

WINTER 2005

Gene Therapy Prolongs
Bypass Graft Viability

Leading Cardiologist
Takes Health System Helm

Douglas Named Division Chief

Meet the New Board Chair

pulse

News from the Duke Heart Center | Duke University Medical Center

The Handwriting's on the wall

Paper Orders Give Way to Computerized System to Improve Patient Safety

In October, Duke became one of a handful of hospitals nationwide to implement computerized physician order entry (CPOE). Designed to improve patient safety, standardize care, and facilitate cost-effective treatment strategies, CPOE is the first step on the path to the electronic health record announced earlier this year as a ten-year goal by U.S. Health and Human Services Secretary Tommy Thompson.

"At its very simplest level, the immediate gain from CPOE is that even the worst physician handwriting becomes legible," says Jimmy Tcheng, MD, a Duke associate professor of medicine and one of three project leaders at Duke.

by Marty Fisher

A Decision Support Network

Instead of writing by hand the myriad orders for tests, procedures, and medicines on multi-copy paper forms, Duke physicians will type orders directly into the CPOE system via computer terminals. A software program called the Duke Order Manager will then disseminate the orders to individual laboratories, nursing stations, and other areas throughout Duke Hospital.

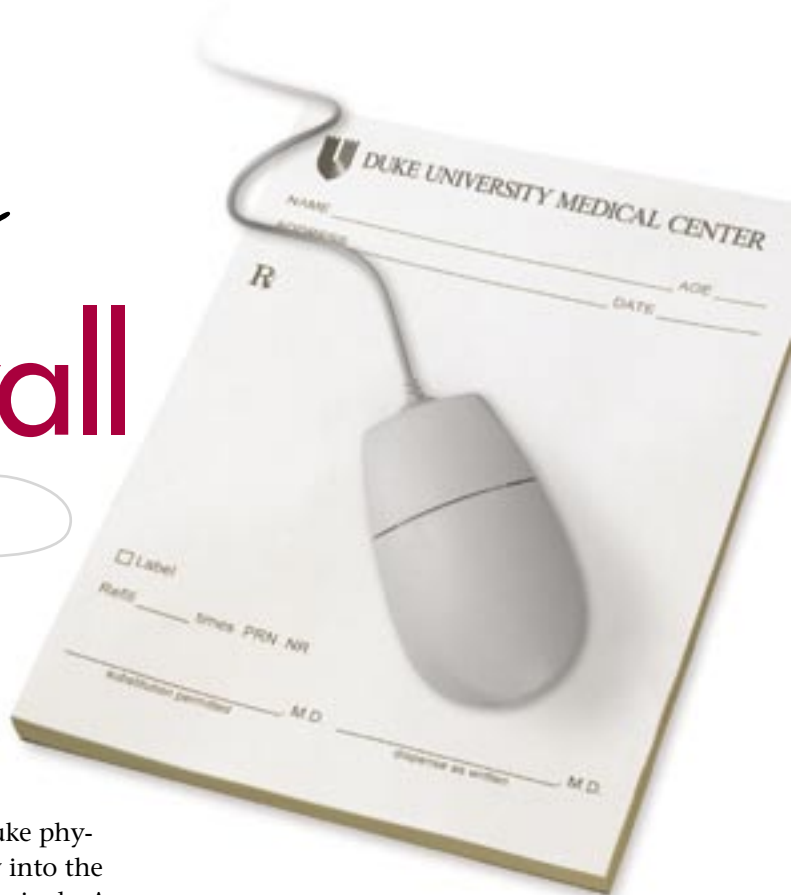
The benefits of CPOE go far beyond eliminating the need to decipher handwriting—they extend to the realm of providing sophisticated decision support, says Tcheng. For example, when a physician enters a prescription into the system, information about drug interactions, potential allergic reactions, and conditions the drug is normally used to treat pops up. No longer is the physician required to flip through the pages of a patient chart to uncover drug

allergies or go to a separate source for drug interactions.

Tcheng and colleagues have also linked orders that normally go together.

