University of Pittsburgh Medical Center
Department of Ophthalmology

Louis J. Fox CENTER FOR
Vision Restoration
of UPMC and the University of Pittsburgh

THE Eye & Ear Foundation OF PITTSBURGH

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The Whole Eye Transplant – An Audacious Program

Transplanting the entire eye will present far more complex issues than more common organ or other tissue transplants. Furthermore, to succeed in all the involved facets of the operation, it will require the highest expertise across many disciplines. To that end, Dr. Joel S. Schuman, Director of the UPMC Eye Center and Chair of the Department of Ophthalmology at the University of Pittsburgh, has designed a way to resolve the inherent issues that consistently impeded progress in the past. Dr. Schuman has worked to establish a large, multi-disciplinary collaboration, combining several of the preeminent departments across the University of Pittsburgh and UPMC infrastructure with leading scientists from other world-class academic and research institutions.

Combining the expertise of the Thomas E. Starzl Transplantation Institute at the University of Pittsburgh and noted surgeons Dr. Kia Washington and Dr. Vijay Gorantla, with the experts at the Louis J. Fox Center for Vision Restoration and Department of Ophthalmology at the University of Pittsburgh (including Dr. Schuman and the Ophthalmic Imaging Research Lab led by Dr. Gadi Wollstein), Dr. Schuman established a strong framework to lead the scientific efforts. This basis soon extended outwards, building a collaboration with experts in optic nerve regeneration at Harvard University, led by Dr. Larry Benowitz, and retinal regeneration at the University of California in San Diego, led by Dr. Jeff Goldberg.

The Whole Eye Transplant collaborators (left to right): Robert W. Nickells, PhD (UW); Victor L. Perez, MD (BPEI); Angus W. Thompson, PhD, DSc (Pitt); Larry I. Benowitz, PhD (Harvard); Joel S. Schuman, MD (Pitt); Kia M. Washington, MD (Pitt); Jeffrey L. Goldberg, MD, PhD (UCSD); John E. Dowling, PhD (Harvard); Dimitri Azar, MD, MBA (UIC); Alain Chedotal, PhD (Paris); Louis J. Fox, JD (EEF); Donald J. Zack, MD, PhD (Hopkins) Not Pictured: Andrew D. Huberman, PhD (UCSD); Ben A. Barres, MD, PhD (Stanford); Vijay S. Gorantla, MD, PhD (Pitt)

At the Fox Center for Vision Restoration of UPMC and the University of Pittsburgh, we believe that setting a bold goal is critical to innovation and success in creating new and important discoveries, and to improving the care that we can offer to our patients.

The first step was the whole eye transplant in rats from genetically identical animals, eliminating the challenge of immunologic rejection. This has already been achieved by researchers at the University of Pittsburgh. Eyes that have been so transplanted can survive for at least a month with healthy appearing retinal tissue, but loss of the optic nerve. Despite the fact that the circulation to the eye has been restored, and that the optic nerve has been reconnected between the transplanted eye and the host, the neurons in the optic nerve do not grow back under normal conditions. This is a tremendous problem that we are working on with the Whole Eye Transplant team from around the world.

"This project is an audacious program," states Dr. Joel Schuman, "with very high risk and high reward scenarios. We are very excited to be spearheading it, and very honored to have been collaborating with global leaders in optic nerve regeneration."

"In some ways, the whole concept sounds crazy," Dr. Schuman continues, "but by solving one facet of the problem at a time, this may be possible." The entire project has just started to form – creating this collaborative team was an enormous first step. The next step involves bringing in the necessary funding to support the work, followed by establishing animal models and testing for preliminary results.

For more information on our research, please contact Lawton Snyder, *Executive Director*, Eye & Ear Foundation.

Research donations can be made at **eyeandear.org** or made payable to Eye & Ear Foundation.

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