Cardiology

Prestigious $11.6M Grant Supports Study of Heart Failure

The National Heart, Lung, and Blood Institute (NHLBI) has awarded Jefferson scientists an $11.6 million grant for the study of cardiac injury and repair. Three of the four labs funded by the grant are part of the Department of Medicine’s Center for Translational Medicine, which oversees the department’s research activities. The fourth lab belongs to Steven R. Houser, Chair of the Department of Physiology at Temple University Medical Center.

Principal Investigator for this programmatic award is Walter J. Koch, PhD, the W. W. Smith Professor of Medicine and Director of the Center for Translational Medicine; Dr. Koch is also Director of the Center’s George Zallie and Family Laboratory of Cardiovascular Gene Therapy. “Much of the project will focus on the science of cardiac failure and repair with the goal of understanding and developing new therapies,” says Dr. Koch. “We are also working with stem cells and pharmaceuticals that patients already receive.”

The study examines molecular mechanisms as well as the potential for processes that might repair a failing heart in adults, in the hopes of generating data that could eventually result in new therapies. Along with Dr. Koch (at far left), support in administrative, surgical, molecular cell biology, and gene therapy will come from Center faculty members (see left; clockwise from top right: Andrea Eckhart, PhD; Joseph Rabinowitz, PhD; Ehre Gao, MD, PhD; and Patrick Most, MD).

From the Chairman

These pages profile the kinds of impressive accomplishments in research, education, and patient care that make me proud to lead Jefferson’s Department of Medicine.

On the research front, we are honored to announce that Dr. Koch and a team of Jefferson scientists were awarded an $11.6 million grant from the National Heart, Lung, and Blood Institute to study cardiac injury and repair. In the clinical arena, our Cardiology Division was recognized for its outstanding performance in meeting the quality standards set forth by the Centers for Medicare and Medicaid Services. In education, the Internal Medicine Clerkship Program, under Dr. Diemer’s direction, demonstrates our commitment to deepening students’ medical education. Other articles feature the important work of Dr. Bergmeier and division chiefs Dr. Cheung and Dr. Irigoyen.

I would like to thank several of the generous donors (featured on page 5) who play an invaluable role in supporting our initiatives. Together, our researchers, clinicians, educators, and supporters are the substance behind the Department of Medicine’s well-regarded reputation. Please also visit our department website at www.jefferson.edu/medicine for more in-depth articles and updates on our activities.

Arthur M. Feldman, MD, PhD
Magee Professor of Medicine and Chairman of the Department
Keynote speaker Stephen B. Liggett, MD (above, left), Professor of Medicine and Physiology receives the Excellence in Translational Science Award 2008 in appreciation of his outstanding contributions to translational cardiovascular and pulmonary research from the Director of the Center for Translational Medicine and W.W. Smith Professor of Medicine Walter J. Koch, PhD (above, right).

Presenting scientists and organizing committee of the Center for Translational Medicine's 4th annual symposium: Front row, left to right: Que-Xian Zhang, PhD; X. Li, PhD; Yanrong Su, PhD; Jee In Kim, PhD; Wolfgang Bergmeier, PhD; Raihana Zaka, PhD. Back row, left to right: Donjun Li, PhD; Susan Moraca; Walter J. Koch, PhD (Director of the Center for Translational Medicine); A. Konakkar, PhD; Carolin Kraus, MD; Dave Harris, PhD; Paulina Oca, MS; Patrick Most, MD (Symposium Director); Yajing Wang, MD, PhD; David Rohde, MD; Stephen B. Liggett, MD (keynote speaker); Jeffrey Martini, PhD.

Center News

Patrick Most, MD (far right), Assistant Professor and Director of the Laboratory for Stem Cell and Gene Therapy at the Center for Translational Medicine, received an NIH Research Project Grant (or RO1) for more than $1.9 million. The study is entitled "S100A1: A novel modulator of myocardial infarct inflammation and regeneration." Dr. Most began work in April 2008 and the grant runs through March 2013.

On May 9, 2008, Heather I. Cohn successfully defended her PhD dissertation, entitled "The role of GRK2 in high blood pressure," making her the first doctoral student to graduate from the Center. Her advisor was Associate Professor Andrea Eckhart, PhD, Director of the Center’s Eugene Feiner Laboratory for Vascular Biology and Thrombosis.

On March 28, 2008, Washingtonpost.com featured a story about the Center for Translational Medicine’s basic research on the signaling protein called Gi and its critical role in protecting the heart during a heart attack. The full findings were published in the March 18, 2008, issue of the journal Circulation.