"If you order diagnostic test number one, you automatically get numbers two through ten, instead of having to remember to write down 10 different things on a paper form," says Tcheng. "At the same time, if order number 11 really needs the physician to think about it every time, we create a speed bump to say 'you need to decide.' With any given order set there can be a multitude of these branch points."

continued inside



Best Practice Guidelines

To help bridge the gap between clinical research findings and actual physician practice, the Duke team customized the new system with “best practice” guidelines for hundreds of symptoms and diseases.

“The wonder and beauty of medicine is that we are constantly making progress—advances in therapies that improve quantity and quality of life,” says Tcheng. “The downside is that we are now at the point where physicians can’t keep track of it all.”

One example is the use of the clot-busting drug tPA for stroke victims. Studies have shown that administering tPA within three hours following a stroke reduces disability by 10-13



Jimmy Tcheng, MD, Leslie Nowiak, and Michael Collins, MD, were project leaders for the computerized physician order entry (CPOE) program launched at Duke in October.

percent. When “stroke” is typed into the computer system, a “best recipe” for treatment pops up—number one, STAT head CT scan; number two, call the neurologist; number three, administer tPA when indicated; number four, give aspirin, for example.


A Cradle-to-Grave Record

“If you’re really good, you’ll do all the things that are supposed to be done every time for every patient in every situation, but I would argue that a computer will be better at ‘remembering’ all of the associated orders each and every time compared to relying on someone’s memory,” says Tcheng.

The insurance industry and federal government favor computerized order entry as a way to save costs, improve safety, and standardize care across the health care system. But the computer equipment and implementation process are incredibly expensive and complex, and there are concerns about compatibility, equity, data-sharing capabilities, security, and privacy. Duke purchased the basic functionality for its CPOE system, but 80 percent of the system was then custom engineered during a process that took about two years.

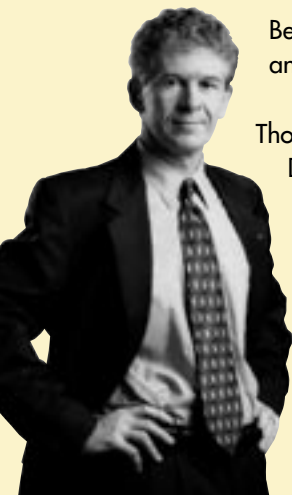
For now, CPOE is limited to the in-patient hospital experience at Duke and other major hospitals. Duke’s long-term plans include expanding it to all Duke Health System hospitals. And, support is building in Congress for the electronic health record, a cradle-to-grave record for every patient that could be shared among any authorized providers.

As the new system rolls out at Duke Hospital, Tcheng and his colleagues expect both accolades and obstacles as physicians and caregivers transition away from paper.

“This is one of a number of critical steps in what we consider to be a long journey,” says Tcheng. “Our whole premise is that a physician should be able to focus on giving care and coming up with a plan for each patient. We want to ensure that the mundane stays easy; the patient care issues are approached, managed, and customized by the physician and the health care team; and that the computer is positioned to do what it does best—providing decision support, reducing errors, and complementing the delivery of the highest quality care.” 

Dear Friends,

With this issue we are pleased to welcome many new faces to cardiology at Duke—chancellor Victor J. Dzau, MD, cardiology chief Pamela Douglas, MD, and our new board chairman Scott Fungler. As you will read, the Duke Heart Center is vibrant and thriving, with exciting progress in areas that will directly benefit our patients and people the world over. As always, thank you for your continued support and encouragement.



