Zebrafish may hold the answer to repairing damaged retinas and returning eyesight to people

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Zebrafish, the staple of genetic research, may hold the answer to repairing damaged retinas and returning eye-sight to people.

University of Alberta researchers discovered that a zebrafish's stem cells can selectively regenerate damaged photoreceptor cells.

Lead U of A researcher Ted Allison says that for some time geneticists have known that unlike humans, stem cells in zebrafish can replace damaged cells involved in many components of eyesight. Rods and cones are the most important photoreceptors. In humans, rods provide us with night vision while cones give us a full colour look at the world during the day-time.

What was not known says Allison was whether stem cells could be instructed to only replace the cones in its retina. This could have important implications for human eyesight.

"This is the first time in an animal research model that stem cells have only repaired damaged cones," said Allison. "For people with damaged eyesight repairing the cones is most important because it would restore day-time colour vision.

The researchers say that to date almost all success in regenerating photoreceptor cells has been limited to rods not cones. Most of these

previous experiments were conducted on nocturnal rodents, animals that require good night vision so they have far more rods than cones.

"This shows us that when cones die in a cone-rich retina, it is primarily cones that regenerate," said Allison. "This suggests the tissue environment provides cues to instruct stem cell how to react."

The researchers say this shows some hope for stem cell therapy that could regenerate damaged cones in people, especially in the cone-rich regions of the retina that provide daytime/colour vision.

Allison says the next step for his team is to identify the particular gene in zebrafish gene that activates repair of damaged cones.

More information: The paper was published Jan. 30 in the journal *PLOS ONE.*

Provided by University of Alberta