New Research Examines the Science Behind Blood Clots

Wolfgang Bergmeier, PhD, runs a laboratory in Jefferson’s Curtis Building with two other researchers that focuses on the problem of thrombosis (blood clotting) at a molecular level. After doing undergraduate work in his native Germany, he did postgraduate training at Harvard Medical School and the Immune Disease Institute. He joined Jefferson in early 2008 to build upon the Division of Hematology and the research program at Jefferson’s Cardeza Foundation Hemophilia Center.

Investigating Arterial Thrombosis

Dr. Bergmeier’s work deals with the signaling pathways regulating platelet activation and adhesion. Platelets are best known for their critical role in arterial thrombosis, that is, in pathological conditions such as heart attack and stroke. “Arterial thrombosis is the formation of a thrombus within an artery, a process driven by the uncontrolled accumulation of platelets,” says Dr. Bergmeier. “If these thrombi grow too big, they can obstruct blood flow through the circulatory system, leading to ischemia and infarction of vital organs such as the heart or the brain. Coronary heart disease is responsible for 1 in 5 deaths in the U.S., and ischemic heart disease is still the leading cause of death in developed countries.”

Issues of Anti-Thrombotics

Dr. Bergmeier’s lab is currently studying new ways to inhibit platelet adhesion and attack or a stroke. The signaling cascades regulating integrin activation are complex and interlinked, but there has been substantial progress in identifying the important players in this process,” he says.

Dr. Bergmeier’s recent work has identified a protein called CalDAG-GEFI as one of these central regulators of integrin activation in platelets. “Our studies demonstrate that CalDAG-GEFI is important for the near-immediate activation of integrins in stimulated platelets, a process that is absolutely required for the cell to adhere at the site of vascular damage,” he says. Dr. Bergmeier has published related articles in *Nature Medicine*, the *Journal of Clinical Investigation*, and *Blood*.

This basic research studies platelet function in mice and is done in vitro (outside the animal) and in vivo (inside the animal). He uses a cutting-edge intravital microscopy approach to study thrombus formation in arterioles of living mice. “It’s still a mouse model, so we have to be careful when we make predictions on how successful targeting a particular protein would be in humans,” he says. “But studying platelet adhesion to sites of vascular damage in vivo, or under most physiological conditions, has become the gold standard for evaluating new targets.”

Targeting Proteins

Dr. Bergmeier’s studies suggest that CalDAG-GEFI cooperates with P2Y12, the target of the antithrombotic drug Plavix®, in various aspects of platelet activation. His studies suggest that targeting CalDAG-GEFI may be more effective than Plavix with regard to reducing thrombus formation. He is currently validating these observations in other models of arterial thrombosis. “We are very excited about our collaboration with Dr. Force of the Center for Translational Medicine, which will allow us to evaluate the importance of CalDAG-GEFI in mouse models of myocardial infarction and ischemia-reperfusion injury in the heart. We are convinced that targeting CalDAG-GEFI could be a very powerful approach to interfere with these illnesses.”

“Jefferson is an exciting place to be right now,” says Dr. Bergmeier, given its core group of people in the division who focus on platelet biology and platelet-driven diseases. “We also have a long tradition of caring for patients with bleeding and clotting disorders in our Hemophilia and Thrombosis Center. And the Center for Translational Medicine is one of the leading research institutions in the country with regard to understanding heart failure and heart disease. What we are starting to do now is to combine our forces.”
Nephrology

From Patient Rounds to Mouse Cell Research: Nephrology Chief Covers All the Angles

The Department of Medicine benefits greatly from leaders who pair leading-edge research with clinical excellence. Joseph Cheung, MD, PhD, who joined Jefferson in October 2006 as Chief of the Division of Nephrology and the Capizzi Professor of Medicine, embodies this dual commitment. In addition to his long list of responsibilities as Division Chief — overseeing the finances of the division, expanding its activities, and recruiting new faculty — Dr. Cheung also routinely sees patients and conducts an extensive program of NIH-funded cardiovascular research.

In the two years under Dr. Cheung’s leadership, Nephrology has increased from five to ten faculty members, and he has expanded the division’s clinical activities as well as its profile. In addition to three-month rotations on inpatient nephrology consultation, he works the same number of nights and weekends as the other faculty members in the division.