Best wishes to you and your family,

Thomas Ryan, MD
Director, Duke Heart Center

Gene Therapy Prolongs Bypass Graft Viability

By Brian Lima, MD, and Carmelo A. Milano, MD



Brian Lima, MD, and Carmelo A. Milano, MD, of the Duke Heart Center

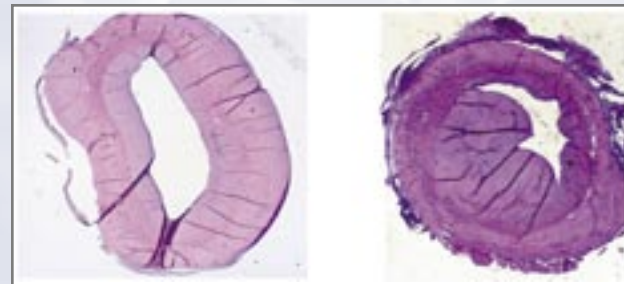
As the world recently witnessed in the case of former President Bill Clinton, heart bypass surgeries—even a quadruple bypass, as in Clinton’s case—are safely and successfully performed regularly today.

In fact, coronary artery bypass grafting (CABG)—the procedure’s formal name—is performed on an estimated 400,000 patients annually in the U.S. The life-saving therapy relieves blockages in the coronary arteries, thereby restoring blood flow and oxygen to the heart. Depending on the number of obstructed arteries, one or multiple bypasses can be woven around the constricted areas. This form of therapy is reserved for cases not well-suited for conventional, less invasive approaches, such as balloon angioplasty or coronary stenting, due to numerous blockages or the sheer severity of disease.

In Clinton’s operation, two of the bypass grafts were derived from healthy mammary, or thoracic, arteries supplying his right and left chest wall. The remaining two grafts came from a harvested segment of the greater saphenous vein, found in the lower extremity.

Engineering Stronger Vein Grafts

Although vein grafts remain an important and frequently used channel for CABG, they have limited durability. Because veins have much thinner walls than arteries, they don’t perform well when placed in the arterial circulation and subjected



to high pressure. As a result, these vein grafts grow progressively thicker—in a process known as *neointimal hyperplasia*—resulting in an eventual blockage of the vein graft itself.

For this reason, an estimated 10-15 percent of CABG patients eventually require a repeat bypass procedure, with an even higher percentage of patients requiring other interventions.

Recognition of this important clinical dilemma has led to coor-

ordinated research efforts by several Duke investigators. One key contributor to advances made in this area is Victor J. Dzau, MD, the newly appointed chancellor for health affairs at Duke University and president and CEO of the Duke University Health System. (See page 5.)

Dzau’s work pioneering gene-therapy strategies that reduce vein-graft failure have led to the ongoing PREVENT IV clinical trial of genetically modified vein grafts in heart bypass patients. This gene therapy technique involves a pressurized treatment of the vein in a solution containing short segments of DNA.

New Approach Aims for Long Term

The laboratory of Carmelo A. Milano, MD, an associate professor of cardiothoracic surgery at Duke, has also made significant strides in this area of research. A study involving a simulated model of CABG—in which vein grafts were treated with a


Figure 1. Representative cross-sections of saphenous vein grafts 90 days after CABG procedure. The photo on the right illustrates an empty virus-treated graft, while the photo on the left illustrates a genetically engineered graft.

genetically engineered virus carrying a therapeutic gene—has shown up to a 50 percent reduction in abnormal cell growth in vein grafts several months following CABG (Figure 1).

A primary limitation to current genetic vein-graft treatments is that the gene of interest is active, or expressed, for a very short time—only days or weeks. The process of vein-graft failure, however, takes place over years. Newer therapies may promote longer gene expression, which

continued

may better address the process of vein-graft failure, and Milano's laboratory is currently investigating these newer therapies in CABG models.

Although the effectiveness of these approaches must, of course, be validated in clinical trials, the collective efforts of Dzau, Milano, and other investigators worldwide offer promising solutions to the challenging problem of saphenous vein-graft failure. 

Would you like to receive secure income for life AND support Duke Heart Center?

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70	6.5%	70/70	5.9%
75	7.1%	75/75	6.3%
80	8.0%	80/80	6.9%
85	9.5%	85/85	7.9%

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New Chief Dedicated to Heart Health in Women and Athletes

After a year-long search, the Division of Cardiology has a new leader

With heart disease now positioned as the number-one killer of American women, the Duke Division of Cardiology couldn't have recruited a more well-suited leader at a better time.

