 660 S. Euclid, Campus Box 8065, St. Louis, MO 63110

Ter-Pogossian Receives Award

MICHEL M. Ter-Pogossian, Ph.D., is one of five scientists chosen to receive the 1993 Gairdner Foundation International Award.

Michel M. Ter-Pogossian, Ph.D.

Of the 230 scientists to receive this Canadian award, 40 have subsequently received a Nobel Prize. Ter-Pogossian was selected for his pioneering work in developing positron emission tomography (PET).

Ter-Pogossian, professor of radiation sciences at Washington University's Mallinckrodt Institute of Radiology, is recognized internationally for developing the PET scanner and for introducing the use of some short-lived radioactive isotopes in biomedical research.

In the early 1970s, Ter-Pogossian led a team of Mallinckrodt Institute investigators in developing the first PET scanner, a technology that traces the path of radioactive pharmaceuticals in the body and produces images of metabolic activity. The images give investigators information about how the body works, rather than what it looks like. The technology has led to a better understanding of memory, language, aging, lung and heart function and diseases such as cancer, depression, multiple sclerosis, Alzheimer's and Parkinson's. ●

Professional Societies Honor Goldring

SIDNEY M. Goldring, M.D. '47, professor emeritus of neurological surgery, has been recognized by two prestigious professional societies. He was honored in April at the annual meeting of the American Association of Neurological Surgeons when he was presented with the distinguished service award, the Cushing Medal. Goldring trained under Henry G. Schwartz, M.D., who also was a Cushing Medal recipient.

In May, Goldring received the Distinguished Service Award of the Society of Neurological Surgeons at the organization's annual meeting in San Diego. Goldring is a past president of the Society of Neurological Surgeons and served as head of neurological surgery here from 1974 to 1989. ●

Peck Testifies

IN JUNE, William A. Peck, M.D., executive vice chancellor for medical affairs and dean of the School of Medicine, testified on behalf of the Association of American Medical Colleges (AAMC) at a hearing before Congress on the issue of university and industry collaboration.

Holding hearings on the matter to learn more about contractual relationships that exist between industry and academia, Congress is exploring the potential for conflict of interest. Peck testified before the Subcommittee on Regulation, Business Opportunities and Technology, presenting an overview of university-industry agreements and detailing the Washington University-Monsanto Agreement, established in 1982 for the purpose of conducting biomedical research.

At the heart of the congressional inquiry was a proposed $300 million, 10-year deal between Scripps Research Institute, La Jolla CA, and Sandoz Pharmaceuticals Corp., a Swiss company. The proposed contract entitled Sandoz to first rights on nearly $1 billion in federally funded U.S. research. However, at the urging of Congress and the National Institutes of Health (NIH), Scripps renegotiated the agreement.

The bulk of the hearing was devoted to Bernadine Healy, M.D., former head of the NIH, who said that the NIH will develop guidelines for all universities negotiating such agreements with industry. ●

Studying Politics

DEBORAH Lindes and Alison Wakoff, second-year medical students, participated in the American Medical Student Association (AMSA) Foundation's Washington Health Policy Fellowship Program.

Lindes and Wakoff were two of 15 physicians-in-training chosen for the summer program. Some 115 applications were received.

The Washington Health Policy Fellowship Program introduces promising medical students to the political process and the role of physicians as policy makers and advocates. Fellows spend two months gaining hands-on experience in a congressional office, federal agency or Washington-based advocacy organization. Lindes was at the Advocacy Institute, and Wakoff served with the National March of Dimes. ●

Dowton Leads Curriculum Revision

BRUCE Dowton, M.D., associate professor of pediatrics and assistant professor of genetics, has been named associate dean for medical education.

In the newly created position, Dowton will oversee all matters pertaining to medical education. One of his long-term projects will be to revise and implement a medical curriculum to better meet the challenges of educating medical students into the next century. Although Dowton says it will take several years to plan and launch a new curriculum, he expects pilot programs for the revised guidelines to begin this fall.

"We feel it is timely to develop a creative medical school curriculum to ensure we are meeting the challenges confronting our students of today and physicians and physician/scientists of tomorrow," says Dowton. "We have such exceptional students at Washington University, with diversified attitudes and interests, that we need to continually enhance the curriculum to respond to their changing needs."

Dowton, currently director of the division of medical genetics in the Department of Pediatrics, will continue in that role. ●

Institute Of Medicine Elects Deuel

THOMAS F. Deuel, M.D., Lewis T. and Rosalind B. Apple Professor of Oncology in Medicine, has been elected to the Institute of Medicine of the National Academy of Sciences.

Deuel, who also is professor of biochemistry and molecular biophysics, is co-director of the division of hematology. He is renowned for his pioneering work on the role various growth factors play in the development of cancer. His laboratory was the first to purify a substance known as platelet-derived growth factor (PDGF), which he later showed influences the growth of abnormal cells.

He was elected by the incumbent membership on the basis of professional achievement and interest, concern and involvement with problems and critical issues that affect the health of the public. ●

Schwartz Receives Eliot Society Award

HENRY G. Schwartz, M.D., August A. Busch, Jr., Professor Emeritus of Neurological Surgery, received this year's William Greenleaf Eliot Society Award for outstanding service to the university.

Schwartz began his career at the medical school in 1936 under the guidance of Ernest Sachs, who held the first academic appointment in neurosurgery in the country.

Schwartz' experiences during World War II led him to develop new techniques for the surgical treatment of head and nerve injuries. He was awarded the Army's Legion of Merit for that work.

Following World War II, Schwartz returned to the university as professor and head of neurological surgery. He also became head of neurosurgery and neurosurgeon in chief at Barnes, Children's and Jewish hospitals. He was named August A. Busch, Jr., Professor of Neurological Surgery in 1970.

He was instrumental in establishing the craniofacial reconstruction program at the medical center in 1978, contributing both his intellectual support and his surgical skills. ●

Honor To Eisen

ARTHUR Eisen, M.D., received the Stephen Rothman Memorial Award from the Society for Investigative Dermatology for distinguished service to investigative cutaneous medicine.

Arthur Eisen, M.D.

Eisen, professor of medicine and head of the Department of Medicine's dermatology division, studies a family of enzymes known as extracellular matrix metalloproteinases. These enzymes are responsible for degrading important connective tissue proteins such as the collagens, which help bind together and support various body structures. His laboratory has shown that these enzymes play an important role in tissue repair and early tissue development. Substances that inhibit metalloproteinases may prove to be valuable for treating diseases such as cancer and rheumatoid arthritis.

Eisen, who is Winfred and Emma Showman Professor of Dermatology, is past president of the Society for Investigative Dermatology and past president of the Association of Professors of Dermatology. ●

Farwell Receives Dean's Scholarship

GREG Farwell, a fourth-year medical student, has been named the first Dean's Scholar and awarded a full-tuition scholarship. Funds for the prize became available through an existing scholarship program known as the Distinguished Student Scholarship, or DSS.

Greg Farwell, the first Dean's Scholar.

The DSS usually is awarded to students in the entering class who have earned an outstanding record of academic and personal achievements on the undergraduate level. For 1993-94, William A. Peck, M.D., approved a proposal by the scholarship selection committee that one scholarship be awarded to a senior medical student with a distinguished academic record and significant extracurricular involvement during the first three years of medical school. In recognition and appreciation of the dean's support of the proposal, the selection committee voted to name the scholarship recipient the "Dean's Scholar."

John Walters, assistant dean of student affairs and a member of the selection committee that chose Farwell, says he was selected from several outstanding candidates. "We wanted to award the scholarship to someone who had really distinguished him- or herself," says Walters. "Greg participated in student projects and activities, did research in a preclinical and a clinical department and still earned one of the most distinguished academic records in the third year class."

Arthur D. Loewy, Ph.D., professor of anatomy and neurobiology and a member of the selection committee, describes Farwell as "one of the best students I've seen in my 19 years at Washington. He is unbelievably caring, careful, attentive and responsible." Farwell worked in Loewy's laboratory in 1991.

Farwell says of the prize, "It was a complete surprise and a tremendous honor to receive the scholarship, especially since it is the first time it has been awarded. I am extremely appreciative of the opportunities available to me at Washington U., and the support and close personal interaction I have received from the faculty and administration." ●

On Japanese Television

A DOCUMENTARY film crew from NHK Japan Broadcasting Corp. spent four days at the medical school in June, interviewing faculty members who study memory. NHK is the Japanese equivalent of the Public Broadcasting Service in the United States and is considered the top Japanese producer of documentaries about science, technology and medicine. A six-part documentary, "The Human Mind & Brain," will feature episodes on evolution, perception, memory, emotion, development and the subconscious mind and creativity.

The documentary will air from October through March in Japan and will be seen by an estimated 20 million viewers. After it airs in Japan, NHK plans to distribute the series throughout Asia and Europe. The network currently is negotiating with the Discovery Channel to make the series available to viewers in North America. The network also is seeking funds to publish an animated version of the documentary that would appear in comic book form for school-age children. ●

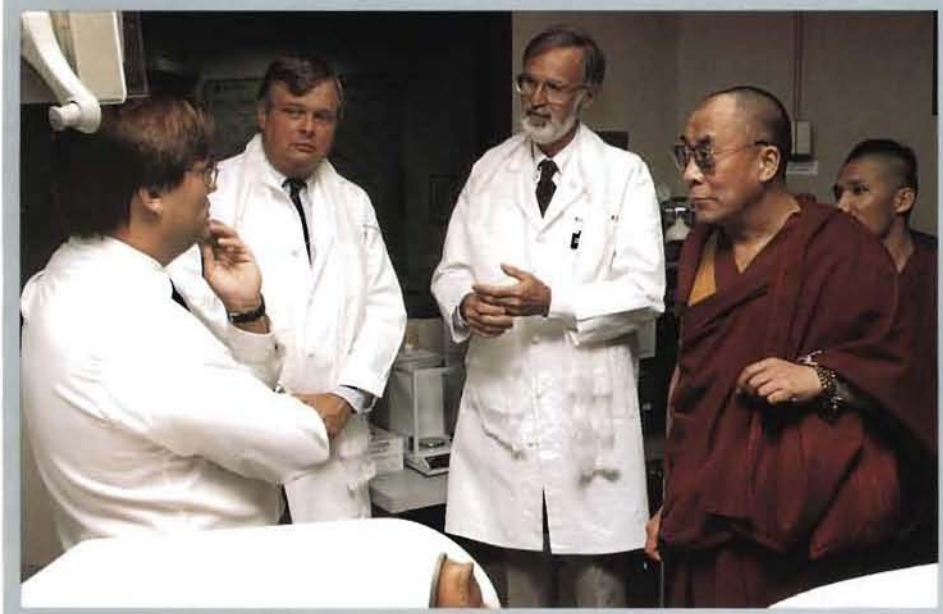
Ladenson Named To Chair

JACK Ladenson, Ph.D., professor of pathology and medicine, has been named to the newly created Oree M. Carroll and Lillian B. Ladenson Chair of Clinical Chemistry.

Jack Ladenson, Ph.D., in conversation with Emil R. Unanue, M.D., (left) and John P. Atkinson, M.D., (right).

The new endowed chair is named after Ladenson's father-in-law and mother. It will be funded in part by licensing fees that companies pay the university for the use of monoclonal antibodies Ladenson developed. Additional funding will be provided by the university and the Departments of Medicine and Pathology.

Ladenson's developments have made it possible to create automated blood tests for diagnosing heart attacks. The automated tests, which are used by about half of the hospitals in the United States, replace assays that have been the diagnostic standard since the 1970s. ●



Dalai Lama Visits

His Holiness the Dalai Lama came to the medical school on September 8 to explore his interest in neuroscience. Exiled from his homeland of Tibet, the Buddhist leader and Nobel Peace Prize winner heard explanations of the work of (from left) Steven E. Petersen, Ph.D.; Thomas A. Woolsey, M.D., and Marcus E. Raichle, M.D., among others.

Occupational Therapy Turns 75

FACULTY, alumni and guests gathered May 7-8 to celebrate the 75th anniversary of the Program in Occupational Therapy, one of the oldest such programs in the country.

Among the featured speakers for the two-day event was William Stix of St. Louis, first cousin of Rachel Stix Michael, a leading advocate for the establishment of the St. Louis Training School for Reconstruction Aides, which became the St. Louis School of Occupational Therapy in 1918. The St. Louis program — the first offered west of the Mississippi River — and the program at Tufts University (previously the Boston School of Occupational Therapy) are the two that remain from the four occupational therapy programs that existed in 1919.

The St. Louis School of Occupational Therapy opened its doors on November 4, 1918, and graduated its first class of 10 students in June 1919. The school was acquired by Washington University in 1945, and a year later it became an academically recognized division of the School of Medicine.

Today, the program is involved in major research initiatives, many of which receive federal support. It also continues to grow in its number of faculty and students. This year the program graduated 71 students.

Other achievements include the establishment of a merit fellowship for minority students, organization of an integrated academic-clinical technology program and reinstatement of the post-professional master of science program. In addition, a doctoral program is slated to begin in 1997. ●

Magazine Gets Facelift

A NEW version of *Outlook*, featuring a complete redesign, debuts with this issue — Fall 1993.

