Two faces of a fight against blindness

While Elaine Cain was slowly losing her vision in the Midwest, Jing Yang, MD, PhD, worked in a laboratory in Denmark, figuring out how to nurture the cells that might offer hope for an eye disease that had no treatment and assured future blindness. As it happened, both women moved to Orange County where the research of one would have a profound effect on the other.

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RESEARCH UPDATE

Jing Yang, MD, PhD

Dr. Jing Yang was seeing 50 to 100 patients a day at the eye center in China where she first worked as an ophthalmologist. With that kind of patient load, it’s no surprise that she encountered multiple patients with retinitis pigmentosa, a genetic condition that causes cells in the retina to degenerate.

Many of these patients were teenagers who would continue to lose vision until they were completely blind. “And that’s what I needed to tell them would happen over the next 20 or 30 years,” Yang said. “That encouraged me to think about whether there was any way to do something about it.”

Some 12 years later, that “something” is a clinical trial involving patients with advanced vision loss from retinitis pigmentosa. In 2015, the project received the U.S. Food and Drug Administration’s go-ahead for human clinical trials. And though the results won’t be published until next year, Yang, now a researcher at the Gavin Herbert Eye Institute and an assistant professor of ophthalmology at UC Irvine Health School of Medicine, hints that the doctors and patients are happy with the results so far.

Yang went to Denmark with an interest in stem cells. In particular, she started working with progenitor cells (destined to become retinal cells) as a safer alternative for therapeutic use. However, growing these particular cells, which have limited regenerative capacity, requires extraordinary care. “I feed them fresh medium every day,” Yang said. “I handle them very gently.” She even gives them vitamin C as an antioxidant.

At her current home, the Sue & Bill Gross Stem Cell Research Center, Yang has conducted extensive safety research trials on animals with conditions similar to retinitis pigmentosa, working alongside Henry Klassen, MD, PhD, an associate professor of ophthalmology, and also her husband. Most of the funding for the clinical trials has come from the California Institute for Regenerative Medicine (CIRM), the agency created by voter approval of Proposition 71 in 2004. Yang and Klassen founded jCyte, a company to commercialize the treatment, which sponsored the clinical trial.

“I feel that maybe this is my life’s mission,” Yang said.

Elaine Cain

When Elaine and Al Cain moved to Orange County from Michigan five years ago, their goal was to be close to family. They had no idea the move would also bring them hope for Elaine’s vision for the first time.

Elaine has been losing vision since age 32, when she was diagnosed with Usher syndrome, a congenital condition that causes both hearing loss and retinitis pigmentosa, the degeneration of retinal cells in the eye. She already had been wearing hearing aids since elementary school but had no idea she had the same ailment as her brother, Walter Szczur, diagnosed in 1952. He is now completely blind and lives with the Cains.

Elaine, now 70, first began losing peripheral vision as the rods — the cells responsible for vision in dim light — were affected, a common pattern in retinitis pigmentosa patients. Then she lost some of her color perception as the cones degenerated, until her vision became limited to a tunnel of less vibrant images.

Elaine’s brother heard from an Ann Arbor doctor about Dr. Baruch Kuppermann, MD, PhD, chief of the retina services at UC Irvine Health Gavin Herbert Eye Institute, known as one of the top-ranked retinal specialists in his field. Because he works at the institute, Kuppermann saw that Elaine might be a good candidate for the clinical trial, using retinal cells in an effort to restore some vision to patients in the late stages of this untreatable disease.

“This new approach to treatment offers the chance of really improving the quality of vision and life for people with RP, and it is exciting to be involved in this innovative project, especially since so many of the patients are noticing a difference,” Kuppermann said.
It took a couple of years of waiting before Elaine’s turn arrived. In January, hundreds of thousands of progenitor retinal cells — like stem cells, but at a later stage of development — were injected into her left eye. There was no pain, she said, and she felt no ill effects.

And there wasn’t much waiting afterward. “I was at the dentist’s office a couple of weeks later,” she recalls, “and I saw something out the side of my eye. I didn’t say anything because maybe it was my imagination and I would jinx it.” But it seems there was no denying the reality as weeks passed. She was regaining peripheral vision, which has continued to improve.

Kuppermann has told her that his other patients in the trial have seen similar results.

Al pulls out his smartphone to show off the scans of Elaine’s retina and the transplanted progenitor cells over time, as though they were a brood of growing grandchildren. To the uninitiated, it’s mostly just a dark circle, but with numerous white dots after the treatment.

“When I leave my daughter’s house at dusk, now I can find my own way to the car,” Elaine said, still a little amazed. It’s not known exactly how much of her vision will return and whether she will need more injections. But she’s eager for the clinical trial to end so that she can get an injection in her other eye, to gain a bigger perspective on her new world.

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