Pamela S. Douglas, MD, FACC—a specialist in heart disease in women and athletes and an expert in non-invasive cardiovascular imaging—took the reins of the division in August. Douglas has conducted pioneering research using echocardiography to better understand the function and dysfunction of the left ventricle, the main pumping chamber of the heart.

Most recently the head of the University of Wisconsin section of cardiovascular medicine, Douglas replaces Department of Medicine chairman Pascal Goldschmidt, MD, who was promoted to his current position in March 2003. Thomas Ryan, MD, director of The Duke Heart Center, served as interim division chief until Douglas's arrival.

"Pam is an outstanding leader with tremendous vision, easily bridging the basic and clinical sciences and clinical practice," Goldschmidt says. "She has demonstrated success in building innovative research programs and an efficient clinical enterprise. We had the choice of some of the best possible cardiologists in the world to be the new chief at Duke—and we are very fortunate to have recruited Dr. Douglas. She was our top choice."

In addition to her role as chief of the Division of Cardiology, Douglas will serve as the director of cardiovascular research strategies for the Duke Clinical Research Institute, as well as the Ursula Geller Professor for Research in Cardiovascular Diseases.

"Cardiology at Duke has had




Pamela Douglas, MD, FACC

such a history of excellence, and very few programs can match Duke's strengths in patient care, education, and research," Douglas says. "Cardiovascular disease is the leading cause of death, and I am looking forward to working with my new Duke colleagues to better understand heart disease so we can be more successful in preventing and treating it."

Douglas earned a bachelor's degree from Princeton University and a medical degree from the Medical College of Virginia. She completed both a three-year residency in internal medicine and a three-year cardiology fellowship at the Hospital of the University of Pennsylvania.

After serving as an assistant professor of medicine at the University of Pennsylvania from 1984-90, Douglas joined the faculty of Harvard Medical School, where she spent ten years. Her service as the University of Wisconsin's cardiology head and the Dr. Herman and Ailene Tuchman Professor of Cardiovascular Medicine began in 2000.

The current president of the American Society of Echocardiography, Douglas will serve as president of the American College of Cardiology in 2005-06. She also is a national advocate for more research into women's heart disease. 

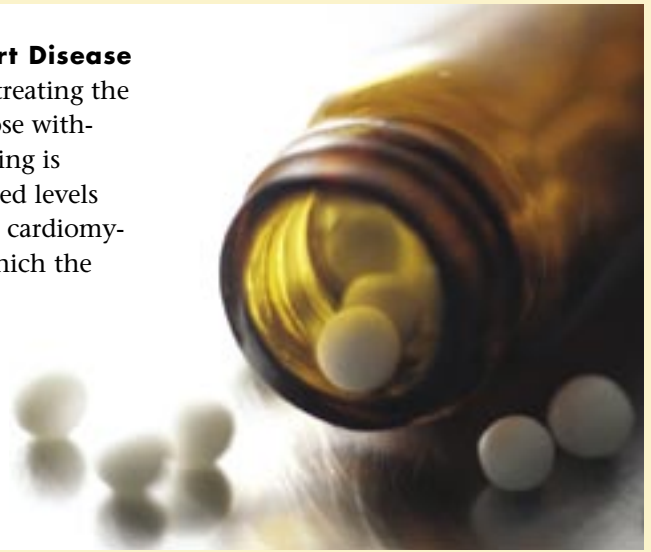
Beta-Blockers May Hold Promise for Diabetics with Heart Disease

A class of drugs known as beta-blockers are showing potential for treating the special cardiac issues faced by diabetics, say Duke researchers.

Beta-blockers have been used successfully for two decades to help treat hypertension, chest pain, and heartbeat irregularities because they slow the heart rate and lower blood pressure.

The researchers report that beta-blockers appear to reduce the body's level of a protein called G_i, which is nearly twice as high in people

with diabetes than in those without the disease. This finding is significant because elevated levels of G_i can lead to dilated cardiomyopathy, a condition in which the heart becomes unable to pump blood effectively throughout the body. Untreated, the condition often leads to congestive heart failure.



