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Vision Researchers Revive Donated Human Retinas Hours After Death

Method creates platform to test new drugs, takes step towards transplantation

TAMPA, FL (NOVEMBER 13, 2015) - Researchers specializing in vision science have discovered new methods to preserve human retinas from organ donors and literally bring the retinas back to life in a laboratory for hours after death.

Much like a digital camera sensor, the retina forms the back wall of the eye and transforms light into electrical signals that the brain interprets into an image of what the eye is seeing.

The discovery, made at laboratories in Tampa, could reduce the use of animals for vision research and take a big step to one day transplanting human retinas just as commonly as surgeons transplant other organs. Until now, retinas were so extraordinarily fragile and perishable that they were never candidates for functional research.

“These are human donor retinas we’re able to revive and keep functioning for eight hours or more,” said Daniel Lindgren, president of OcuScience, a company founded eight years ago to focus on eye research. “The industry of medical research will no longer be dependent on animal models, and more importantly we will be able to use living human retinas to test drugs for Age-related Macular Degeneration (AMD), and other diseases that affect millions of people.”

The sample retinas aren’t strictly “seeing” anything, Lindgren said, partly because they are not connected to the brain. Rather, the new method revives the retinas to a level where electrical sensors can measure their response to light. Lindgren draws similarities to the early days of heart transplants, when researchers fine-tuned the ability to collect, preserve, and restart human hearts for transplants.

The technology for reviving retinas originated from laboratories at Washington University-St. Louis, and OcuScience conducted research to advance the concept in cooperation with the Lions Eye Institute for Transplantation and Research (LEITR) in Tampa. This past summer, OcuScience proved the method works repeatedly in the laboratory and has filed for patents of the method.

“We foresee a compelling new reason for people to donate the gift of vision,” said Jason K. Woody, CEO and President of LEITR, which provided space for the research as well as a supply of donated tissue. “We want to encourage everyone to help advance the science of sight.”

With nearly 285 million visually impaired people worldwide, this discovery creates a brand new approach to finding a cure. Although corneal transplantation has been done for decades, and millions of people have had their sight saved, no vision restoring retinal transplantation has yet occurred.

Historically, retinal transplantation research has only focused on stem cell and fetal tissue as the source of potential grafts. Now, there will be a third avenue of adult human donor retina as the graft to a recipient in need of retinal transplantation.

In the near future, human donor retina processing and testing are essential next steps in advancing this technology. Lindgren is currently building out the infrastructure to provide these services to pharmaceutical companies and transplantation research.

The longer term goal in research, Lindgren said, will be ensuring a donor retinal graft will be “wired” into the recipient’s neural circuitry to potentially restore vision. That day may be years away, but the OcuScience method, Lindgren said, is providing a critical stepping stone forward.

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About OcuScience

Xenotec Incorporated d/b/a OcuScience® is a privately held company focused on eye research for over eight years. OcuScience develops and manufactures devices and services for discovery of new drugs, therapeutics and treatments coming forward to help cure blindness. For more information, go to www.ocu-science.com.

About Lions Eye Institute for Transplant and Research (LEITR)

LEITR is leading the worldwide fight against blinding eye disease through our unique model – uniting the world’s largest Eye Bank, our cutting-edge Ocular Research Center, and our Foundation together to create the leading institution for ocular science. For more information, go to www.lionseyeinstitute.org.