Born and raised in Hong Kong, Dr. Cheung left to attend McGill in Montreal, where he obtained his MD in Biophysics. He enrolled in the combined MD-PhD program at Penn State where he obtained his PhD in Physiology, and completed his MD studies at Duke. It was as a first-year medical student at Penn State that Dr. Cheung met his wife, Barbara A. Miller, MD, now the Four Diamonds Professor of Pediatrics, Vice-Chairman of Pediatric Research, and Chief of Pediatric Hematology/Oncology at Penn State. She is Principal Investigator on NIH-funded research on hematopoiesis.

Dr. Cheung’s training included a Medicine Residency at Duke and Nephrology Fellowship at Massachusetts General Hospital; he subsequently obtained faculty positions at Harvard and later Penn State, where he rose to Professor of Medicine (tenured) in 1991 and Chief of Nephrology in 1993. In 2000, to refocus and retool his research skills, Dr. Cheung became Senior Scientist at the Weis Center for Research at Geisinger Medical Center. He was also named Director of Geisinger’s Pancreas Transplant Program in 2003.

Heart Cell Remodeling

Dr. Cheung was elected in 1994 to the American Society for Clinical Investigation (ASCI), an honorific society that elects some 60 members each year for their outstanding records of scholarly achievement in biomedical research. Throughout his career, Dr. Cheung has always focused on cardiovascular research. The first of his two major interests — both of which are currently NIH funded — explores heart cell remodeling after a heart attack and the mechanisms by which exercise training improves heart function in the wake of that event.

“We measure intracellular ions, ion currents, and the contraction of single heart cells,” explains Dr. Cheung. He works within Jefferson’s Center for Translational Medicine and surgically induces heart attacks in genetically engineered mice. “We actually have the mice running on a treadmill,” he explains, “in order to observe changes in the heart after heart attack, with and without exercise.” Apparently the mice take to the exercise regimen rather quickly and easily. “After three weeks, they can run quite fast,” says Dr. Cheung. “Within eight weeks, we start to see cellular changes.”

Sodium-Calcium Exchanger

A second major interest is the regulation of cardiac sodium-calcium exchanger in the heart, which not only controls the force of the heartbeat but can generate irregular heartbeats under pathological circumstances. “It is critical to understand this ion exchanger, especially when its function has been altered,” asserts Dr. Cheung.

Cardiac Cells in Mice

His work in the Center for Translational Medicine involves isolating single cardiac cells and placing them in culture. “Mice offer unique advantages to the researcher because their genes are much easier to manipulate than those in larger animals,” Dr. Cheung explains. Yet mouse heart cells are very difficult to isolate and culture. “We put genetically altered heart cells in culture, and then use a virus to alter the expression of another gene of interest — at least in the short term.”

The work of Dr. Cheung’s lab is breaking ground in two areas. “Ours is the first lab to show that mouse heart cells retain normal contractility in culture for 48 hours,” he says, whereas previous research had shown contractility and other function for only 24 hours. “Pictures taken at day two show the cells still maintain normal transverse-tubule architecture.” He adds, “We also are the first group to discover the first and only protein regulator (phospholemman) of sodium-calcium exchanger in the heart.”

A minor interest of Dr. Cheung’s is erythropoietin, an agent that is widely used clinically to stimulate the growth of red blood cells in kidney failure patients and in patients receiving chemotherapy. “Our goal is to answer the question, ‘How does this work?’” he says. “More than 20 years ago, we were the first to report that erythropoietin increases intracellular calcium in red blood cell precursors.” Drs. Miller and Cheung have identified the erythropoietin-regulated calcium permeable ion channel, which belongs to the family of transient receptor potential (TRP) channels. “What is translational,” says Dr. Cheung, “is how erythropoietin promotes cell division and survival — and our goal is to understand the precise pathway so that better agents can be designed with fewer side effects.”
Gift Supports Research in High Blood Pressure and Kidney Disease

Murray I. Blackman, Trustee of the Kahn Foundation, was kind enough to support Joseph Cheung, MD, PhD, in his work on chronic kidney diseases, and specifically, on ion transport in patients with high blood pressure (hypertension).

"High blood pressure is the most common cause of chronic kidney disease and kidney failure," explains Dr. Cheung. "One-third of patients with kidney failure who are currently treated with dialysis have hypertension as the causative event." Mr. Blackman’s generous gift supports his research in studying the mechanism of how a particular molecule is regulated. Dr. Cheung is hopeful that this research will provide a window through which to see the pathway of how hypertension causes kidney disease.

