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Building a Better Bypass Graft

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Overview



CHARLES J. YEO, MD
Samuel D. Gross Professor and
Chair, Department of Surgery

I'm energized to be leading Jefferson's outstanding Department of Surgery. Moving forward, my vision includes:

- Nurturing a culture of continuous clinical excellence through team building, selected recruitments and Centers of Excellence for various clinical programs
- Increasing scholarly output, facilitated by the electronic medical records system, implementation of critical pathways and our department Web master
- Organizing a clinical research center to improve our clinical database capabilities, beginning with implementation of the American College of Surgeons' National Surgical Quality Improvement Program
- Fostering improved basic science and translational research by taking advantage of Jefferson's Center for Translational Medicine and the Kimmel Cancer Center at Jefferson, facilitated by Tom Tulenko, PhD, being named Director of our new Division of Surgical Research
- Enhancing residents' education and learning environment
- Maintaining high-quality medical student teaching and mentoring, with additional support for a surgical skills laboratory
- Creating a regional and national network to improve patient outreach, education and fundraising through collaboration with the Jefferson Foundation and regular publication of this newsletter.

Clinical integration



Dr. DiMuzio and residents Lauren Fischer, MD, and Negar Golesorkhi, MD, prepare the detergent that removes foreign cells from blood vessels donated for grafting.

Building a Better Bypass Graft

Jefferson vascular surgeon obtains three research grants.

Vascular surgeon Paul DiMuzio, MD, FACS, Assistant Professor of Surgery and Radiology, Jefferson Medical College (JMC) of Thomas Jefferson University, has been awarded grants from the National Institutes of Health (NIH), American Vascular Association and American Heart Association totaling \$975,000. These funds will further his team's research to use tissue engineering and stem cell technology to develop a novel bypass graft for patients who lack autogenous tissues for vascular procedures such as coronary and peripheral artery bypass and hemodialysis access.

"Today, the gold standard for creating these grafts is using the patient's saphenous vein or another artery," Dr. DiMuzio says. "When those are unavailable because they are diseased, too small or have been previously used for surgery, the current alternative is plastic grafts, which typically clog up quickly. Our goal is to create a new, readily available graft starting with saphenous vein taken from tissue transplantation donors."

Recipients may reject blood vessel transplants; Dr. DiMuzio, however, has developed a novel two-step process to get around this problem. First, the foreign cells

are removed from the donated blood vessels, leaving a "skeleton" of the vessel that has a much-reduced chance of rejection. Second, this skeleton is repopulated with the patient's own cells to form the new graft. Dr. DiMuzio and his team are now conducting in vitro and in vivo studies – the latter using animals – to develop methods of using the patient's own stem cells for this purpose.

"Ultimately, over the next several years, our work is designed to translate into

clinical use, primarily as a hemodialysis conduit," Dr. DiMuzio explains. "With success in this area, we hope to expand our work to cardiac, peripheral and microsurgical reconstructions."

"Our goal is to create a new, readily available graft starting with saphenous vein taken from tissue transplantation."

Dr. DiMuzio's collaborators include his JMC mentors, Thomas N. Tulenko, PhD, Professor, Department of Surgery, Biochemistry and Molecular Pharmacology, and Director, Division of Surgical Research, and Irving Shapiro, PhD, Professor of Orthopedic Surgery. In turn, he is mentoring several Jefferson residents and students assisting him.

Dr. DiMuzio received a mentored five-year/\$500,000 grant from the NIH's National Heart, Lung and Blood Institute, a five-year/\$375,000 grant from the American Vascular Association, and a two-year/\$100,000 grant from the American Heart Association, all beginning this year, concurrent with the final year of a three-year/\$150,000 grant from Pacific Vascular Research Foundation.

Please welcome



MEET OUR SURGICAL INTERNS

The staff of the Department of Surgery at Jefferson is currently assisted by an exceptional group of interns. Pictured left to right, they are:

Hamid Abdollahi, MD, Jefferson Medical College (JMC), Class of 2005; **Lisa Harris, MD**, State University of New York (SUNY) Downstate Medical Center, Brooklyn, Class of 2005; **Matthew Rosen, MD**, JMC, Class

of 2005; **Jennifer Sullivan, MD**, University of Maryland, College Park, Class of 2005; **Nikolai Bildzukewicz, MD**, JMC, Class of 2001 (followed by military service as a flight surgeon in the United States Navy); and **Daniel Lefebvre, MD**, SUNY Upstate Medical University, Syracuse, Class of 2005. We are proud to have them as an integral part of our team.