

OSN Supersite

The U.S. Food and Drug Administration has approved initiation of the first clinical trials using retinal cells derived from human embryonic stem cells to treat Stargardt's macular dystrophy and dry age-related macular degeneration.

Advanced Cell Technology submitted investigational new drug applications to undertake the open-label studies of retinal pigment epithelial (RPE) cells derived from stem cells, according to company news releases. The Stargardt's trial was cleared in late November, and the AMD trial was approved in early January.

"At this stage in time, Stargardt's macular dystrophy has no treatments, and although various forms of vitamin supplementation are being evaluated, there is no treatment for this disease," Edmund Mickunas, vice president of Advanced Cell Technology's regulatory division, said in an interview with *Ocular Surgery News*.

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Stargardt's macular dystrophy spurs progressive vision loss in patients between the ages of 10 and 20 years. Photoreceptor loss stemming from degeneration of the retinal pigment epithelium commonly results in blindness. A genetic defect makes photoreceptor cells susceptible to damage resulting from the loss of RPE cells.

"We are trying to delay or stop the progression of the damage to the point where the patient's photoreceptors will remain," Mr. Mickunas said.

Stargardt's macular dystrophy

The prospective, multicenter phase 1/2 clinical trial is designed to assess the safety and tolerability of RPE cells after subretinal implantation in patients with advanced Stargardt's macular dystrophy. It will include 12 patients older than 18 years of age. Advanced Cell Technology is in the process of finalizing contracts with three trial sites, which will be identified on clinicaltrials.gov.

Inclusion criteria include visual acuity of 20/320 or worse, pathology consistent with Stargardt's macular dystrophy, and tolerance to vitrectomy and subretinal injection under general anesthesia or waking sedation. Patients with HIV, cancer, hepatitis B or C, or a history of illicit drug use will not be included.

Investigators will perform optical coherence tomography, fluorescein angiography, slit lamp examination, fundus photography and electroretinography to confirm implantation of RPE cells in the intended location.

“We will be looking at patients with advanced disease,” Mr. Mickunas said. “We are looking at the safety of this particular product. So, the agency’s perspective is that you do not want to go into an eye that has good vision to begin with. There is always that risk that with a new therapy you do not know what is going to occur. You would not want to introduce this into a patient who has good vision with the risk of possibly losing that.”

Treatment involves subretinal injection of RPE cells generated from human embryonic stem cells. Patients will first undergo a partial pars plana vitrectomy.

“Then, a very small needle is introduced to puncture the retina at a certain point,” Mr. Mickunas said. “A small hole is created. Then, a cannula is introduced and a bleb is created subretinally. Once that is done, then the cells are injected into that bleb.”

Dry AMD

Advanced Cell Technology will also conduct a phase 1/2 clinical trial using RPE cells derived from human embryonic stem cells to treat dry AMD.

The prospective, multicenter, open-label study is designed to gauge the safety and tolerability of RPE cells transplanted by subretinal injection. It will also include 12 patients.

“It will be a much older population for the most part,” Mr. Mickunas said. “Age-related macular degeneration does not fall directly into that hereditary retinal disease category. This is a more typical retinal and macular degeneration that occurs in people who are 55 to 60 years old and older.”

Like the Stargardt’s macular dystrophy trial, the AMD study will focus on the ability of RPE cells to preserve photoreceptors and slow or halt the progression of macular degeneration.

“The RPE cells can, in fact, help support the health of the retinal cells,” Mr. Mickunas said. “We are hoping ultimately that we can at least retard that progression of the

disease or perhaps stop it altogether.”

The same RPE cells derived from human embryonic stem cells will be used in both clinical trials, according to a news release from Advanced Cell Technology.

Preclinical animal studies showed improved visual function with no adverse effects, the release said.

There are currently no FDA-approved treatments for dry AMD on the market. – *by Matt Hasson*

• Edmund Mickunas can be reached at Advanced Cell Technology, 33 Locke Drive, Marlborough, MA 01752; 508-756-1212; e-mail: emickunas@advancedcell.com.