“One way to look at hypertension is to study smooth muscle cells,” says Dr. Cheung. “Alteration of ion homeostasis in vascular smooth muscle cells can cause stiffening of blood vessels and subsequent development of high blood pressure.” One of the ion transporters is sodium-calcium exchanger — a target of Dr. Cheung’s research for several years, which has been intimately related to ion homeostasis in vascular smooth muscle.

Cath Lab Dedication

On May 14, 2008, Jefferson hosted the dedication of a newly renovated catheterization laboratory (Cath Lab) with the corporate donor who funded the renovation with a $500,000 donation. The donor, N. J. Sky Cooper, is President/CEO of Charles Jacquin et Cie, Inc., America’s oldest producer of cordials, operating in Philadelphia since 1884.

Education

Clerkship Director Gretchen Diemer: Shaping the Med Student Experience

As Clerkship Director and Assistant Residency Program Director for Internal Medicine, Gretchen Diemer, MD, has a direct impact on the career of every third-year student in the Internal Medicine program at Jefferson — which totals more than 250 people this year alone.

After attending the University of Virginia Medical School and doing an internship and residency at Penn, Dr. Diemer came to Jefferson in 2004 and worked as a Hospitalist in Internal Medicine — a hospital-based specialty that focuses on improving the quality of care for inpatients.

Dr. Diemer assumed her current role of Internal Medicine Clerkship Director in 2007, and finds her work in medical education to be a challenging and satisfying way to support the next generation of physicians. The Internal Medicine Clerkship program, which she oversees, takes place during the students’ third year. This is a period of intense clinical experience, “when the students do what are essentially apprenticeships,” she says. “The idea is for each student to be exposed to a number of areas, to gain a strong understanding of internal medicine — regardless of a particular specialty.”

The students rotate at Jefferson University Hospital for four of the 12 weeks of the clerkship, and for the other eight weeks rotate through one of seven other affiliated hospitals: Christiana Hospital in Delaware, York Hospital, Reading Hospital, UPMC Mercy in Pittsburgh, Methodist Hospital, Albert Einstein Medical Center, and the Wilmington VA Medical Center. Dr. Diemer helps the site directors to structure the program so that all students receive a consistent experience. “There’s a strong correlation between the quality of a student’s clerkship and the specialty that he or she ultimately chooses, so we take this part of the process very seriously.” She is also constantly seeking to recruit new sites to the clerkship program.

Dr. Diemer is also involved in curriculum development for the residency program and oversees evaluations that are written for every resident in the program. She spends time planning with medical students who are at the end of their third year, in terms of what electives to take. In addition, her position includes a fair amount of career advising. “I really enjoy my job,” Diemer says, “because Jefferson is a place that values education. It’s a pleasure to work at an institution that is committed to devoting resources to programs that it deems as so crucial to its mission.”
Rheumatology

New Director Builds on Centers of Excellence

The Division of Rheumatology is growing and expanding under the leadership of its new Director, Oscar Irigoyen, MD. Named to the position in July 2008, Dr. Irigoyen had served as Acting Director since the spring of 2007 and previously served as the Clinical Rheumatology Director.

Born and raised in Argentina, Dr. Irigoyen received a doctor of medicine degree from Buenos Aires University School of Medicine and completed a residency in Internal Medicine at the Medical Research Institute of Buenos Aires. He completed his fellowship in Rheumatology at the College of Physicians and Surgeons (P & S) of Columbia University in New York. He subsequently served as Assistant Professor at Columbia P & S Medicine and at the Albert Einstein College of Medicine. In 1987, he returned to Columbia University and rose to Associate Clinical Professor of Medicine, a position he held until coming to Jefferson in 2006.

Dr. Irigoyen explains that Jefferson is a major referral center for rheumatology in the tri-state area. “Much of the emphasis in the division now is clinical – seeing patients and doing clinical research,” he says. The size of the division is currently five faculty members, and Dr. Irigoyen seeks to recruit additional physicians in order to meet the increasing demand.

Disease-Specific Centers

To ensure the best of care the Division of Rheumatology has continued to expand and create new disease-specific Centers of Excellence. “The patients who move in and out of Jefferson every day are actively involved in their own education about their health,” says Dr. Irigoyen, “and we are constantly striving to improve the programs and resources we make available to them.”

In May 2008 two of Rheumatology’s centers were highlighted in Philadelphia magazine as Centers of Excellence: Jefferson Osteoporosis Center and the Lupus Center at Jefferson.

Although the Jefferson Osteoporosis Center is located in Bala-Cynwyd and the Lupus Center is located in Center City, consultation services for those conditions are provided at both locations.