If it is successful, the new magazine should be easier to read, more organized and more informative than editions past. Readers will find more and shorter stories organized into more concise categories, all presented in an easy-to-read typeface. The staff also has tried to boost the magazine's visual appeal by using color photographs and more color.

The redesign was undertaken after struggling with the graphic limitations of the old look, particularly the cover. Evolving reading habits and readers with less time to find and absorb what is important to them influenced the new style, too.

"Magazine designs have lives, like other visual statements, and *Outlook*'s appearance was getting long in the tooth," says editor Steve Kohler. "We worked to arrive at a fresh, easy to use design that retained a familial feel." ●

Researchers Rate Infant Bedding

HUNDREDS of infant deaths might be avoided each year if reliable guidelines were developed to identify infant bedding material that could be dangerous due to its softness, according to researchers here.

In their latest study, they looked at three types of bedding: the banned polystyrene-filled cushions, bedding in which infants were found dead and "standard bedding," such as coil spring mattresses, foam mattresses and nursery bassinet mattresses. The bedding was studied for softness, its ability to limit carbon dioxide dispersal and air flow in and out, and malleability.

James S. Kemp, M.D., assistant professor of pediatrics, and Bradley T. Thach, M.D., professor of pediatrics, say more reliable quantitative ratings are needed for infant bedding products.

Kemp and Thach study the problem of rebreathing, a form of accidental infant suffocation. Their work helped lead to the banning of polystyrene-filled cushions by the Consumer Product Safety Commission and to a recommendation that infants sleep on their backs or their sides.

Kemp and Thach found that on polystyrene-filled cushions and in soft bedding material, face-down infants can breathe in air that becomes trapped within the bedding around the baby's face. This rebreathing of carbon dioxide can lead to accidental suffocation.

Malleability of bedding material is key to the dispersal of air that is potentially harmful to sleeping infants, says Kemp. "If a baby puts its head down on an item of bedding and the mattress springs up, it's less likely that carbon dioxide will remain trapped," he explains. "If the bed retains a little 'sink hole' beneath the baby's face, it will be more likely that bad air will be trapped."

Thach says the goal of their work is to develop a quantitative measurement of bedding safety. "We hope to develop a measurement of softness that we can apply to all bedding and then figure out what degree of softness poses a hazard to the sleeping infant," he says. ●

New Method Measures Cholesterol

A NEW cholesterol absorption test will alter the way cholesterol is measured and allow patients to better control their cholesterol levels through diet.

The test has been developed by Matthew S. Bosner, M.D., assistant professor of medicine, who says, "Our research shows that each person absorbs cholesterol at a different rate. One person may absorb a very small percentage of the cholesterol he eats, while another may absorb a much greater percentage. These people have very different dietary needs."

Knowing exactly how much cholesterol a patient absorbs into his or her blood allows physicians to better guide the patient's diet. Equally important, Bosner says, is the method used to test cholesterol absorption. "While it was previously possible to test a patient's cholesterol level, it involved injecting radioactive material into a patient's bloodstream. This made many physicians hesitant to use the test on women of child-bearing age and children," Bosner says.

The new testing method, safe for children as well as men and women of all ages, requires that the patient receive cholesterol in two different ways: by injecting a small amount of cholesterol into the bloodstream and by eating a piece of bread topped with a cholesterol-corn oil spread. A blood sample is taken and analyzed three days later, providing a personalized cholesterol absorption rate for the patient.

"Part of the beauty of this project is the vast number of future applications," says Bosner. "We believe that within the next few years physicians will be able to use this cholesterol absorption test right from their offices. With this new

testing method we also will be able to add greatly detailed information to our research." ●

Defect Causes Newborn Respiratory Failure

RESEARCHERS have discovered a fatal genetic disorder responsible for a form of respiratory failure in full-term newborns.

The disorder, congenital alveolar proteinosis (CAP), strikes newborn infants, and until now all those who have been diagnosed with it have died of respiratory failure within their first year of life.

The incidence and cause of CAP were unknown prior to these studies, however researchers suspected that the disorder is caused by an inborn error of surfactant metabolism. The lungs produce several types of surfactant apoproteins that organize lipids and proteins in the airway. The surfactant keeps the lung from collapsing during the expiratory phase of breathing.

Researchers led by Harvey R. Colten, M.D., professor and head of the Department of Pediatrics, found that CAP can be caused by a deficiency of surfactant protein B (SP-B). "A common problem in premature infants is the inadequate maturation in the production of these surfactant apoproteins," Colten says. "This can lead to severe respiratory problems."

The genetic defect was discovered in a full-term baby with respiratory distress who was admitted to St. Louis Children's Hospital. The family history showed that 19 years earlier the mother had given birth to a baby who had died of respiratory distress. Autopsy of that infant revealed alveolar proteinosis and SP-B deficiency. ●

Laparoscopy Tested On Kidneys

A SURGICAL technique that relies on tiny "keyhole" incisions, miniature scissors and a pocket-sized video camera may some day make it less painful to donate a kidney.

Ralph Clayman, M.D., professor of urologic surgery, is part of a team that has successfully used the approach — laparoscopy — in the laboratory to remove whole, healthy kidneys from pigs that later underwent transplants to re-graft the organs.

The procedure paves the way for applying the laparoscopic technique to living, human kidney donors who typically experience weeks of post-operative pain and months of recuperation from the large incision traditionally required.

"Without decreasing the function of that kidney, we are trying to reduce the discomfort of the individual making the donation," says Clayman. "That's the whole reason for the laparoscopic approach."

In the controlled study of 15 pigs, Clayman and colleagues from the University of Kentucky Albert Chandler Medical Center in Lexington found that transplanted kidneys that were procured laparoscopically functioned well and without complications compared with the transplanted kidneys that were removed by traditional surgical techniques.

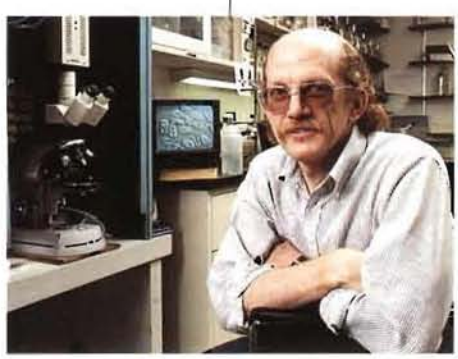
Clayman estimates that human kidney donors undergoing the laparoscopic procedure would require only a four-inch incision instead of the 10- to 12-inch incision necessary with conventional surgery. The smaller incision would lessen pain and also dramatically reduce recovery time. ●

Genome Project Gets Big Boost

ROBERT H. Waterston, M.D., Ph.D., professor and acting head of genetics, has received a $29.7 million grant from the National Institutes of Health's Center for Human Genome Research to continue his work in the human genome project.

Waterston has played a leading role in the human genome project, which seeks to decipher the genetic makeup of humans and a handful of more basic organisms. The grant will enable him to complete his project to sequence all 100 million chemical bases that determine the genetic blueprint of the C. *elegans* nematode, a tiny transparent worm. The nematode project is a model for the larger effort to map and sequence the entire human genome.

Washington University scientists working with Waterston include Richard Wilson, Ph.D., LaDeana Hillier, Philip Green, Ph.D., Mark Johnston, Ph.D., and Eric Green, M.D., Ph.D. The group collaborates with scientists John Sulston and Alan Coulson at the Medical Research Council Laboratory of Molecular Biology in Cambridge, England. ●



Robert H. Waterston, M.D., Ph.D.

Beauty and Data

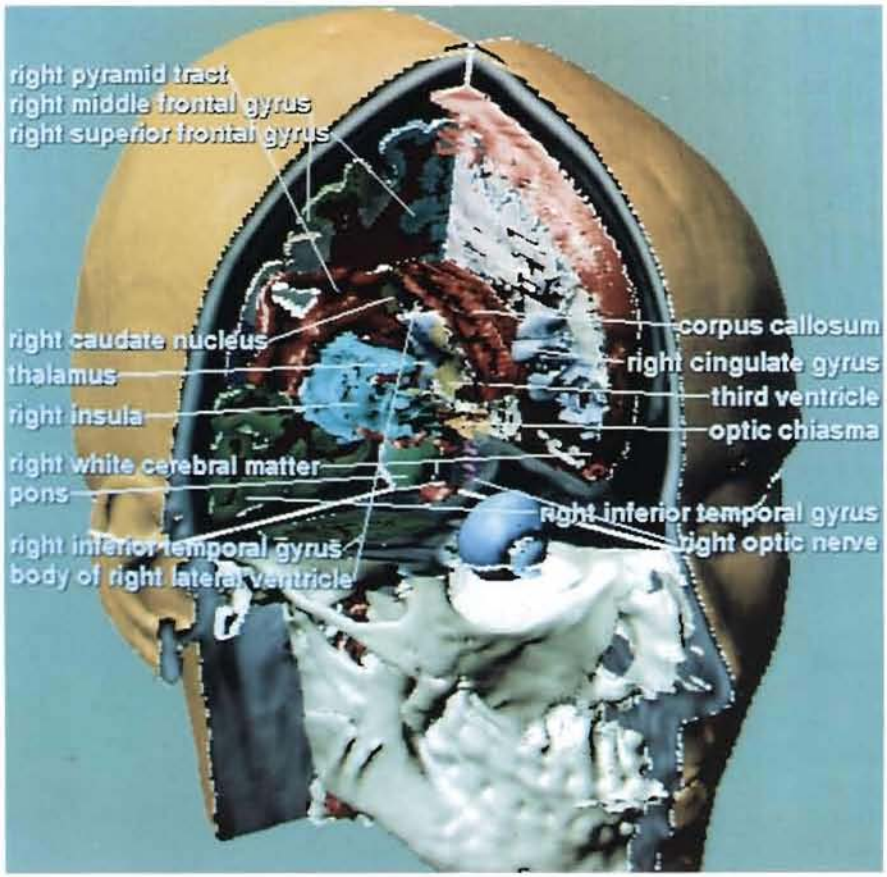
by *Juli* Leistner

The *Artful,* Instructive Images of the *Electronic* Atlas

For centuries, depicting the beauty of human anatomy on the printed page has been one of the artist's highest forms of expression. Scientists and physicians have used the same means to record and communicate their knowledge of anatomy.

Today, a marriage of sophisticated computing and imaging techniques is creating a new art form to map the human body. Called electronic atlases, the new tools offer highly realistic, three-dimensional views of anatomy on a computer screen. Like both art and map, they not only depict their subject but serve as an instrument for further exploration.

Researchers first began to develop electronic atlases about 15 years ago. The most notable among the many that have been created are three comprehensive atlases of the head currently in use at Washington University's Mallinckrodt Institute of Radiology (MIR). In addition, researchers all over the world are taking advantage of the computer's flexibility to develop atlases tailored to individual research needs. Investigators at Washington University are part of an international collaborative effort to improve the quality of atlases and to explore teaching and research applications, says Michael Vannier, M.D., professor of radiology and head of the image processing lab at MIR.



An electronic atlas provides interactive, instructive views of the anatomy. Individual structures can be named and colored for clarity and classed by tissue type in this example from Karl Heinz Höhne with Michael W. Vannier, M.D.

Atlases can be understood as computerized models — of the brain, foot, face or any other area — that can be manipulated at will. They are generated largely from computed tomography (CT) and magnetic resonance imagery (MRI) data, as well as from digitized photographs of cadaver slices. Once digital data is stored in the computer, software stacks the individual image slices into three-dimensional views, subtracts redundant information and allows unprecedented manipulation of the image, from colorization through angle of view.

Typically, an atlas depicts the anatomy of one person, though some represent data from many people averaged together. One of the most comprehensive atlases currently available was created by German researcher Karl Heinz Höhne of the Institute of Mathematics and Computer Science in Medicine in Hamburg. It offers practically unlimited freedom to explore the head. From a computer workstation, a user can rotate the head, slice it at any angle and in any plane, remove and replace structures to look deep inside the brain and access information about a specific structure such as its name, tissue type, blood supply and functions.

Such an atlas provides great benefits to students, says Glenn Conroy, Ph.D., professor of anatomy and neurobiology. As a departure from the static nature of traditional anatomy textbooks, an electronic atlas allows students to explore anatomy as if it were an adventure or practice surgical procedures according to their own interests, he says. David Van Essen, Ph.D., head of the Department of Anatomy and Neurobiology, is exploring ways to work such electronic materials into the neuroscience and anatomy courses taught in his department.

