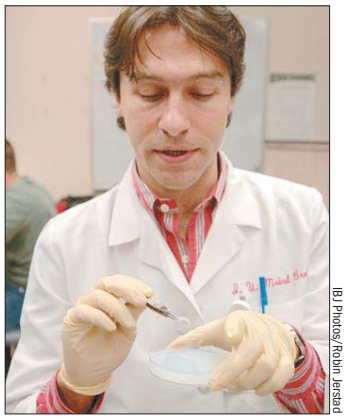

IBJ Photos/Robin Jerstad

Dr. Juan Grandin examines corneas.

Eye research could spawn biotech product

Cornea Research Foundation aims to reduce global shortage of corneal transplants

By **J.K. Wall**
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Peering into a high-powered microscope in cramped, shared lab space at Indiana University Medical Center, Dr. Juan Carlos Grandin is trying to see a solution to a worldwide problem: a shortage of corneas available for transplants.

If he's successful, Grandin's work could one day lead to a new biotech product for an Indianapolis company. Officials from Indianapolis-based EndGenitor are watching the project but currently have no stake in it.

At the very least, Grandin's work provides a bit of prestige to his sponsor, the Indianapolis-based Cornea Research Foundation of America, and its founder, Dr. Frank Price Jr. It's also another example of the whirl of life sciences activity in central Indiana.

Grandin is looking for the key cells in a tiny layer of the human cornea called the endothelium that are capable of spawning new cells.

Each person is born with a certain number of cells in their endotheliums, but since the cells don't reproduce, that number decreases with age. However, scientists have been able to get endothelium cells to reproduce in a lab.

Grandin is trying to isolate which cells drive that growth, then use them to produce lab-grown endotheliums en masse to alleviate a global shortage of corneas.

"The big dream is going to help not only the United States, but countries all over the world," Grandin said. He added, "This would be a fantastic business."

Tens of thousands of Americans who die each year donate their corneas, including the endothelium, for transplantation into patients with eye disorders. Endotheliums wear out over time due to a genetic disease called Fuchs dystrophy, or from trauma caused by cataract surgery or other eye procedures, or simply from the effects of aging.

"The big dream is going to help not only the United States, but countries all over the world. This would be a fantastic business."

Dr. Juan Carlos Grandin

But other countries' populations aren't so willing as Americans to donate body parts. So as corneal replacement surgeries have surged worldwide, the supply of corneas hasn't kept up.

Also, gradually more stringent rules enacted by the U.S. Food and Drug Administration have limited the number of American corneas OK'd for transplant operations.

Pinning down the extent of the shortage is difficult. The World Health Organization declares that the estimated 120,000 cornea transplants performed annually are not meeting demand, but it has not quantified the shortfall.

News reports from various countries show they don't have enough corneas. In May, *The Hindu* newspaper in India reported that the country's premier medical institute has 1,000 donated corneas available for 2,500 "top priority" patients—those who have gone blind in both eyes and are still young.

In Grandin's native Argentina, he said, patients wait two years to get transplants because corneas are so scarce.

In 2005, American eye banks supplied more than 44,000 corneal grafts for transplants, according the Eye Bank Association of America. But 28 percent of those went for transplants outside the United States.

Grandin gets about 10 corneas a week from eye banks. They come in glass vials full of pinkish liquid, packed in a Styrofoam box loaded with ice. Grandin uses enzymes and other processes to detach endothelium cells from the cornea. He then grows those cells in Petri dishes full of collagen.

Grandin was hired to work on this project by Price, the Indianapolis ophthalmol-

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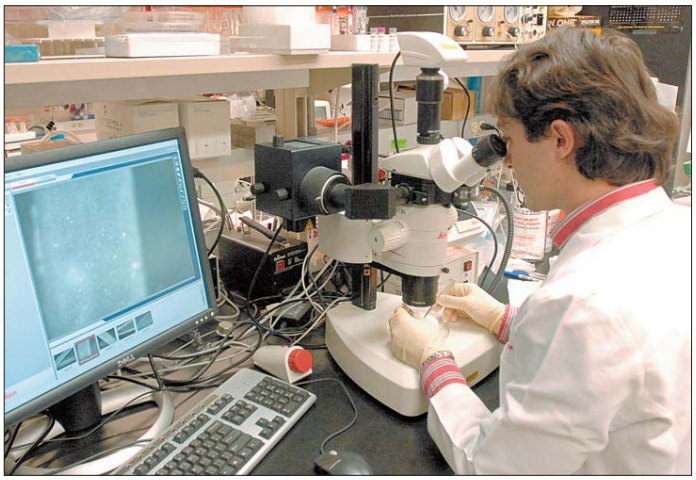

Dr. Juan Carlos Grandin examines a human cornea under a high-powered microscope at the Herman B Wells Center for Pediatric Research at the IU Medical Center.

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ogist whose Price Vision Group is well-known locally for doing laser eye surgery.

Price also does other surgeries and, in 1988, he founded the Cornea Research Foundation. It conducts research on the effects of eye surgeries and publishes the findings in medical journals. The small foundation, with assets in 2006 of $227,000, sponsors a dozen clinical studies each year.

To help it fund Grandin's work, the foundation secured a $45,000 donation from retired Indianapolis businessman Jim Butler.

"It's in its infancy now," Price said, "but we're actually trying to change how transplant surgery is done around the world."

Price has already worked to change how transplants of corneas are done. Six years ago, he traveled to the Netherlands to learn a less intrusive technique that, instead of cutting out and replacing two-thirds of a person's cornea, slipped out the endothelium and slipped in a new one.

Since then, roughly 450 doctors from around the world have traveled to Indianapolis to learn the technique from Price. Grandin was one of those doctors, making the trek in 2006.

Grandin came back to the United States on Sept. 1 to do the cornea research project. He plans to stay one year, then continue the research back in Argentina.

"It is exciting," said Grandin, as he drew diagrams of corneas on a white board in a conference room at the Herman B Wells Center for Pediatric Research, where his lab space is located. "If you wanted to be an astronaut and somebody invited you to the moon, that's what it's like."

Officials at EndGenitor agree, but they're trying not to get too excited. Commercializing new biotech products takes a minimum of six years and $10 million just to win approval from the U.S. Food and Drug Administration.

The years and dollars can also mount much higher.

"We have two other projects that are occupying all of our scientific muscle," said Carlos Lopez, co-founder and chief scientific officer of EndGenitor. The 3-year-old company has yet to commercialize either of its adult-stem-cell products, which it derives from umbilical cord blood.

So as corneal replacement surgeries have surged worldwide, the supply of corneas hasn't kept up.

But Lopez clearly has a soft spot for Grandin's and Price's cornea research. He was a patient of Price's, receiving new endotheliums because Fuchs dystrophy had worn his out.

"My hope is to take that [research] into a kind of development phase and improve upon [it]," Lopez said. Another co-founder of EndGenitor, Dr. Merv Yoder, is overseeing Grandin's work.

David Johnson, CEO of BioCrossroads Inc., which promotes life sciences developments in central Indiana, said the kind of collaboration on Grandin's cornea project is what Indiana needs to see more and more.

"It's exactly what it's all about," he said.•

Cornea Research Foundation of America Inc.

Address: 9002 N. Meridian St., Suite 212
Service: conducts research on corneal and refractive eye surgeries, publishes findings in medical journals
Founded: 1988
President: Dr. Francis W. Price Jr.
Employees: six
2005-2006 revenue: $328,000
Assets (2006): $227,000

Sources: Cornea Research Foundation, 2006 tax filing

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