The Arthritis Center treats patients with inflammatory disorders, including rheumatoid arthritis and psoriatic arthritis. These chronic conditions are characterized by inflammation of the lining of the joints (in rheumatoid arthritis) and inflammation of the skin and joints in psoriatic arthritis (also known as psoriasis when it affects only the skin). “In the past we could never get patients into complete remission; the treatment we had available would not completely prevent progressive damage to the joints,” he says.

“This is a time of movement forward and expansion, as we strive to make our clinical centers the best in Philadelphia as well as Pennsylvania,” Dr. Irigoyen says.

Research Studies

The Osteoporosis, Arthritis, and Lupus Centers are currently participating in clinical research studies on the conditions of osteoporosis, rheumatoid arthritis, scleroderma, and lupus. Rheumatology also collaborates with other Jefferson departments and divisions on a number of projects. One of the collaborations is with Dr. Charlene Williams in the Center for Translational Medicine, to identify gene abnormalities in conditions classified as autoinflammatory or in conditions that cannot be classified. “Symptoms of these conditions range from recurrent fevers to rashes that have no apparent explanation,” Dr. Irigoyen says. “Our hope is to identify specific gene abnormalities, so that we can diagnose the disease more effectively, and understand the mechanisms of the disease, which can lead to a more rational treatment.”

Dr. Irigoyen emphasizes that this has been a time of growth for the division. The Infusion Centers have been expanded and renovated, and the planning process is underway for construction of a new clinical area at the Center City location on the 6th floor of Walnut Towers.

http://jdc.jefferson.edu/translations/vol4/iss1/1

Prestigious $11.6M Grant Supports Study of Heart Failure, continued from page 1

Dr. Koch’s group will focus on the role of the enzyme GRK5 in regulating gene transcription and growth of heart cells, which can cause cardiac enlargement and heart failure. A group led by Arthur Feldman, MD, PhD, Magee Professor and Chair of the Department of Medicine, focuses on the role of signaling through the heart’s adenosine receptors. A third group is led by Thomas Force, MD, James C. Wilson Professor of Medicine and Clinical Director of the Center for Translational Medicine, and will continue studies of cancer drugs called tyrosine kinase inhibitors to understand how they affect heart cells including cardiac stem cells.
Preparating for the Future of Clinical Medicine: Pay-for-Performance Programs

Jefferson University Physicians (JUP) participated in a pilot project from July through December 2007 called the Physician Quality Report Initiative (PQRI), sponsored by the Centers for Medicare and Medicaid Services (CMS). This quality initiative aims to measure and improve physicians’ performance in ambulatory care (outpatient) settings. Many of the JUP practices agreed to participate, and although the project is ongoing, CMS has reported on the initial period. Assistant Director of Clinical Outcomes Research, Suzanne Adams, RN, MPH, supported PQRI for the Division of Cardiology and explains that the Division had both the highest level of participation and the best performance ratings of those Jefferson practices involved, including Family Medicine, Anesthesiology, Dermatology, and other medical and surgical sub-specialties. “We are proud to report that a total of 31 Jefferson Heart Institute (JHI) physicians participated, and of those, 27 met the PQRI standard,” she says. Some of the cardiology quality indicators this project evaluates include evidence-based medication management and appropriate testing for common diagnoses such as myocardial infarction and heart failure.

PQRI is related to a new value-based purchasing initiative that CMS intends to implement, where the organization takes a closer look at the services for which reimbursements are requested. The quality performance measures address over 180 diagnoses.

The advantage to strong performance in this initiative is that it strengthens the position of Cardiology to become eligible for reimbursement on Medicare billing, and also to measure and respond to quality indicators. However, there is also a prognostic side to the program. “When it’s time for cutbacks, as is inevitable in the current economic climate,” says Adams, “strong PQRI performance means that practices like ours will not be affected because we meet that quality standard. This translates into a standards-based clinical environment that will stave off reimbursement cuts.”

“This is an important model not just for Medicare, but for all private payors who are playing an increasingly significant role in medical care,” says Adams. Insurers such as Aetna and Independence Blue Cross are right behind CMS in terms of the same process of measuring and enhancing quality of care.

“We are pleased that the Jefferson Cardiology Group has worked together so effectively to achieve such strong performance — from doctors and clinicians to billing and administration staff,” Adams says. “At JHI we will continue with this ongoing initiative, always striving higher for optimal standards of care.”