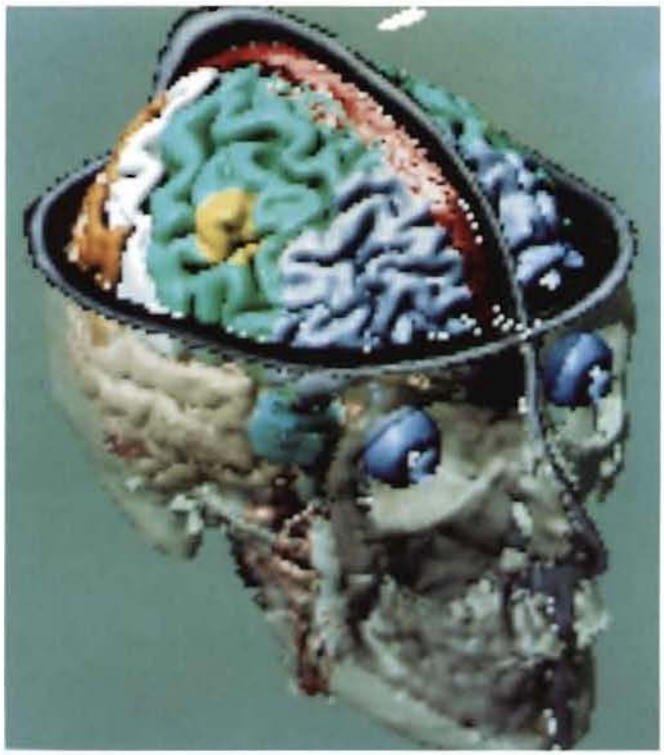
Atlases may also become an integral part of medical libraries. The National Library of Medicine currently is planning a "Visible Human" project to create atlases of two complete human beings, says Vannier, a member of the project's original advisory committee. In the future, atlases could serve as an additional interface between the library user and the information contained in the library. For example, the user could point (on the screen) to a structure of interest and receive a list of relevant research articles, he says. Efforts are now underway to make atlases available in the School of Medicine library.

Already valuable as idealized versions of individual brains, atlases show potential as powerful research tools. They already are providing more accurate ways to measure brain structures. For example, Vannier and his colleagues are interested in measuring the patterns and dimensions of the folds, or sulci, on the brain's surface. "Many people believe that sulci are characteristic for certain illnesses, such as schizophrenia. But it has always been very difficult for a human to mark where those sulci start and what path they take through the brain," Vannier says. He and his colleagues have created atlases of several patients' brains to serve as

computerized three-dimensional models. The atlases can be manipulated with software to obtain measurements that are nearly impossible to get any other way.

In another project, Vannier and Dan McKeel, M.D., associate professor of pathology, are interested in an atlas' potential for spotting early changes related to Alzheimer's disease. "We have known for a long time that after age 50 or so the brain shrinks and its ventricles get bigger, and that this occurs much more quickly in Alzheimer's patients," says McKeel. The search is on to find out which structures shrink.

"Right now, we can look at fixed brain in post-mortem studies, but what we really want to do is look at the earliest changes that occur while the patients are still alive," McKeel says. He and Vannier are studying whether measurements taken from an electronic atlas of patients will be accurate compared to measuring cadaver brains. If so, researchers could use an atlas generated from MRI scans taken during life to pinpoint the first signs of the disease.



Any part of Voxel Man, as the resident of the atlas is known, can be controlled. Here, the skin has been removed, some bone has been cut away and the rest has been made transparent.

A major limitation in applying atlases to research, explains Van Essen, is that studying one brain in the form of an atlas is not a valid representation of the whole population. "There are large differences from one individual to the next. Even for a perfectly defined area of the brain, size may differ by a factor of two or more, and its exact location will be variable across individuals. We need to cope with that individual variability," he says.

And again, the computer is able to address the challenge. Michael Miller, Ph.D., professor of electrical engineering and at the Institute for Biomedical Computing, and doctoral candidate Gary Christensen are developing computer software aimed at making the information in atlases apply to everyone. "In the case of the brain, the variability is so high that you can't just blow up one brain like a balloon or rotate it to make it match another," Miller says.

Running in a supercomputer on the Hilltop Campus called the MPP, or massively parallel processor, their software "warps" the map of one person's brain onto an electronic brain atlas. The computer applies 4,000 processors to the task, and the software treats the atlas brain and the patient's brain as two sets of hundreds of thousands of points. It matches up the corresponding points, defines how the location and orientation of each bit in the patient's brain differs from the atlas, and moves it to align with the atlas. At the end of the procedure, the brains superimpose nearly perfectly.

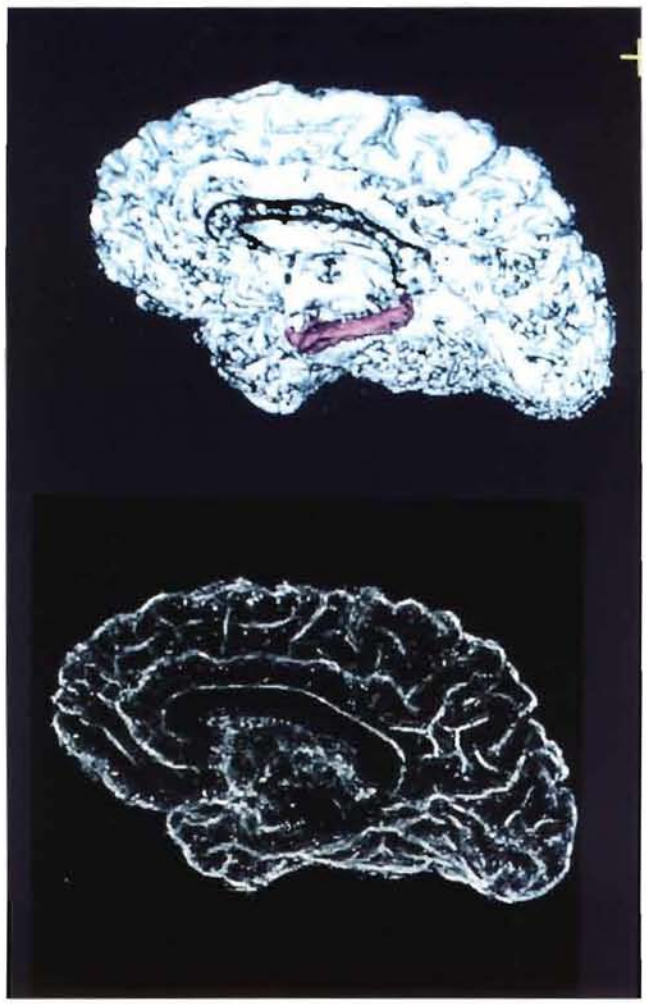
One natural result of mapping one brain onto another is the ability to measure how different they are, Miller says. By mapping many brains, researchers will gain a richer understanding of human variation, both normal and abnormal. Eventually, it will be possible to describe that variability mathematically, Vannier adds.

Collaborators Vannier (right) and Miller with the massively parallel processor supercomputer that makes the computer-intensive tasks associated with warping possible.

Mapping also may help researchers obtain better information from positron emission tomography (PET) scanning, an imaging technique that — in one application — shows brain activity. Currently, PET researchers average together scan results of many patients using a similar but less-precise mapping technique. Miller's method could allow researchers to align patients' PET scans more exactly. That will allow researchers to locate more precisely where brain signals originate or uncover previously masked differences among individuals, explains Tom Videen, Ph.D., research assistant professor of neurology and neurological surgery.

"More importantly, often what we are looking for is a small signal against background noise. If we can match different subjects' brains so that a small activation is aligned in all of them, it is much more likely that we will see it," Videen adds.

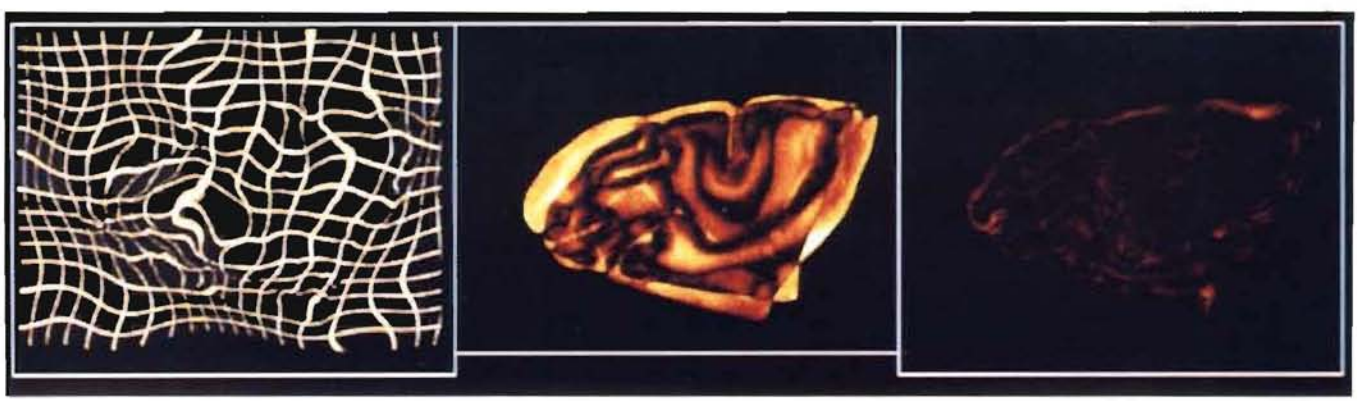
Also under development are methods to automate brain measuring. Currently, as investigators create each atlas, they must manually outline the structures of interest, a tedious and error-prone process. "Our ability to precisely define these areas in any one brain is limited. The borders we paint in reality are not as sharp as we would like. Different investigators, even if they were able to study the same brain, might come up with different answers," says Van Essen. An electronic comparison of a patient's brain with an already-labeled atlas might yield more consistent results, Vannier says.



In this rendering, the top image is from a digital "slice" of brain. The bottom image is a map of that slice, manipulated in the computer to allow accurate length measurement of the grooves, or sulci. The images are from a project to study the brains of schizophrenics.

In the future, atlases will provide a common framework to integrate information from all types of imaging systems. One atlas may eventually incorporate information originally collected via PET, MRI, CT scans, plain X-rays and other imaging techniques. Such integration is sorely needed both for research and clinical work.

The mathematical precision that such a system offers may also become commonplace. Says Vannier, "I think you will ultimately see automated systems based on atlases become a standard part of radiological image interpretation. In addition to the subjective report given by a radiologist, you will also get quantitative information derived automatically from the same set of data." The new art form will continue to record the beauty of human anatomy, but with greater precision and wider application than ever before. ●



The middle panel shows a monkey's brain overlaying an atlas image of a monkey's brain. Dark areas match up; yellow areas do not. In the right panel, the two brain images after "warping." The grid at left shows the degree to which the monkey's brain map was manipulated to match the atlas. (Data courtesy of David Van Essen, Ph.D.)

THE WAY OUT

Encapsulated Islet Cells Tested As Therapy For Diabetes

❖

by Steve Kohler

Twenty-three years ago, when Dennis Weiss had just graduated from high school, he lost 20 pounds in two weeks, started seeing double and was alarmed by suddenly excessive urination. At the hospital in Illinois, he was diagnosed as having diabetes — juvenile onset, or Type I diabetes that requires insulin injections to sustain life. Every day since, Weiss has hated his disease, has fought against it while struggling to control it.

Weiss knows that inactivity raises his blood-sugar level, so he often works late into the evening or bicycles as much as 30 miles at a clip. He sometimes reads his blood sugar six times a day and adjusts himself each time, using the type and amount of insulin experience dictates. But Weiss is discontent to manage; he wants to prevail, wants to take a big step and win. "It rules my life. I've always wanted a way out," he says.