Slower Post-Bypass Rewarming Improves Outcomes

In an effort to reduce the likelihood of mental decline after cardiac bypass surgery, Duke researchers are recommending that fellow health care providers spend an extra 10 to 15 minutes rewarming the blood of patients who undergo the procedure.

Normally when the heart is stopped during bypass surgery, the blood is cooled as it passes through a heart-lung machine to protect the brain and other organs from damage. It is rewarmed near the end of the operation.

While it is unclear exactly what role temperature plays in cognitive impairment, researchers believe that when patients are rewarmed too quickly, the brain begins to need oxygen faster than the blood can supply it. By returning patients to normal temperature more slowly, physicians can reduce the potential for brain tissue damage.

While current data show that this change has been incorporated into clinical practice at DukeMed and

other medical centers, Duke cardiothoracic anesthesiologist Hilary Grocott, MD, says that slower rewarming is not yet the standard of care nationally.

Duke researchers found that patients given an additional 10 to 12 minutes to return to normal body temperature scored almost one-third better on standard tests of cognition six weeks after surgery.

New Cardiac Arrhythmia Syndrome Identified

An international team led by researchers from Duke and the Howard Hughes Medical Institute (HHMI) have discovered a previously unidentified cardiac arrhythmia syndrome, or an irregular heartbeat, that can lead to sudden death in young, seemingly healthy people.

Since discovering a specific gene mutation for the arrhythmia in a French family in 2003, the researchers have screened 664 heart patients

continued



Data Suggests Benefits of Post-Heart Attack Statin Use

Patients experiencing acute coronary syndromes should be treated aggressively and early on with LDL cholesterol-lowering drugs called statins, according to the results of an international clinical trial led by researchers from the Duke Clinical Research Institute, the University of Texas Southwestern Medical Center, and the Brigham and Women's Hospital.

The study of 4,497 patients in 41 countries was one of the first to examine the effects of administering statins to patients shortly after treatment for their heart attack symptoms.

"The results of [this] trial, as well as two previous trials, suggest that an early and aggressive use of statins can reduce the long-term incidence of heart attacks, death from heart attack, stroke, or readmission to the hospital for a cardiac event," says Duke cardiologist Michael Blazing, MD.

After two years, Blazing says, the researchers discovered that 14.4 percent of those treated early and aggressively had suffered a heart attack, stroke, or cardiovascular death—or been readmitted to a hospital—compared to 16.7 percent of patients treated more conservatively.

in the U.S. and Europe—and have identified four similar mutations in other families.

The gene in question—ankyrin-B—ensures that microscopic pores called ion channels are correctly positioned in heart muscle cells so that they can work in a coordinated fashion. Because these channels allow chemicals to pass in and out of the cells, they regulate the electrical activity—and therefore the beating—of the heart.

When this gene is mutated, the channels are not located properly in the cells, leading to abnormal heartbeats. Because the researchers believe that ankyrin-B mutations are more common than previously suspected, they suggest that all relatives of patients with sudden cardiac death undergo genetic testing.

The good news is that beta-blockers should be quite effective in controlling the irregular heartbeats, the researchers say.

“In the past, researchers have been investigating mutations in the channels themselves, and not how they are coordinated and work together as a unit,” says Duke cell biologist and HHMI investigator Vann Bennett, MD, PhD, a senior member of the research team. “If we can better understand the cellular mechanisms behind their actions, we should be able to develop promising new therapies for a variety of diseases.”

Additional information about these news briefs can be found on the DukeMed News web site, <http://dukemednews.duke.edu>

Minimally Invasive Surgery Eases Atrial Fibrillation

A new minimally invasive heart surgery can erase the damaging effects of atrial fibrillation, or A-Fib, a condition in which the heart beats quickly and erratically.

