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BONE MARROW MAY RESTORE CELLS LOST IN VISION DISEASES

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GAINESVILLE, Fla. - University of Florida scientists conducting experiments with mice have found evidence that the body naturally replenishes small amounts of cells in the eye essential for healthy vision. The finding may shatter the belief that a cell layer vital for eyesight called the retinal pigment epithelium, or RPE, is a nonrenewable resource, say researchers writing in a recent issue of *Investigative Ophthalmology & Visual Science*.

RPE plays a vital role in our visual health by forming the outer barrier of the retina and supporting the function of cells that receive light. Damage to RPE is present in many diseases of the retina, including age-related macular degeneration, which affects more than 1.75 million people in the United States.

With evidence that the body does indeed regenerate these cells in small amounts, scientists can focus on ways to accelerate natural healing processes to treat sight-robbing injuries or diseases.

"What this tells us is for problems such as macular degeneration, we should be able to harvest stem cells to help repair the damage," said senior author Edward Scott, a professor of molecular genetics at the UF Shands Cancer Center and director of the Program in Stem Cell Biology and Regenerative Medicine at UF's College of Medicine. "The question is whether we can do it in a patient."

Scientists widely believe that RPE is a finite resource. The same belief used to be held about brain cells - people who suffered from trauma, stroke or disease formerly faced no hope of growing new cells to replace dead ones. Then, in the late 1990s, when scientists began to report findings of brain cell growth in humans and monkeys later in life, focus turned toward understanding the mechanisms to regenerate cells in the brain.

Now, UF researchers believe it may be possible to also grow new cells in the retina to replace cells lost to injury or disease. "In people, retinal pigment epithelium can become damaged with age," said Jeffrey Harris, a graduate student in the molecular cell biology program in UF's College of Medicine and first author of the paper. "Factors like smoking and diet also come into play. The problem is without these cells, the rods and cones - our primary cells for vision - die. If we can regenerate the retinal pigment epithelium, it could make a big difference in our visual health."

Scientists were able to detect that RPE cells indeed appear to be naturally replenished in the test animals by transplanting bone marrow cells from normal male mice into albino females with two different types of acute RPE injury. Bone marrow contains stem cells, which have the extraordinary abilities to home in on injuries and possibly regenerate other cell types in the body. In this case, the cells were transplanted to confirm that bone marrow does regenerate the injured RPE. It was easier to track male, pigment-producing cells in female, albino recipients, Harris said.

Chemical and microscopic analysis showed the cells that traveled to the injury site and transformed into RPE indeed had male genetic characteristics. Furthermore, these cells were capable of producing pigment - a colorful indication that the RPE could only have arisen from the donor bone marrow stem cells.

"We did not use a direct model of macular degeneration," Scott said. "But we now know that when RPE is injured, it can be replaced in certain situations. It gives us growth factors, cell pathways and other different places to look at to find reasons why the disease is occurring."

Researchers want to discover ways to mobilize an elderly patient's own cells to travel to the injury site to make repairs.

"The dogma has been that we're born with a fixed amount of RPE, but there is growing evidence retinal progenitor cells exist in the adult," said

Lawrence Rizzolo, a Yale University associate professor of anatomy and experimental surgery and of ophthalmology and visual science who was not involved in the research. "To derive cells of neuronal lineage from cells of bone-marrow lineage is significant, if the finding stands up to the test of time. Compared to RPE transplantation, there are a lot of advantages if someone's own bone marrow could supply the cells, because it's a ready source and the cells would not be rejected by the patient. Further, if bone-marrow progenitors circulating in the blood could be attracted to sites of disease, surgery could be avoided."

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EYE EXERCISES ARE OFTEN RECOMMENDED BY EYE CARE PROFESSIONALS.

1. Sit upright in your chair. Without moving your head, look as far to the left as you can and hold for one full breath. Repeat, looking far right, and then up and down. Now move your eyes diagonally, from upper right to lower left and then upper left to lower right. Repeat each diagonal move 5 times. Next, circle your eyes slowly several times as if you were following the numbers on a clock and then counterclockwise several times, keeping your head still.
 2. Hold your right or left arm out in front of you with your elbow bent and your thumb about a foot from your face. Shift your vision 5 to 10 times back and forth between your thumb and the wall behind it.
 3. Rub your palms together vigorously until they feel warm. With your fingers pointing up, gently cup your hands over your closed eyes (don't press on your eyelids.) Imagine that you're seeing black. Feel the warmth from your palms relaxing the muscles around your eyes. Hold for 1 minute.
 4. Place your hands on your lap. Sit quietly and breathe deeply for about 2 minutes, feeling your facial muscles relax.
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CONTACTING MDF

To speak to a support representative directly, you may call 1-888-633-3937. If you reach our voice mail, please speak slowly and distinctly.

ORDERING BOOKS & TAPES

When purchasing items from Amazon.com, please remember to use the MDF search box located at <http://www.eyesight.org/Books/books.html> . By simply originating your search from our website, Amazon rewards the Foundation with a small commission from each product you order. Thank you.

MAKING CONTRIBUTIONS:

Please make checks payable to Macular Degeneration Foundation, Inc., P.O. Box 531313, Henderson, Nevada 89053, or you may use your credit card on our web site <http://www.eyesight.org/Donations/donations.html> . Your contributions make our services available as a support system for macular degeneration patients in the following ways:

1. We provide toll-free lines for personal contact assistance.
2. We mail brochures and other printed materials upon request.
3. We support an award-winning web site that provides the latest up-to-date information.
4. We fund research proposal grants to provide therapies for both the wet and dry form of AMD. Contributions marked "research" are used 100% for research.

MDF was founded in 1992 by Edmund J. Aleksandrovich Ph.D (a victim of macular degeneration). It provides MD patients and their families with the information necessary to understand the disease, the latest news concerning ways to cope with the disease, and supports the efforts of researchers to find a cure.

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