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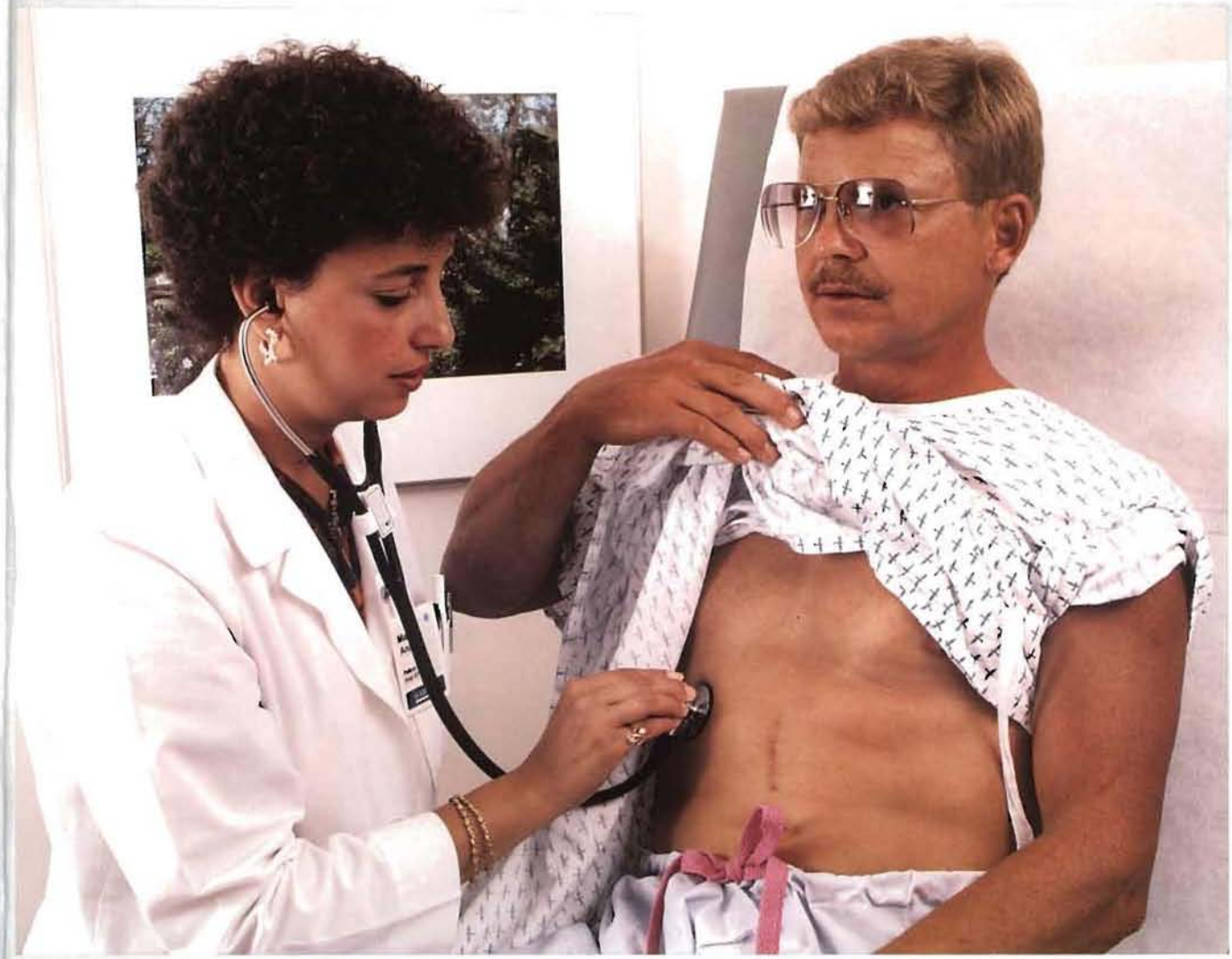

Preparing to receive an implant of encapsulated insulin-producing islet cells, volunteer Dennis Weiss is examined by postgraduate fellow Maha Ansara, M.D.

In mid-August, Weiss got a chance to make a dramatic contribution. He was one of nine people to take part in the first FDA-approved trials of implant technology that may eventually free diabetics from complications and insulin injections. A small implant of encapsulated islet cells (the insulin-producing cells that reside in the pancreas) was placed under the skin of his thigh, where it stayed for two weeks before being removed and assessed.

This implant couldn't cure him — it was too small — but the trial is a watershed event in the research of Paul Lacy, M.D., Ph.D., and David Scharp, M.D., physicians who feel as strongly about diabetes as Weiss does.

Lacy and Scharp's work has been going on for almost as long as Weiss has been battling diabetes. Twenty-one years ago, they argued to their colleagues that the blindness, kidney failure, heart disease and stroke that so often accompany diabetes were functions of a diabetic's poor sugar control, not separate, genetically determined conditions.

Today, they are nearing an effective therapy to prevent those complications. "If you can control glucose well enough in people with diabetes, you can eliminate the trouble," says Scharp, professor of surgery. He points to the recent multicenter Diabetes Control and Complications Trial, results of which were announced early when it became clear that extreme attention to glucose levels could greatly reduce complications among diabetics.

But even subjects in that trial could not achieve normal blood-sugar levels over the long term, and the delicate sugar balance too often resulted in incidents of low blood sugar, or hypoglycemia, Scharp says. "So how do we get there?" he asks.

Lacy and Scharp's approach is first to isolate natural islet cells that produce insulin, then encapsulate them inside an acrylic copolymer membrane that benefits from everything known about tricking the immune system into accepting it. The technique, dubbed "immuno-isolation," has worked in lab animals.

Immuno-isolated islet tissue is protected from rejection by the semi-permeable membrane that surrounds it, eliminating the need to suppress the immune system of the transplant recipient. That's critical, says Lacy, the Robert L. Kroc Professor of Pathology, because powerful immunosuppressive drugs cannot be administered to children who would then have to use them for their lifetimes. Children will

Paul Lacy, M.D., Ph.D., (left) and David Scharp, M.D., have worked toward an effective and practical therapy for diabetes for 21 years.

benefit first from any effective therapy, because many of the complications of diabetes cannot be reversed but may be prevented if they're treated early. Only half of all Type I diabetics go on to develop severe complications, but there is currently no way to predict who will suffer them and who will not. "You can't use major immunotherapy to cure a disease that may not develop," says Scharp.

Processing and purifying the islets is the first hurdle, one that Lacy and Scharp have cleared. Beginning in 1989, they injected insulin-producing cells into the portal veins of the livers of diabetics who already were receiving immunosuppressive drugs. Weiss, always interested in volunteering, participated in those trials, but his body rejected the transplanted cells after 13 days. In one such case, however, a patient was freed of the need for exogenous insulin for 11 months. A one-of-a-kind facility has been established at Barnes Hospital for the preparation and storage of islet cells.

The immuno-isolation approach also requires high technology to create the package and its all-important membrane. Scharp explains that this membrane must serve as a barrier between the host and the graft, or implanted cells. But it also must be permeable to the sugar that stimulates the islets to produce insulin and then to the insulin itself. Transport across the membrane must be timely, so that the insulin available rises as the subject is eating. "If the engineering is not accurate, the insulin can arrive too late, driving the blood sugar down to hypoglycemic levels," Scharp says.

Meanwhile, the membrane must protect the enclosed islet cells from elements of the immune system. "Insulin has a molecular weight of 5,000, and antibodies average a molecular weight of 150,000. Nothing gets through our membrane larger than 50,000," Scharp says.

That seems like plenty of leeway. But he worries that there may be other factors — unknown growth factors required to sustain the islets, perhaps — in the molecular-weight range of 50-100,000. "All we can do is set the membrane's threshold and see." The membrane has worked well in laboratory animals — receiving sugar, delivering insulin and protecting from immune system assault. The membrane is the product of CytoTherapeutics, Inc., a Rhode Island firm in which the university holds an equity position. Scharp and Lacy serve on the scientific advisory board of the company.

The nine patients in the proof-of-principle trial are arrayed in three groups. Weiss and two others have Type I diabetes (see sidebar). Three others are Type II diabetics, and the final three volunteers are "healthy normals."

The subjects, normal controls included, run a slight risk of becoming

DIABETES

Affecting the body's ability to turn fuel into energy, diabetes has an impact on every aspect of its victims' lives. Normally, glucose made from sugars and starches is transported by insulin into the cells where it is used. But in diabetes, the process fails either because there is too little insulin produced or the system cannot employ it properly. The resulting high blood sugar is thought to do damage to all organs of the body. An estimated 14 million Americans have diabetes; slightly more than 7 million of them have been diagnosed.

Types:

Type I diabetes is probably an autoimmune disease in which the body attacks its own insulin-producers as if they were foreign. It occurs most often in children and young adults, and its onset is often rapid. The pancreas makes little or no insulin, so sufferers must take insulin injections to sustain life. Type I accounts for about 10 percent of all cases.

Type II diabetes, the more common form of the disease, usually occurs gradually in adults over 30 who are overweight. It frequently goes undetected. Often, it can be controlled by diet and exercise; sometimes it requires oral medication or insulin injections for control. Risk factors for this type of diabetes include: excessive weight, a family history of the disease, an age of 30 or older and being black, Hispanic or Native American.

Capsules containing islet cells were implanted under the skin on the front of the subjects' thighs. They remained in place for two weeks in a test of their isolation from the immune system and the cells' ability to survive.

sensitized to a future implant, but Scharp says they were chosen carefully to be free of kidney disease and to be non-smokers, greatly reducing their likelihood of ever needing a transplant. They got only a tiny dose of cells, far fewer than the number received in a transfusion. And the donor tissue type is uncommon, so their immune systems will not be sensitized to the great majority of donors.

All nine subjects received four small capsules of the size used in rodent studies. Three of the four contained a total of 300 islets. The fourth was empty — one more control. The capsules were placed under the skin on the front of the thigh, with the islet cells inside them suspended in a gel made from seaweed "to keep them from clumping up and dying," says Lacy. Such suspended cells have lived productively in mice for more than a year.

The implanted cells came from pancreas H-785, the 785th human pancreas processed by the research team. Scharp says he knows the pancreas well; he has used its cells before; they are productive, and they have been carefully tested and typed.

After two weeks, the implants (which the doctors say are too small to affect a patient's insulin level) were surgically removed. The questions being asked about the packages and their payloads have huge implications. Did the cells survive? If they are dead, were they rejected because the holes in the membrane are too big? Or were they suffocated because the holes in the membrane are too small? Are they still producing insulin? Is there scarring, a congregation of the immune system's killer cells or other indication of immune response to the capsules?

Lacy says that by including in the trial both Type I and Type II patients, the researchers will learn whether the capsule protects against both the body's normal immune cells and the antibodies of the Type I patients' autoimmune reactions to islet cells.

Weiss, ever hopeful, committed himself to watching his insulin requirements especially closely during the two-week period. Though he's been told that there can be no therapeutic effect from such a small implant, he says he can't help but remain expectant.

Should the trial show a perfectly successful membrane, then it's not long to the next step of a clinically relevant device. Scharp already has it pictured in his mind — about the size of two dollar bills side by side and only slightly thicker, the capsule maximizes the surface area of its islet cell cargo. The package would be rolled up and implanted through a tiny incision, then unrolled inside the peritoneal cavity where it begins to secrete insulin. About 750,000 to 1 million cells will be required in an adult whose pancreas makes no insulin.

Only about 4,000 pancreata are donated each year, not enough to fully support research, much less such therapy. But Scharp goes on to imagine the day when immunoisolation is effective enough to allow the use of xenografts — those from another animal species. Pigs are especially promising candidates, according to Scharp.

Results of the trial are expected to be announced near the end of the year. They can't come soon enough for the six percent of the American population with diabetes who may benefit. Nor can they come too soon for Lacy and Scharp, who have worked so long. "People are dying and being debilitated by a disease process that we are convinced is preventable," says Scharp. "Now, finally, it has come down to rolling up our sleeves." Dennis Weiss and his fellow subjects stand ready to go to work. ●

The Barnes Hospital Islet Processing Laboratory collects, purifies and banks islet cells for the implants. Too few pancreata are donated each year to support a widespread implant program, a situation researchers hope will change.

Warning Signs:

- Frequent urination
- Excessive thirst
- Extreme hunger
- Sudden weight loss
- Frequent infections
- Blurred vision
- Tingling in extremities

Diabetes is the fourth leading cause of death by disease in this country. Each year, 12,000 people lose their sight to diabetes, and nearly 25 percent of all new dialysis patients have diabetes. People with diabetes are two to four times more likely to die of heart disease than others and two to six times more likely to have a stroke. Direct and indirect costs for diabetes total more than $20.4 billion annually, equal to about five percent of all healthcare costs. ●

HANDLE WITH CARE

Trauma Center Cares For Seriously Injured Children

by Kleila Carlson

Krystal Pappas knows to look both ways before crossing the street, but on the morning of May 14 she forgot.

In a hurried moment, as her family packed the car to attend her school's end-of-year picnic and parade, Krystal darted across the street into the path of a speeding mini-van. Struck on her right side, she was thrown onto the hood of the van and propelled about 35 feet through the air until she came to rest on her head.

Krystal, 9, lay in the street unconscious until paramedics arrived. She awoke briefly complaining of abdominal pain, then drifted in and out of consciousness during the seven-minute ride to St. Louis Children's Hospital, where a trauma team of physicians, nurses, laboratory specialists and social workers had assembled for her arrival.

Children's is a Level I pediatric trauma center specially equipped to handle seriously injured children like Krystal. Its emergency room sees 160 children a day, more than twice the number it is set up to handle. Although not all of those patients are suffering trauma, physicians are concerned about the incidence of trauma and are trying to improve how the hospital responds to trauma patients.

When Krystal arrived at the emergency room, she was whisked off to a curtained examination area where her breathing and blood pressure were evaluated, an IV was started and X-rays were taken. A computerized tomography (CT) scan revealed a lacerated liver, a bruised kidney and a fractured pelvis. She also had a concussion and a broken right collar bone.

Krystal's mother, Wanda, sat outside the examination area answering physicians' questions about Krystal's medical history. Tearfully, she recalls the moment she saw her daughter after the accident. "I just broke down," she says. "There was a lot of blood and numerous scrapes and bruises, and that made her look pretty bad. The paramedics had cut her shirt off and her hair, which was waist-length at the time, was swirled around her face in a mess. I thought for sure she had a crippling injury. I kept envisioning her in a body cast and traction for the summer."

Pediatric trauma services at St. Louis Children's Hospital returned Krystal Pappas, 9, to full health after she was struck by a car and gravely injured. Today, she has no trouble enjoying a skate with her dog, Bear.

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As medical director of pediatric trauma services at St. Louis Children's Hospital, Andrea L. Winthrop, M.D., examines and treats seriously injured young people.