Commonly linked to high blood pressure and heart disease, A-Fib affects more than 2.2 million people in the U.S. The irregular rhythm, or arrhythmia, associated with A-Fib results from abnormal electrical impulses in the heart's upper chambers. Untreated, A-Fib can promote the formation of blood clots, increasing the risk of stroke.

The surgery, called thoroscopic ablation, uses FDA-approved microwave technology to create scars on the heart's surface through two small incisions in the chest. The scars protect the heart from the irregular impulses by “essentially disconnecting those defective electrical switches from the rest of the heart,” says Duke cardiac surgeon Sinan Simsir, MD.

The first thoroscopic ablation was performed in 2003 at the University of Massachusetts, and about 100 of the surgeries have been performed since. Simsir, who trained with the UMass surgical team, performed Duke's first thoroscopic ablation in July.

Simsir reports that the surgery has an 80 percent success rate in patients for whom medications to lower heart rate or correct arrhythmias have failed. Although patients may experience several months of sporadic, post-surgery A-Fib, no major complications have been reported.

“By curing atrial fibrillation,” Simsir says, “thoroscopic ablation surgery stands to significantly improve the quality of life for these patients.”


Implantable Defibrillators a Cost-Effective Way to Prolong Life

Sudden cardiac arrest (SCA) claims up to 450,000 American lives each year—and only five percent of those who experience it survive. According to the American Heart Association, SCA occurs six to nine times more frequently in heart failure patients than it does in the general population, and some one million people in the U.S. suffer from the potentially deadly combination of heart failure and a high risk of SCA.

The good news, according to Duke Clinical Research Institute researchers, is that implantable cardioverter-defibrillators, or ICDs, have not only proven highly effective in preventing sudden cardiac death, they're very cost-effective.

Results from the landmark Sudden Cardiac Death in Heart Failure Trial showed that ICDs reduced death by 23 percent in people with moderate heart failure and poor heart pumping

function, compared to those who did not receive defibrillators.

And new data presented at November's American Heart Association scientific sessions indicate that the cost of adding one year of life for heart failure patients with ICDs is \$33,192. (Medical therapies that add a patient year of life for \$50,000 or less are considered to be cost-effective treatments, the researchers said.) “Implantable defibrillators represent an economically attractive way to save lives in many people with moderate stable heart failure due to a damaged heart muscle,” said Duke's Daniel Mark, MD, MPH, primary investigator for the economics research. “It is highly unusual and very exciting that we have a therapy that provides such a significant impact on saving lives and does it efficiently from an economic standpoint.” 

Leading Cardiologist Takes Medical Center's Helm

As of July 1, Victor J. Dzau, MD, has succeeded Ralph Snyderman, MD, as Duke University's chancellor for health affairs and president and CEO of the Duke University Health System.

Most recently from Harvard Medical School's Brigham and Women's Hospital, Dzau (pronounced "zow," as in "how"), has authored 10 books and more than 225 articles on cardiovascular disease and related topics. His research encompasses molecular and cellular biology, genomics, and gene- and cell-based therapies—with the goal of treating heart disease at its source.

From Shanghai to Harvard, Stanford, and Duke

Born in Shanghai and raised in Hong Kong, Dzau received his bachelor's and medical degrees from Canada's McGill University. He then completed an internship at New York Hospital and served as resident and chief resident at Peter Bent Brigham Hospital (now Brigham and Women's). He held a variety of senior clinical and academic positions at the hospital and at Harvard Medical School.

In 1990, Dzau moved to Stanford University School of Medicine, where he held the William G. Irwin Professorship of Medicine and served as chief of the Division of Cardiovascular Medicine. He was later promoted to Arthur Bloomfield Professor and chair of the Department of Medicine. In 1996, he returned to Brigham and Women's Hospital, where he was the Hersey Professor of the Theory and Practice of Physic (Medicine) at Harvard Medical School, Department of Medicine chair, physician-in-chief, and director of research.

He has held a number of leadership and advisory positions with the American Heart Association, the




Victor J. Dzau, MD

National Institutes of Health, and other medical and scholarly organizations. His many honors range from election to the Institute of Medicine of the National Academy of Sciences to honorary degrees from leading universities in Argentina, Brazil, and the Republic of China.

