

Stem cells show potential to treat a leading cause of blindness

June 4 2013, by Josh Barney

(Medical Xpress)—Stem cells derived from body fat show great potential for treating and possibly even reversing the effects of diabetic retinopathy, a complication of diabetes that threatens the vision of millions, new research at the University of Virginia School of Medicine shows.

If developed successfully, the approach could provide a much-needed alternative to current treatments, which either destroy much of the retina with a laser or require patients to receive an injection directly into their [eyeball](#) as often as monthly for the rest of their lives.

"In people with diabetes, once they have lost the [blood vessels](#) in the back of the eye, there is currently no method by which we can either regenerate those blood vessels or otherwise fix the problem," U.Va. researcher and ophthalmologist Dr. Paul Yates explained. "This [research] is a first step to demonstrate that you can use these stem cells to impact aspects of [eye disease](#) associated with diabetes."

The U.Va. research used mouse models to prove that fat-derived stem cells can differentiate into pericytes, cells that sustain the blood vessels at the back of the eye and prevent leaks. The loss of pericytes destroys these vessels and can allow nonfunctional ones to form, causing [vision problems](#) for the more than 100 million people with diabetic retinopathy and related conditions.

"Before we started, we didn't know if the stem cells were going to get

from [the injection point] back to the [retina](#), if they were going to turn into the right type of cell," said Tom Mendel, an M.D./Ph.D. student at U.Va. and the first author of the paper outlining the research results. "This paper essentially shows that these cells, when injected into the vitreous, do get back there. Not all of them, but many of them. They find their way to the vessels. They start to look and behave just like the pericytes that were already there."

As the number of people with diabetes increases, the problem of diabetic retinopathy grows too. "Now we're diagnosing people with [diabetic retinopathy](#) in their 30s and 40s and telling them they're going to have monthly injections for 30 or 40 more years," Mendel said. "It's a big patient burden."

As such, the need for better treatments is pressing. So far, the research suggests that the use of [stem cells](#) holds great promise and the potential for great cost savings.

"One of the things that's particularly exciting with these cells is that obviously they're abundant – everyone has extra fat – and they're relatively easy to harvest, plus having a liposuction has a cosmetic appeal," U.Va. researcher and study author Shayn Peirce-Cottler said. "Most importantly, you can obtain them from the same donor as you would be injecting into, so it's autologous therapy, meaning you don't need to worry about the body's immune response."

The findings have been published online by the journal *PLOS ONE*.

The U.Va. researchers note that while the approach is promising and warrants further investigation, much work must be done to determine its safety and effectiveness in people before it could become a treatment option for patients. Years of additional research may be necessary, though the researchers are moving as quickly as possible to speed the

process.

The researchers next plan to propose a phase 1 clinical trial to the federal Food and Drug Administration.

More information: [dx.plos.org/10.1371/journal.pone.0065691](https://doi.org/10.1371/journal.pone.0065691)

Provided by University of Virginia

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