Krystal was admitted to the hospital under the care of Andrea L. Winthrop, M.D., assistant professor of pediatric surgery and medical director of pediatric trauma services at Children's. Winthrop was recruited to Children's in January to formalize and implement a trauma program and is responsible for assembling the pediatric experts who must be ready at a moment's notice when patients like Krystal arrive.

"We have been caring for pediatric trauma patients for some time, but until recently we have not had a well-organized trauma team incorporating all of the resources in the hospital under one service," says Winthrop. "The administration here feels very strongly that we make sure we have all the resources necessary to care for seriously injured children."

Robert P. Foglia, M.D., surgeon in chief at Children's and director of the division of pediatric surgery at the School of Medicine, says the trauma program is essential. "A formal trauma program is integral to our responsibility to give the best pediatric care possible in Missouri and Illinois," he says. "Prompt transportation, stabilization and assessment of the trauma patient can be critical to the child's survival. The pediatric patients in the area are the ones who will benefit most from the interest and enthusiasm of all the members of the trauma team."

Seriously injured children have become a priority at Children's and at hospitals nationwide because the incidence of trauma is increasing. In 1991-92, 19 million children were treated for some form of injury in the United States, and about 1 million of them were permanently disabled from their injuries.

Among children between the ages of one and 14 years, trauma is the leading killer, accounting for about 50 percent of all deaths. Winthrop says trauma claims more children's lives than any illness, including cardiac disease and malignancy.

Since 1989, Children's has treated between 550 and 700 injured children per year. Of that population, 10 to 15 percent suffer penetrating injuries, such as gunshot or stab wounds; 60 to 70 percent suffer blunt trauma, such as that from automobile accidents, child abuse or injury from recreational activities, and 10 to 15 percent suffer major burns covering more than 20 percent of the body. Children's reports its trauma information to the National Pediatric Trauma Registry which compiles data from 61 pediatric trauma centers across the country.

"Most pediatric trauma centers see a higher percentage of blunt injury than penetrating," Winthrop says. "In 1992, our total number of penetrating injuries (gunshot or stab wounds) was 76 — too many — but fairly consistent with patterns seen at Level I centers across the country."

Although Winthrop can't halt the violent injuries, she can ensure that the injured who are brought to Children's receive the best possible care. Since her arrival, she has worked to formalize procedures for the acute care and resuscitation of seriously injured children. Enhanced trauma education programs — some related to specific types of injuries — are now in place for physicians and nurses. And a trauma committee reviews pediatric trauma deaths and evaluates the multiple disciplines that care for children before they arrive at the hospital, while they are in the hospital and when they are released.

Complementing those efforts, the U.S. government recently awarded the State of Missouri a Trauma Care System Planning and Development Project Grant to set up trauma systems within the state. St. Louis is part of the East Regional Trauma System — one of four regions established — and serves communities north to Lincoln County, south to Cape Girardeau and west to Jefferson City, including St. Charles County.

Winthrop said guidelines will be developed for the assessment and transport of injured patients in those communities who need care at one of Missouri's three Level I pediatric trauma centers (Children's and Cardinal Glennon in St. Louis and Children's Mercy in Kansas City) and those who could be managed at a community hospital.

Sleuthing For Signs Of Injury

When a child has been injured, whether in a car accident or by a fall from the schoolyard swing, experts say there is likely to be more to the injury than meets the eye. Children suffer different types of injuries than adults, and their physiologic response to injury is different.

Children suffer more blunt injury than adults, and head injury in children is far more common. One reason is that a child's head is larger in proportion to body size and acts as a

heavy weight if he or she is in an accident in which there is an acute acceleration and deceleration of force. Although children have a better overall outcome from head injury than adults, it is the most common cause of long-term disability.

"A child is like a speeding missile when he gets hit by a car. His head leads the fall with his body following, causing widespread injury," says Judith Landvatter, R.N., coordinator of prehospital outreach and education for emergency services at Children's. "With this type of injury, it's highly likely for children to have injured multiple systems. In addition to a head injury or a broken leg, they sustain other injuries that you may not readily see."

Landvatter, who is also a paramedic, was with the St. Louis County Ambulance District for four years. She now instructs emergency medical services (EMS) students and professionals throughout the metropolitan region on how to feel more at ease assessing and handling injured children.

Landvatter teaches paramedics to be detectives because, she says, the clinical signs of injury children display can be subtle or misleading. In an adult, measuring blood pressure is a relatively sensitive means of assessing shock. But monitoring blood pressure may not be as effective in a child. An injured child can lose more than one-quarter of his blood volume without suffering a drop in his blood pressure and causing profound shock; strong hearts and unclogged blood vessels enable children to compensate for significant blood loss. After a 30- to 50-percent blood loss, however, a child's blood pressure plummets, and he or she may suffer irreversible shock and be difficult to resuscitate.

When a child has suffered an injury, the airway may swell or become more easily obstructed because it is small in diameter. Landvatter and Winthrop say breathing abnormalities must be detected early, and obstructed airways must be cleared. Winthrop says children can aspirate more easily after an injury because they tend to cry and swallow air, and they're more likely to vomit and aspirate, which can compromise breathing.

For pediatric trauma patients, moments often count. Some are rushed to the trauma service by helicopter.

Winthrop also noted that children are less likely to injure their ribs or chest walls and more likely to have internal injuries that may not be obvious. Because their skeletons are poorly calcified until they are about eight years old, children have softer bones. Their skeletons don't absorb the energy of an impact, so the energy is transmitted to the internal organs such as the lungs. Like Landvatter, she says there may be significant internal injury with few external signs.

Musculoskeletal injuries frequently occur in children and are another leading cause of permanent disability, according to Winthrop. Fractures that involve the growing ends of the bone or the joint space can permanently affect the growth of extremities. Because of poorly developed abdominal wall musculature, abdominal injuries can occur with a low-energy impact, such as a punch or tackle. Abdominal wall muscles and the lower ribs don't protect the internal organs. The three most commonly injured abdominal organs are the liver, spleen and kidney.

Krystal's Speedy Recovery

Krystal, who suffered a head injury, abdominal injuries and multiple fractures, was lucky. She spent nine days in the hospital, including two in the intensive care unit, which put her on the road to a speedy recovery. Her lacerated liver was healed in approximately two months, and her broken collar bone did not require surgical repair. Her right arm, put in a sling to aid the healing of her collar bone, caused her the most pain. "As long as I didn't move, I didn't feel anything," Krystal says now of her hospital stay.

Her pelvic injury limited her mobility and initially caused her to walk with a limp, but through physical therapy she has overcome that and returned to her normal gait. Although the accident forced her to give up soccer, softball and in-line skating for most of the summer, she swam almost every day, which hastened her healing. All that physically remains of her ordeal is a scar the size of a 50-cent piece on her left shoulder, remnants of cuts and scrapes on her left leg and a bedroom full of 42 flattened helium balloons and many stuffed animals received during her hospitalization.

Wanda describes Krystal's ordeal as the "scare of my life," and says she has treated her daughter like a "china doll" since she returned home. "You love your children and you know they are precious, but you don't realize how precious until something happens. They can be taken away so quickly." Preventing that most devastating loss is at the root of the effort in the pediatric trauma center. ●

PAYING ATTENTION

Studies Reveal How The Brain Concentrates

By Jim Keeley

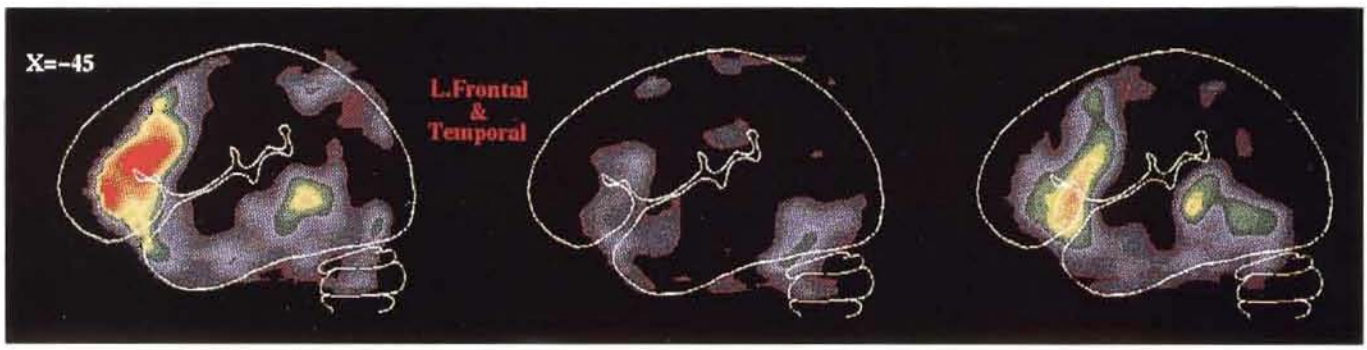
Any time Steven E. Petersen, Ph.D., travels Interstate 64 from his home to a St. Louis Cardinals game at Busch Stadium, there's a one in three chance that he will end up taking the exit that leads to the School of Medicine.

Is Petersen a workaholic? Is he absent-minded or not paying attention? The answer, he says, is more complicated than that. Petersen, whose research specialty is attention, is making a career out of understanding and explaining why such slip-ups occur.

At the broadest level, attention is a collection of mental states that together allow us to organize ourselves in the world, says Petersen, associate professor of neurology. We constantly are bombarded by huge amounts of information. We also have many conflicting needs and desires. Attention manages information overload by helping us choose the information we take in. It also helps process that information and make decisions about how to respond so that our needs and desires are fulfilled.

This story also illustrates ideas about attention that Petersen and his colleagues — Julie Fiez, Ph.D., Tom Videen, Ph.D., and research assistant Ann Mary McLeod — are exploring. In simplified form, they have shown recently that in certain cases the old adage, "practice makes perfect" is true, but for reasons no one dared to suspect. Their positron emission tomography (PET) study, to be published in the journal *Cerebral Cortex*, shows that when people hear a list of nouns and are asked to respond with appropriate verbs — such as the stimulus "fork" and the response "eat" — the brain is at first taxed by the task, and very specific areas are active. As the task is repeated it becomes automatic, requiring less attention and little activity in the areas of the brain previously involved. Other areas become more active in the automatic state.

Somewhere between the first attempt and "automatic-ness," the brain shifts gears, Petersen says. When a person automates a task, he or she uses different brain circuitry than when first learning to do the task, he explains. The journal article concludes that automatic activities demand very little attention.



An experiment to evaluate different types of attention: The left photo shows the brain areas active when subjects were asked to supply appropriate verbs for nouns the researchers provided. If the noun is "dog," the subject might say "bark." The middle photo shows the brain areas active after the subjects had practiced the same list of words 10 times. The brain has shifted into its automatic mode. On the right, subjects were presented with an all new list of nouns, and the subjects again employed full attention to complete the task.

Ask Petersen about attention, though, and he does not respond with a textbook definition. Instead, he prefers to discuss attention using anecdotes from his own experience. His occasional foray into the Central West End on the way to Busch Stadium he sees as an opportunity to learn.

Petersen suspects that because he travels the I-64 route to work each day, the act of driving there has been automated by his brain. When he leaves his house for the Cardinals game, he knows fully that his destination is Busch Stadium, but sometimes he cannot overcome the autopilot that directs him to turn right at the Kingshighway exit.

In order to arrive downtown at the ball game without a hitch, Petersen says he must will himself to overcome the automatic tendency to take the exit that leads to his office. He must use a cognitive strategy that goes something like this: "*You are going to the ball game, go past here.*" It all comes down to one simple fact: The attention expert must pay attention to what he is doing.

Petersen and Marcus E. Raichle, M.D., professor of neurology, believe that their study shows that the brain frees itself from having to fret over mundane tasks — like shifting a car at the right time or walking — in order to devote energy to other endeavors. Petersen explains the concept with another anecdote: "Typing takes 100 percent of my attention, or I make too many mistakes," he says. "But I had a secretary who could carry on a conversation while typing, without losing much speed or accuracy."

His secretary had learned to type so well that typing was converted to an almost automatic activity, though it requires great skill. Petersen believes that her brain had transferred typing to a separate, automatic circuit, freeing her to carry on a conversation. Petersen, on the other hand, devotes much more of his attention to typing because his brain hasn't made that switch.

Whether he's playing tennis or playing a musical instrument, Petersen is a walking laboratory for his attention studies. Personal experience and intuition have provided many insights during his years of studying attention.