The Best Place to be in American Medicine

Dzau's recent research includes gene therapy to prevent the organ damage commonly suffered by heart attack victims and a genetically modified coronary bypass graft that is currently being evaluated in a clinical trial.

Duke is "the best place to be in American medicine," says Dzau. He looks forward to encouraging synergy among the many different components and disciplines in the medical center and the university.

"The most important thing is to remember why we are doing what we are doing," he says. "When I was running the Department of Medicine at Harvard and people asked me what kind of physicians I hoped to produce from our training program, I said those who would contribute to society—who would give back, whether they become researchers or clinicians or senators or run a health system." 

Meet the New Chair

New Board Chair Brings Enthusiasm

As an attorney, Scott Funger, T'79, helps people on a daily basis. He brings that same mission to his new role as chair of the Duke Heart Center Advisory Board.

Funger joined the 24-member board three years ago, inspired by the infectious enthusiasm of his friend and fellow Duke alumnus, Gary Lachman, T'74. Funger's awareness about heart disease coupled with Lachman's encouragement led him to accept a new challenge. In October, Funger became chair of the board. His mission for the board is aimed at boosting the impact of Duke Heart Center, in North Carolina, nationally, and internationally.

Boosting Duke's Visibility

One of Funger's lead objectives is to increase communication with Heart Center director Tom Ryan, MD. Though this interaction, Funger will employ the board's diverse expertise to offer feedback on Heart Center endeavors and stay abreast of developments and ongoing projects. As the Duke Heart Center explores new opportunities for expansion, Funger's involvement with the center's leaders will aid him in keeping the board informed of progress.

"When the Heart Center began, it was a small entity run by busy Heart Center physicians," recalls Funger. "The board was organized in 1993 to help raise awareness and recruit financial support for research and patient care initiatives. Overall, we aid in boosting Duke's visibility as one of the nation's leading heart centers."

Funger plans to strengthen the center's reputation both nationally and internationally by tapping into the business talents of his board members. Funger credits board members such as Brandt Louie of Vancouver, British Columbia, and

continued

Meet the New Chair *continued*



“With this opportunity, I hope to make a bigger splash and greater impact by helping Duke.”

Scott Funger, T’79


Dalia Garih of Ortakoy-Istanbul, Turkey, with extending the reach of the center. For the past five years, Louie has sponsored the Vancouver Forum, which features Duke physician-scientists presenting the latest information on various medical breakthroughs. Garih’s extensive networking has helped Duke Heart Center build an international presence by bringing in new patients and philanthropic gifts.

Taking the Challenge

Philanthropy is a significant component of the board’s vision. Funger encourages the board to fulfill its fundraising ambitions to Duke by giving of their own financial resources and encouraging others to join in. During the \$2 billion *Campaign for Duke*, which ended in December

2003, 100 percent of Heart Center Board members contributed to the Medical Center’s \$600 million portion of the campaign.

The role of philanthropy is so critical that Funger has made it a personal challenge. Recently, his family made a gift of \$100,000 to establish the Funger Fellowship in Cardiology. The family also made a gift of \$50,000 for unrestricted support of the Heart Center.

“Every day, I help people on an individual basis,” says Funger. “With this opportunity, I hope to make a bigger splash and greater impact by helping Duke.” 

Pulse is published twice a year by Duke Heart Center Development. Your comments, ideas, and questions are welcome. Please contact us at: **Duke Heart Center Development** 512 S. Mangum Street Suite 400 Durham, NC 27701-3973, (919) 667-2500, and lori.osowski@duke.edu / Director of Development **Lori Osowski** / Editor **Marty Fisher** / Contributing Writers **Jeni Lytle, Emma Martin** / Photography **Duke University Photography, Duke Medical Center Photography** / Produced by the Office of Creative Services and Publications. Copyright © Duke University Health System, 2004 MCOC-3905



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