Awards and Honors

Paul Bray, MD, Thomas Drake Martinez
Cardeza Professor of Medicine and Director of the Division of Hematology, has co-authored a research study indicating that postmenopausal women can take a simple blood test to determine whether hormone therapies present an elevated risk of heart attack. The paper was published in the April 3, 2008, issue of the American Journal of Cardiology. The study was part of the Women’s Health Initiative sponsored by the National Heart, Lung, and Blood Institute of the National Institutes of Health (NIH).

Sharon Rubin, MD, Associate Professor of Cardiology, received a Humanitarian Award from Jefferson Medical College on Awards Day, May 29, 2008.

Paul Mather, MD, Professor and Director of the Advanced Heart Failure and Cardiac Transplant Center at the Jefferson Heart Center, has been chosen to serve as the program co-chair for the 2010 American College of Cardiology Annual Meeting.

Kathleen Squires, MD, Director of the Division of Infectious Diseases and Environmental Medicine, was appointed Chairperson of the NIH AIDS Clinical Studies and Epidemiology (ACE) Study Section. The term runs July 2008–June 2010.

Behzad Pavri, MD, Associate Professor of Cardiology, was invited to serve as the keynote speaker for the inauguration of the Therapy and Procedure Training Center in Chennai, India in July 2008.

Leon Peris Award

On June 11, Jefferson Medical College presented the 2008 Leon A. Peris Memorial Award to Alfred O. Moon, MD, a graduating internal medicine resident. The award is given to a graduating resident who exhibits excellence in the completion of medical records. Dr. Moon is pursuing an Allergy and Clinical Immunology Fellowship at Kaiser Permanente in Southern California.
Welcome New Faculty

The following faculty members have joined the Department of Medicine as of January 2009:

**Cardiology**
Deborah August, MD
Kimberly French, MD
Gregory Marhefka, MD

**Center for Translational Medicine**
David M. Harris, PhD
Jifen Li, PhD

**Gastroenterology**
Bob Etemad, MD
Marianne Ritchie, MD

**Hematology**
Michael Holinstat, PhD
John Kark, MD

**Internal Medicine**
William Chong, MD
Allison Johnson, MD
Joanna Kipnes, MD
Mary Kate McCullen, MD
Rola Rimawi, MD
Justin Vadaparampil, MD
Jennifer Valentine, MD

**Infectious Disease**
Deena Athas, MD
William Short, MD

**Nephrology**
Stephanie DeLoach, MD
Dan Negoianu, MD
Pooja Singh, MD

**Pulmonary/Critical Care/Sleep**
Ritu G. Grewal, MD

**Rheumatology**
Michele Meltzer, MD

ACC Poster Competition Winners

Faculty member David Axelrod, MD (far left), Residency Program Director Gregory Kane, MD (4th from right), and Department Chair Arthur Feldman, MD, PhD, congratulate students and physicians in training who won honors at the American College of Cardiology poster competition (see background), including graduating JMC seniors (from left to right) Nisha Aggarwal, Katie Hawthorne, Erin Toto, and Mahdi Chowdhury as well as 3rd-year medical resident Paul Sagar, MD (2nd from right) and cardiology fellow Siva Kumar, MD (3rd from left). Not pictured: David Whellan, MD, MHS, Director of Clinical Outcomes Research.

Translations is published several times a year by the Department of Medicine at Thomas Jefferson University (www.jefferson.edu/medicine). For more information call 215-955-6946 or write to the address below.

The Department of Medicine encompasses 9 divisions and 6 centers:

**Cardiology**
Howard H. Weitz, MD, Director
Center for Outcomes Research

**Critical Care, Pulmonary, Allergic, and Immunologic Diseases**
Gregory C. Kane, MD, Interim Director

**Endocrinology, Diabetes, and Metabolic Diseases**
Serge A. Jabbour, MD, Interim Director

**Gastroenterology and Hepatology**
Anthony J. DiMarino, MD, Director

**Hematology**
Paul F. Bray, MD, Director
Hematology/Cardeza Foundation for Hematologic Research

**Infectious Diseases and Environmental Medicine**
Kathleen E. Squires, MD, Director
Center for Biodefense
Center for Human Virology

**Internal Medicine**
Barry S. Ziring, MD, Director
Center for Vascular Diseases

**Nephrology**
Joseph Y. Cheung, MD, PhD, Director
Center for Novel Therapies in Kidney Disease

**Rheumatology**
Oscar Irigoyen, MD, Director

**Center for Translational Medicine**
Walter J. Koch, PhD, FAHA, Director, Vice Chair for Research, and W.W. Smith Professor of Medicine

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