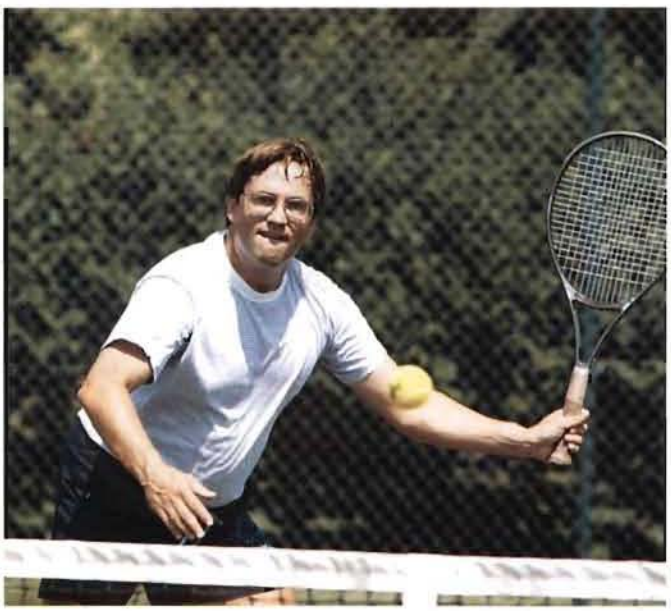
But Petersen didn't set out to become a neuroscientist, let alone an attention specialist. He began as an anthropologist, hoping to understand what characteristics make humans special. "The two classic examples that everyone talks about are language and tool making," he says. At the time, anthropologists were beginning to consider the brain, but, he notes, it was clear that no one in the field had the right tools to answer the most basic questions about the brain. Neuroscientists had some of the right tools and ideas, so Petersen decided to study neuroscience to become "an anthropologist who understood the brain."

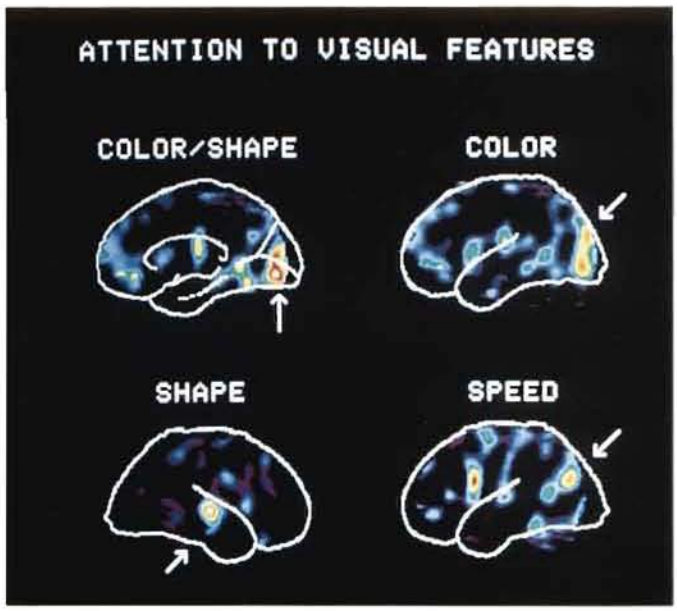
Somewhere along the way from the California Institute of Technology, where he received his Ph.D., to the National Institutes of Health, where he conducted postdoctoral research on spatial attention in monkeys, Petersen became less an anthropologist and more a neuroscientist. The questions that grabbed his attention as a neuroscientist were much the same questions that got him interested in anthropology. Studying how visual decisions are made, he says, is close to thinking about consciousness, volition and those things that make humans unique.

At the School of Medicine, Petersen has stepped in as a member of the team of neuroscientists that researchers from other universities loosely refer to as "the St. Louis group." The group has successfully applied modern imaging techniques to a catalog of human mental states including attention, anxiety, depression, memory, language, speaking, seeing and hearing.

Petersen remembers early skepticism about the idea of being able to image mental states. He recalls being invited to give his first departmental seminar at Washington University. He had been at the School of Medicine for nearly two years, working on cognition, when a faculty member called to ask if he would like to give a presentation. "The person said, 'We'd like to hear about your cognitive work, but we realize you don't have any hard data.'" he recalls. Petersen accepted the invitarion, and by the time he had finished his talk, those present were fully aware that this brash new science of neuroimaging could indeed produce hard data.

Part of the reason the St. Louis group has been so successful is the element of careful design members bring to their experiments. Each project's goal is to develop an experiment that isolates only one mental state, such as attention. Given the mind's tendency to wander and elude science, this goal can be difficult to achieve. Each successful experiment leaves many trials and errors in its





◀ Steve Petersen, Ph.D., keeps his eye on the tennis ball, employing one of the several types of attention that the game requires.

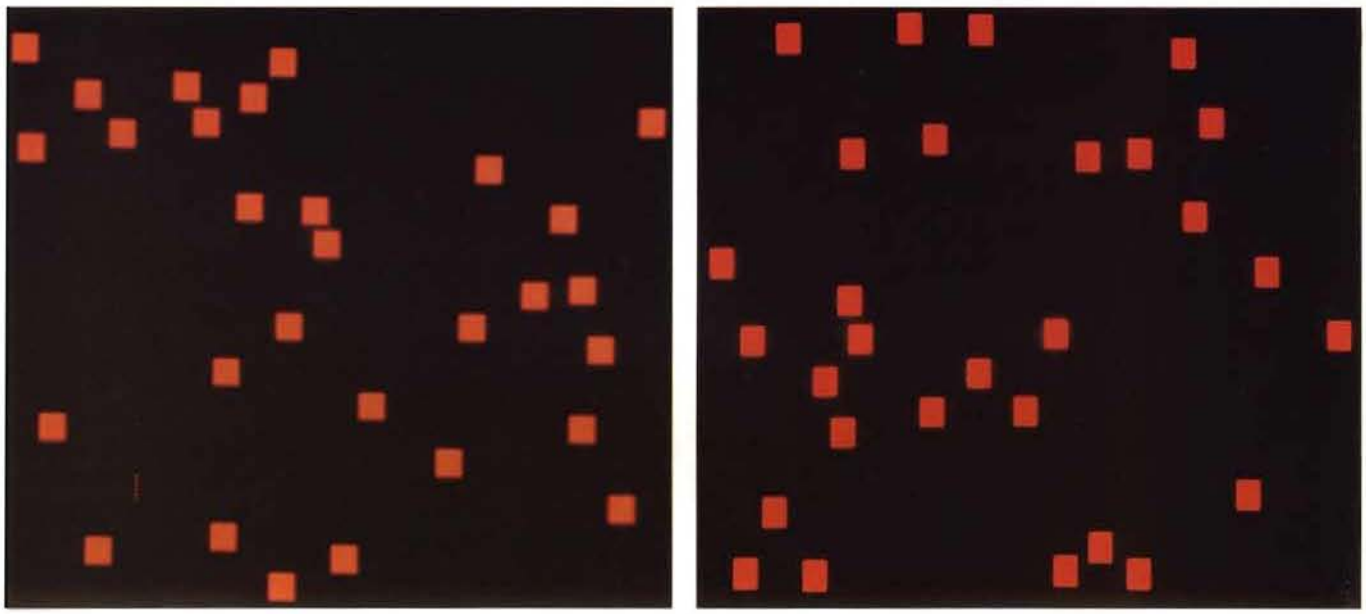
➤ Even when the stimulus is the same, different areas of the brain are active depending upon whether a subject is instructed to look for variations in color, shape or speed of movement.

wake. "What we want from behavior in our PET experiments is a measurement that the people are thinking about what we wanted them to think about," says Petersen.

Having studied attention for so long, Petersen could be expected to have an explanation of what attention is. But he hesitates, pauses, starts an answer and backs up before offering an answer to the question. It's not a lack of insight, ideas or words that keeps him from answering quickly, it is the complexity of the problem. "Attention is like memory," he says. "And memory is a whole bunch of different things." For example, "the memory you use for storing a phone number long enough to dial it is different from remembering what you had for lunch yesterday. Attention is the same way," Petersen explains. "There are just very, very different things that people call attention, and they are probably associated with different parts of the brain."

Neurobiologists have views of attention different from those of non-scientists. When the layperson thinks about attention, he or she is probably thinking about "paying attention," or concentrating. Most likely, two types of attention are mixed up in that concept, Petersen says. "There's arousal (or alertness) and vigilance (or clearing your mind to do a specific task)." Neurobiologists have isolated other types of attention. In addition to arousal and vigilance, there's selective attention — what we use to locate a person in a crowd — and salience, the reason why a bright light on a dark night draws our attention.

For all of its reliance on abstract concepts and theories, the work on attention could someday help patients with brain damage. Petersen's studies are designed to explore which structures in the brain manage and process the many different types of attention. One thing that is becoming apparent, Petersen says, is that there are many parallel routes or pathways in the brain. It is conceivable that many pathways can achieve the same goal. "Attention is one of the ways we mediate between all these parallel pathways," he says. "By learning what these different parallel pathways are capable of, we may be able to build a bridge around some that are lost," due to disease, trauma or stroke.



Some of the stimuli used to test a subject's attention. These two images differ in both color and shape; the subtlety of the difference insures that the subjects pay close attention, Petersen says.

Petersen employs analogies to describe attention, but knowledge is changing so quickly that most analogies are short-lived at best. He now describes attention to the layperson using a maze analogy. He explains: "Think of those mazes that you had when you were a kid. There were one or two ways into the maze; it was filled with dead ends, and then there were one or two ways out. The brain is like a maze, but any input can travel many different ways out. Attention selects the way through the maze for you." And attention makes sure you get to the ball game on Saturday evening and turn right at Kingshighway on Monday morning. ●

The Halls Of Power

by Doug Pogue

THIS spring I had an opportunity to represent Washington University and the medical student community to Hillary Clinton's Task Force on National Healthcare Reform. I would like to share with you what it was like to be involved with healthcare reform at that level and also some of the lighter side to the reform movement in Washington DC.

Healthcare is a strange animal. Sitting down and telling a person about the keys to enjoying a long and healthy life usually is met with all the enthusiasm of your mother telling you to take out the garbage.

And healthcare *reform* is even worse. In a country that says "we" but thinks "me," the reality checks of trying to organize 250 million people and 1 trillion dollars come from all directions. Many times, reality shoots you down without providing any insight into the nature of the problem. Further, it is a full time job to educate yourself well enough just to have an insightful, constructive opinion concerning how healthcare should be set up, yet the changes made will affect all of us at a time when we are vulnerable and dependent upon a well-designed system.

On April 14th at about 9:30 p.m., I received a call from Elizabeth Morrison, then president of the American Medical Student Association (AMSA), informing me that the Clinton Administration was interested in input from medical students and residents concerning how government could encourage a greater percentage of medical practitioners to enter generalist medicine. A handful of students was to be selected to work with the Task Force on National Healthcare Reform, making recommendations for policies that would have an impact on undergraduate and postgraduate medical training. Having worked on this type of legislation for the Democratic bloc while doing a health policy fellowship in the U.S. Senate, I was delighted at the opportunity to work with some of the best minds in the field and to be able to have an influence on the way medical doctors would be trained in the future.

Medical student Doug Pogue, with a patient. Pogue testified before Hillary Clinton's Task Force on National Healthcare Reform.

What was less than delightful was realizing that 1) my curriculum vitae had to be on Hillary Clinton's desk in Washington DC less than 36 *hours* after the phone call, and 2) the first set of meetings was scheduled right in the middle of my second year final exams. So I figured I could study hard and maybe make AOA or go to Washington and help to create policy that could affect medical education for the next 20 years. I booked a flight.

Life inside the beltway is a trip. The number of idealists per square mile is second only to Berkeley, California's. And the main difference is that the idealists in Washington have both money and power. Everyone walks around wearing $800 Italian suits and the aura that their

business is vital and critical to the future of mankind. The healthcare people are no different. From the AARP through insurance groups to the AMA, everyone has an angle and everyone wants something for nothing.

By the time I got to the Senate chambers on Wednesday, April 28, the people I was to work with had left for the Old Executive Office Building to begin the day's onslaught of hearings and closed-door sessions. I touched base with some old colleagues and headed across town, stopping to pick up a truly awesome tie from a street vendor for four bucks. Outside the OEOB there is almost always a line of 100 or more people waiting for appointments and meetings. I must say I have never seen so many blue suit/white shirt/red tie combinations in one place in my life.

The medical students gathered outside the building, and it was great to see such a big group of people I knew to be exceedingly talented and dedicated. By the time we all got up to the conference room and settled in, it became clear that the Task Force had decided to up the stakes by inviting 15 to 20 medical students and the same number of residents. Further, the plan had been changed so that we all would sit together for a single day, not a number of days, and collectively evaluate the problem and possible solutions.

While this approach was cumbersome and risked inertial failure, the Task Force did an excellent job of inviting a wide range of individuals from across the field. With the clock ticking toward 5:00 p.m., we began wading through the issues with a subgroup of the Task Force — the Work Group on Physician Workforce Reform.

Almost everyone who had gathered agreed that the country faces a future physician oversupply, that our current model of health promotion is inappropriate and that filling the gaps with new physicians is preferable to mandating that a certain percentage of the existing medical field be retrained to perform generalist medicine.

At that point, however, much of the agreement splintered. Specialty and primary care residents argued with each other about the fairness of dramatic financial incentives for primary care residents. Medical students, by and large, argued that incentives before or after medical school were misplaced.

Our group strongly advocated medical school curriculum reform by means of significant exposure to and training in generalist, outpatient medicine during the core clinical years. We felt that medical students who were educated about primary care and had outstanding role models to learn from would make the most appropriate choices regarding generalist practice and would bring new talent and respect to the field. Clinton's plan of indenturement-for-education and the National Health Service Corps program were touted by the administration people but failed to stand up to major criticisms concerning their design and long-term impact on physician supply.

