

ONL Red, BrdU-po

David A. Cameron, Ph.D.

Retinal Cell Regeneration

INI

The human retina cannot regenerate cells it loses due to eye injury, macular degeneration, or other eye trauma. Retinal cells of some animals, however, are able to repair themselves and Dr. David Cameron is learning how



Winter flounder, a model system for investigating mechanisms that control retinal development and regeneration.

they do this. Understanding these reparative mechanisms in animals may help scientists to find ways to repair damaged retinas in humans.

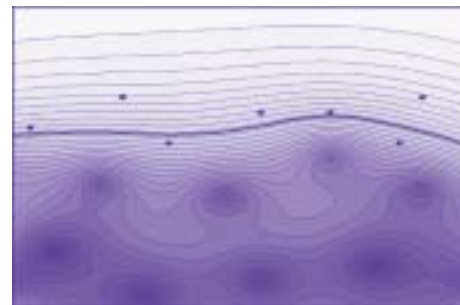


Dr. Cameron's research has been funded by the National Institutes of Health and National Science Foundation. He collaborates with researchers at Syracuse University and University of Idaho. He has also collaborated with scientists at Harvard University, University of Pennsylvania, University of Michigan, Boston University, Tufts University, and University of South Carolina.

His research is published in *Nature*, *Proceedings of the National Academy of Sciences USA*, *Journal of Neuroscience*, *Neuron*, *Journal of Comparative Neurology*, *Molecular Vision*, *Journal of Physiology*, *Visual Neuroscience*, and *Journal of Neurocytology*. He reviews grant proposals for the National Science Foundation and manuscripts for numerous journals.

Dr. Cameron received the Louis B. and Joseph B. Flexner Prize, University of Pennsylvania, and the Sokol Postdoctoral Award, University of Michigan. He is a member of the Society for Neuroscience, Association for Research in Vision and Ophthalmology, and American Association of Anatomists.

Dr. Cameron studies both regeneration and development of retinal cells. As models, he uses several types of adult fish—zebrafish, flounder, and goldfish. He is testing hypotheses for (1) what signaling mechanisms cause damaged retinal cells to regenerate, (2) what precursor cells act as sources of regenerated retinal cells, (3) what patterns of gene expression drive regeneration of certain types of retinal cells, and (4) what role thyroid hormone signaling mechanisms play in producing and specifying retinal cells during development and regeneration.



A computer model of how chemical signals may control retinal development. Signals from existing retinal cells (lower purple profiles) are detected by developing cells (purple dots) with signal intensity (horizontal lines) decreasing with distance from the existing retinal cells.

Scientists know that as retinal cells develop, grow, and regenerate, they form specific two-dimensional patterns. Dr. Cameron is studying the signaling mechanisms that control the fate of these cells in space and time as the cells are assembled in the retina. His research complements and broadens SUNY Upstate Medical University's strong program in vision and neuroscience research.

“Like other parts of the brain, the human retina cannot regenerate cells that are lost due to disease or injury.”