So what did we accomplish? At the end of the day, we had developed three pages of recommendations to be forwarded to Hillary Clinton's desk for use by the Task Force as a part of President Clinton's total healthcare package to Congress. As I write this, the package has not been released to the public, and thus I cannot tell you what was done with our work. I can tell you that the Task Force got an education in the realities of medical training.

Anyone who is scared that the government will make him do dermatology in Puskwa, Idaho, when he wanted to do rheumatology in Boston should rest easy. Medical care will change slowly to accommodate the healthier, longer-lived society that we ourselves have helped to create. The role of physicians also will change, and I think it will be for the better. I cannot stress enough how badly the reform movement is in need of quality physician input. I urge everyone to get involved.

Anyone who is scared that the government will make him do dermatology in Puskwa, Idaho, when he wanted to do rheumatology in Boston should rest easy.

I would like to thank the administration of the School of Medicine for supporting me in this endeavor and allowing me to represent the university and the medical community in this fashion. It is an honor and a privilege, one I hope to continue as my medical career progresses. ●

Editor's Note: *Douglas Pogue is a third-year medical student from Cleveland.*

Good Decisions — *Selna L. Kaplan, M.D., Ph.D.*

by Steve Kohler

WHAT may have been one of the better decisions ever made in the office of admissions was to send Selna Kaplan an application when she requested one. Seventeen of the 20 medical schools to which she applied did not respond. But Washington University did, and Kaplan went on from medical school to distinguish herself unrelentingly.

Why would any school fail to forward an application when asked to? "You must remember the time," Kaplan says, recalling the late '40s and early '50s. "I was once told that I had three strikes against me: I was a woman, I was Jewish and I had attended a city school (Brooklyn College)."

Kaplan entered medical school during 1951, the last year of her graduate studies to earn a doctorate in anatomy here, and she taught her classmates that subject for a year before many of them ever learned that she was a member of their medical class. The pay for an instructor was almost equal to the year's tuition, and in that regard the year was "an even swap," Kaplan says.

But it was not as rosy as those details make it sound. Even at the school that had sent the application — and then accepted her — Kaplan found that she was one of only four females in her class and that "not all members of the faculty welcomed us." Her decisions to go to college, graduate school and especially medical school raised eyebrows among her kin. "But never with my mother and father, who owned a mom and pop grocery in New York. They supported me steadfastly," she says.

Selna Kaplan, M.D., Ph.D.

The bias of some family members aside, Kaplan is not easily daunted. While interviewing for her position in the class of 1953, she recalls being asked, "Why do you want to go further when you've already done well in graduate school?" Her response — "It's my money, my time and my interest. I think all you must do is decide if I am qualified," — apparently satisfied the interviewer with the depth of its determination.

It also reveals the directness with which Kaplan customarily operates. Back in New York after medical school, it took only a small part of a residency at two busy city hospitals for her to decide that she would not pursue a practice in general pediatrics. And within six months of starting a fellowship in pediatric endocrinology with Melvin M. Grumbach, M.D., Kaplan knew that the two would continue to collaborate.

In the nearly 40 years that Kaplan and Grumbach have worked together, their partnership has spawned important research, widely quoted papers, staunch ethical positions and dozens of well-trained protégés who now head up pediatric departments all over the nation. Most recently, Kaplan and Grumbach each received The Endocrine Society's most prestigious honor — the Fred Conrad Koch Award.

In 1955 and '56, when Kaplan and Grumbach were setting the direction of their research, human growth hormone (hGH) was seeing its first use. The hormone was extracted from human pituitaries, which Kaplan collected. She sent them for processing to a biochemist who kept his "cut" before returning the crude powder to the lab for study

or for administration to growth hormone-deficient children. "Only in the mid-'60s was the National Pituitary Agency established, with all pituitaries sent to them and their use regulated," Kaplan recalls.

During their first year of work to understand the intricacies of how hGH works, Kaplan discovered errors in a method that had been described for measuring serum growth hormone. She dropped her bombshell at The Endocrine Society's annual meeting and first came to the attention of many of her colleagues. Later, she went on to use a method that did work and to test children suffering from hGH deficiency extensively.

More than 100 young physicians are practicing, doing research and teaching with skills they learned under Kaplan and her collaborator.

Kaplan has served as chair of the growth hormone subcommittee of the National Hormone and Pituitary Program, helping to evaluate research protocols worthy of receiving the relatively rare natural hormone. There was never much potential for abuse of the natural hormone, Kaplan says, because there wasn't enough even to satisfy the needs of legitimate research. The extract of as many as 70 pituitary glands was required to treat one child.

In 1985, when three people previously treated with hGH died of Creuzfeldt-Jakob disease, Kaplan was a member of the NIH committee that decided to no longer distribute hGH. But Kaplan was ahead of the game. Genentech was involved in studies of the first biosynthetic growth hormone — Protropin — and Kaplan was the principal investigator in those trials.

Potential side effects of the drug made FDA officials "waffle," in Kaplan's words, and they were especially careful because children were involved. Eventually, approved science prevailed and biosynthetic growth hormone was authorized. Kaplan has served on the Genentech advisory board ever since.

And she has been a vocal supporter of the conservative position that growth hormone should be used primarily in children who are genetically deficient in the hormone. "To test the drug in other situations seems reasonable," she says, "but no beneficial effects have been shown on children's final height unless they have a deficiency. It is not worth the $20,000 to $40,000 per year (and $500,000 total) treatment cost to get perhaps two additional inches of height," Kaplan says.

Since 1966, Kaplan has worked at the University of California at San Francisco, where she and Grumbach head the pediatric endocrine research laboratory. Her work also has involved investigations into fetal endocrinology and the mechanisms by which hormones are regulated in the fetus. Using sheep as models, she explores the content of the pituitary hormones and the changes in them that occur over developmental time. She has been instrumental in the development of radio immunoassays for fetal hormones.

The work of Kaplan and Grumbach also has been important to understanding puberty, and they are highly regarded for work treating precocious puberty. They have demonstrated that the inhibitory mechanism that restrains the onset of puberty rests in the central nervous system's hypothalamus. Current projects involve cataloging the hormonal influences and hormonal regulators that wax and wane during development and growth. Kaplan is, as she says, "still plugging along."

By Kaplan's own reckoning, her greatest achievements have been two. The calls she receives from her former patients who remember what she was able to do for them are of particular importance. Recently, she heard from a woman whom she first treated when the patient was just 18 months old. The woman was having difficulty in becoming pregnant, and she was calling to ask for the endocrinologist's expertise. Others call to talk about their own children.

And there are more than 100 young physicians doing research, teaching and practicing with the special skills they learned under the guidance of Kaplan and her collaborator, Grumbach. Ten are chairmen of pediatrics departments; 26 are full professors; 35 head their own endocrinology laboratories. To see them contributing to the body of knowledge at professional meetings is the second of Kaplan's two biggest rewards.

"I am in contact with 95 percent of them, " she says. "I am happy with how things are. I enjoy what I'm doing." Not many can say that with the authority of Selna Kaplan, M.D., Ph.D. She has untiringly chosen her own path and followed it with both vigor and success. ●

Annual Fund Drive Tops Expectations

THE School of Medicine's annual fund drive — the yearly solicitation of support for the school — ended at the close of June after an outstanding year, surpassing the $1 million mark. A total of $1,131,783 was raised for fiscal year 1993 from medical, healthcare administration, occupational therapy, physical therapy and nursing alumni and former house staff. According to John Davidson, M.D., Annual Fund Chair, "We surpassed our goal of $680,860 this past year in alumni giving and raised $757,581. Sixty-seven percent of the total raised was given by alumni."

Overall, alumni gave 14 percent more than they did in fiscal year 1992. Additionally, the number of new Eliot Society members (donors of at least $1,000) reached an all-time high of 114 this year, and 83 percent of current Eliot Society members renewed, up from last year's 77 percent. This renewal rate, as important as the growth in new membership, shows the dedication of the Eliot Society to the School of Medicine and its affiliated programs.

Without annual fund support at all levels, from the Century Club for donors of $100 or more to the Eliot Society, the school would not be able to recruit and retain talented researchers such as the five Alumni Endowed Professors or to attract medical students of the high caliber exemplified by the 16 current Distinguished Alumni Scholarship awardees. Student projects such as Students Teaching AIDS to Students (STATS), the Perinatal Project and the Young Scientist Program also benefit from the generosity of the school's alumni and friends.

Sue A. Ghidina, Director of Annual Giving, says, "The leadership and support obtained from our dedicated volunteers have made this a very special year for the School of Medicine. Hannele Haapala and I are grateful to all the alumni, former residents, faculty, friends and volunteers whose gifts and service make such an important difference." Ghidina recently replaced Hannele Haapala as Director of Annual Giving. Haapala is now Associate Director of Medical Development. ●

Barry Siegel Named WUMCAA President

BARRY A. Siegel, M.D. '69, accepted the president's gavel and assumed the lead of the Washington University Medical Center Alumni Association (WUMCAA) on July 1, 1993.

Barry Siegel, M.D., new president of the alumni association.

Siegel, professor of radiology and of medicine, directs the nuclear medicine division of Mallinckrodt Institute of Radiology. He says of his plans for the association, "I would be wise to follow the leads of Doctors Kodner and Shackelford (his predecessors in the post) to maximize the alumni association's direct interface with students. It provides an amazing payback and is a very productive use of the association's resources. We can broaden our students' educations by providing opportunities for them to work on things unrelated to the routine curriculum."

The recent hospital merger agreements have kept Siegel busy administratively, and his research interest in the use of positron emission tomography (PET) in oncology and the expanded clinical use of PET add to his schedule.

At Washington University since 1962, Siegel earned undergraduate and medical degrees here, then did a medical internship and took a residency in radiology and nuclear medicine. He was gone only for two years of service in the Air Force. Siegel's wife, Marilyn, is also a professor of radiology at the School of Medicine.●

Carl Goetsch Honored

CARL Goetsch, M.D., HS '43, retired recently as chairman of the board of Alzheimer's Services of the East Bay, a not-for-profit community organization that provides day care, healthcare and respite services for Alzheimer's patients in Berkeley and in San Leandro CA.

Goetsch and his wife, Anne Goetsch, M.D. '41, who is also a board member, were instrumental in establishing this program in 1979 at the Berkeley site. The program has grown steadily, expanding to San Leandro in early 1993. On the occasion of Carl Goetsch's retirement, the board held an open house in March and announced that initial gifts had been received for the establishment of the Anne and Carl Goetsch, M.D., Endowment Fund in their honor. The board hopes that the Goetsch Endowment Fund will eventually reach $250,000 and

provide greater financial security for the organization.

Currently funded by a combination of state and county funds and grants from private foundations, as well as fees to participants, the centers serve many Alzheimer's patients who cannot afford the actual cost of the services. The Robert Wood Johnson Foundation selected Alzheimer's Services of the East Bay as a model program because of its success in innovation, cost-effectiveness and service delivery to minority populations. ●

Symposium Honors Charles W. Parker

CHARLES W. Parker, M.D. '53, was honored for his significant contributions to the school and the Department of Medicine at a unique symposium at the School of Medicine on June 2 and at a dinner at the Ritz-Carlton the preceding evening. Each of the 11 symposium presenters, who came from major health centers throughout the country, trained with Parker, as did many of those who attended.

Parker is professor of medicine and of molecular microbiology and served for many years as head of the division of immunology. He has done pioneering research in allergy, immunology and microbiology and made a sentinel contribution in finding methods by which penicillin could be safely given to allergic patients. His work was instrumental in the discovery and characterization of leukotrienes that play an important role in allergic inflammation. He and his colleagues developed a number of immunoassays important in pharmacology and biochemistry, including those for morphine, cyclic nucleotides, digitalis and creatine phosphokinase isozymes. Parker's current research focuses on the control of synthesis of the antibody (IgE) which causes allergies. ●

At a ceremony on August 18, Mrs. Gretchen P. Jones presented a portrait of her husband, the late Andrew B. Jones, M.D., to the medical school in the person of William A. Peck, M.D., executive vice chancellor and dean. The portrait eventually will hang in the redecorated offices of the Department of Neurology, where the Andrew B. and Gretchen P. Jones Chair is held by department head Dennis W. Choi, M.D., Ph.D.

Officers Named

WASHINGTON University Medical Center Alumni Association (WUMCAA) President Penelope G. Shackelford, M.D., presided over the annual meeting held during the reunion in May. She presented the new slate of officers and Executive Council members for 1993-'94 as recommended by the nominating committee. The slate was approved unanimously .

The new officers and members are:

Vice President — Richard A. Blath, M.D. '71;

Secretary-Treasurer — Stephen A. Kamenetzky, M.D. '70;

Council Members to serve three-year terms — Robert C. Drews, M.D. '55; Robert D. Fry, M.D. '72; Gordon W. Philpott, M.D. '61; Bruce I. White, M.D. '64, and M. Gilbert Grand, M.D., former house staff.

Each of the **out-of-town Council Members,** who are elected for a one-year term, agreed to serve for another year. They are: Captain Stephen B. Lewis, M.D. '66; Stephen W. Van Meter, M.D. '67; Sharon Van Meter, M.D. '67; Jonathan M. Mann, M.D. '74, and Gary S. Rachelefsky, M.D. '67. ●

With Apologies

THE Alumni Office apologizes for any errors in reunion photo captions in the last issue of *Outlook*. On page 36, the photo of three Class of 1968 members should have carried the name of Dr. Harold (Jim) Davidson rather than Dr. Carl Dennison, and the photo of Class of 1983 members should have listed Dr. Clay Dunagan rather than Jay Ponder. On page 34, it is not Mrs. Shatz but Mrs. Bernard Garfinkel (who is correctly identified in a photo on page 31) conversing with Dr. Burton Shatz. ●

CLASS NOTES

'30s and '40s

John Walter Jones, M.D. '33, chairs a tumor pathology conference twice each month at St. Michaels Hospital in Texarkana AR. In his free time, he does church work, plays bridge and keeps a vegetable garden.

Henry Vance Kirby, M.D. '33, reports that he served as the first chief of staff of Northern Arkansas Medical Center in Harrison AR, and that April 2, 1989, was celebrated there as "Dr. H.V. Kirby Day" by proclamation of the mayor. The Arkansas Secretary of State presented him with the Arkansas Traveler Award. Kirby was the fourth generation of his family to practice medicine in Boone County AR.

George J.L. Wulff, Jr., M.D. '33, and Mary Evalyn Wulff report that they weathered Hurricane Andrew, despite much damage to their dwelling, which they were forced to evacuate. Six months after the storm, they were back in their repaired home after spending time in Delray Beach FL.

Marion J. Dakin, M.D. '38, lives in New Smyrna Beach FL, still hopes to paint a masterpiece, practices the Hammond organ, works at becoming a bridge life master and enjoys "every minute."

William S. Curtis, M.D. '40, accepted the University of Colorado Medal from the board of regents of that institution in recognition of his service and outstanding contributions. Curtis served the school for 38 years until his retirement in 1991.

C. Barber Mueller, M.D. '42, was selected by the Royal College of Physicians and Surgeons as the 1992 recipient of the Duncan Graham Award for outstanding contributions to medical education. Mueller helped shape the RCPSC surgical examinations and has been at the leading edge in developing new teaching methods.

Louis A. Gottschalk, M.D. '43 December, Ph.D., received the Daniel G. Aldrich, Jr. Distinguished University Service Award from the academic senate of the University of California at Irvine on January 21. Gottschalk is professor emeritus of psychiatry and human behavior in the College of Medicine there.

Robert W. Deisher, M.D. '44, recently received the Outstanding Service Award from the University of Washington. The recognition was for his work with homeless street youth during the past 22 years. He founded and supervises three night clinics in inner Seattle for young people and is professor emeritus of pediatrics at the University of Washington medical school.

'50s and '60s

Marvin E. Levin, M.D. '51, professor of clinical medicine, has been elected a Fellow of The Society for Vascular Medicine and Biology.

Stevenson Flanigan, M.D. '53, was honored with a reception on June 15 noting his retirement from the post of chair of the Department of Neurosurgery at the University of Arkansas for Medical Sciences. The celebration, hosted by the department's physicians and staff, coincided with Flanigan's 67th birthday. The department's new library will be named in honor of Flanigan, and a portrait of him will be hung there.

Charles W. Parker, M.D. '53, was honored by those he taught with a day-long scientific symposium in Cori Auditorium on June 2, 1993.

William D. Sawyer, M.D. '54, is president of the China Medical Board of New York. He recently received the honorary doctorate of public health degree from Chiang Mai University in Thailand. The degree was presented by His Majesty, King Bhumibol. Sawyer also was honored with the University's Gold Medal from Airlangga University, Indonesia.

Donald H. Tilson, Jr., M.D. '55, writes that he is "still working and enjoying every minute (no call or weekends). It's clear that senior citizenhood is when Mondays look as good as Fridays."

Farrell M. Calton, M.D. '59, was one of two physicians recently honored at the seventh annual Evening of Recognition of the Women's Council of the Stewart Rehabilitation Center in Ogden UT. Calton practices cardiology and is devoted to his five grandchildren.

Marjorie J. (McGee) Tillman, O.T. '59, lives in St. Louis County with her husband. She works with severely disabled children at Boonslick State School in Harvester MO.

Joshua B. Grossman, M.D. '65 and **Mickey Grossman, O.T.R. '65,** live and work as physician and occupational therapist in Johnson City TN. Their children are in school at George Mason University, Wake Forest University and Duke University. Mickey and Joshua have appeared on stage together in local community theater productions, and together they enjoy western square dancing, round dancing and ballroom dancing.

Frank Vinicor, M.D. '67, has been named the M.D. vice president of the American Diabetes Association. His term began July1, 1993.

Joseph M. Davie, M.D. '68, Ph.D.

Joseph M. Davie, M.D. '68, Ph.D., has been appointed vice-president of research at Biogen, Inc. He will supervise the company's research programs, from discovery through pre-clinical development. From 1967 to 1987, he was professor and head of the Department of Microbiology and Immunology at the School of Medicine. Davie, his wife and three children will relocate to the Boston area.

Stephen B. Raffin, M.D. '68, associate clinical professor of medicine at the University of California Medical Center in San Francisco, updated the gastroenterology section for the recently published 16th edition of *The Merck Manual of Diagnosis and Therapy.*

Michael L Cowan, M.D. '69, assumed the position of Commanding Officer, U.S. Naval Hospital, Camp Lejeune NC, on September 1. He reported there from San Diego, where he served as Force Medical Officer for the Pacific Fleet. He also recently served in Somalia as Joint Task Force Surgeon during Operation Restore Hope.

Kenneth L. Sims, M.D. '69, has retired from the U.S. Navy with the rank of Captain. For the past six years, he served as chair and program director of pathology at Naval Hospital Oakland. In July 1993, he assumed the position of professor and chair of the Department of Pathology at Creighton University Medical School in Omaha. He writes that he is most proud of his two beautiful granddaughters.

'70s and '80s

Ronald M. Ferguson, M.D. '71, Ph.D., has been named chair of the Department of Surgery in Ohio State University's College of Medicine. He is professor of surgery and director of the division of transplant surgery at Ohio State. In 1985, he directed the team that performed University Hospital's first liver transplant. During 1992, his division performed 299 transplants.

Richard Grisham, H.A. '73, president and chief executive officer of St. Anthony's Medical Center in St. Louis, has been appointed to the board of trustees of the Missouri Hospital Association. His term began January 1, 1993.

Lincoln L. Berland, M.D. '75, professor of radiology at the University of Alabama at Birmingham, has been named vice chairman for planning and administration for the Department of Radiology at his institution. He specializes in body CT and sonography.

Keith H. Bridwell, M.D. '77, co-chaired the symposium "The Treatment of Surgical Spine Disease on April 14-17 in St. Louis.

Dana E. Holloway, M.D. '83, is in the private practice of pediatrics in Columbia MD. Son, Vaughn Parker Wollney, was born on April 16, 1993.

Lynn E. Scroggins H.A. '84.

Lynne E. Scroggins, H.A. '84, has been appointed chief executive officer at New Orleans Adolescent Hospital (NOAH) in uptown New Orleans. NOAH is a 124-bed mental health facility for children and adolescents, ages eight to 18, with 220,000 square feet of building space located on 17 acres. She also is the interim administrator for mental health services at the Medical Center of Louisiana.

Thomas S. Chang, M.D. '85, assistant professor of radiology at the University of Pittsburgh, and his wife, Joan Vondra, announce the birth of their first child, Miranda. Chang says she is "a cute and happy little kid."

Gary R. Collin, M.D. '85, is presently a fellow in trauma and critical care at Jackson Memorial Hospital, University of Miami. He recently has become board certified in general surgery and plans to take the critical care boards in October.

Timothy J. McDonnell, M.D. '86, Ph.D., has been presented with the Benjamin Castle Award by the U.S. and Canadian Academy of Pathology. McDonnell is an assistant professor in the Department of Molecular Pathology at M.D. Anderson Cancer Center in Houston.

Robert L. Grubb, M.D., **FHS in neurological surgery,** has been named to the newly established Herbert Lourie Professorship in the Department of Neurological Surgery. Grubb, known for his understanding of cerebrovascular physiology and disease, has a distinguished reputation for clinical excellence. The chair is endowed by Dr. Shi H. Huang, a Washington University trustee and former resident of the training program in neurological surgery here.

Richard G. Lynch, M.D., **FHS in pathology,** serves as interim dean of the College of Medicine at the University of Iowa.

John F. Meyers, M.D., **FHS in orthopedic surgery,** has been named head physician of the U.S. Olympic Committee Medical Staff for the Games of the XVII Winter Olympics in Lillehammer, Norway. He is an orthopedic surgeon at Tuckahoe Orthopaedic Associates in Richmond VA.

John F. Meyers, M.D.

Nancy M. Newman, M.D., **FHS in ophthalmology**, recently published *Neuro-ophthalmology: A Practical Text* (Appleton & Lange, 1992). *The American Journal of Ophthalmology* said, "This book gets two thumbs up."

IN MEMORIAM

Louis H. Hempelmann, M.D. '38, an authority on radiation biology, died June 30, 1993, in Rochester NY of complications from a stroke. He was 79.

After graduating from the medical school, Hempelmann returned to Washington University in 1942, overseeing the cyclotron, but the war intervened, and he left to direct the health division at the nuclear weapons lab in Los Alamos NM. He left government service to pursue research at Harvard in 1948, but continued to advise the Atomic Energy Commission and later the Nuclear Regulatory Commission.

Hempelmann led major long-term studies of the effects of radiation and, in 1949, was among the first to warn of the dangers of X-ray machines in shoe stores.

Hempelmann and his wife, the former Elinor Wickham Pulitzer, celebrated their 50th wedding anniversary on June 5.

Dorothy J. Jones, M.D. '34, died July 8, 1993, at St. Luke's Hospital in west St. Louis County. She was 84. An instructor in clinical pediatrics at the medical school for 23 years, she was a pioneer in the treatment of tuberculosis.

Jones began her career in 1937 as an assistant in clinical pediatrics at St. Louis Children's Hospital. After she retired in 1963, she was appointed chief of outpatient care, a position she held until 1974. Among her survivors are two sisters.

David B. Lewis, M.D., **FHS in radiology**, passed away suddenly on March 23, 1993. He served his residency in radiology at Mallinckrodt Institute of Radiology between 1957 and 1960 and was chief resident from 1959 to 1960. He was a leader in the development of computerized axial tomography and supervised the first CT scanner in central Illinois. He is survived by his wife, four sons and a daughter.

Albert Marion Richmond, M.D. '32, passed away on June 3, 1993 in San Antonio TX. He retired from the Army in 1955 and entered the private practice of pathology in San Antonio. He retired from that practice in 1978.

Sol Sherry, M.D., former co-chair of the Department of Medicine, died January 28, 1993, of pancreatic cancer at Temple University Hospital in Philadelphia. He was 76.

Sherry was a highly regarded researcher investigating the mechanisms of blood clotting and bleeding and pioneering the use of streptokinase and urokinase for treating clots that precipitate heart attacks. He persuaded the NIH to organize the first major study of thrombolytic therapy in patients with acute pulmonary embolism. Sherry also is credited with the discovery of the action of various natural substances involved in blood clotting.

He came to Washington University in 1954 as an assistant professor of medicine after serving as an Army flight surgeon in World War II, where he earned a medal for his work on typhus. He was named co-chair of the department in 1964. In 1968, he went to Temple as professor and chair of the Department of Medicine.

Among his survivors are his wife, Dorothy, a son, a daughter, a brother and two grandchildren.

Robert H. Waldman, M.D. '63, vice president of the division of medical student and resident education of the Association of American Medical Colleges (AAMC), died of cancer on July 10, 1993, at his home in Alexandria VA. He had been dean and professor of internal medicine at the University of Nebraska College of Medicine from 1985 to 1991. Before that, he chaired internal medicine at the West Virginia School of Medicine for nine years.

In 1992, Waldman was chief of staff for the AAMC Task Force on the Generalist Physician, and in August he would have accepted the American Academy of Family Physicians' Certificate of Meritorious Service for his contributions to family medicine. A Fellow of the ACP, he received the Public Health Service Career Development Award.

He is survived by his wife, Jean Hadden, two daughters, two sons, his parents and a sister. ●

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The Great Flood of '93 may have been second to the deluge of 1844 in terms of peak volume (1,030,000 cubic feet per second at St. Louis compared to 1,300,000 cfs 149 years ago), but the river stage was higher this time and the mess was bigger. Left behind is clean-up work of the dirtiest, most laborious sort. First-year medical students Todd Vedder and Lisa Oldham organized volunteers to participate in the Salvation Army's Operation Noah's Ark. Shown is first-year student Eric Paulin (right) of Portland OR, helping a St. Louis area resident to gut a flood-ravaged home in Bellefontaine Neighbors.