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Research Interests

Our laboratory is investigating persistent and injury-induced neurogenesis in the retina of teleost fish. A hallmark of the human central nervous system is that injuries are not repaired.

Neurons lost to stroke or trauma are never replaced. In contrast, injuries to the retina of some teleost fish stimulate stem-cell based neurogenesis in the area of the wound, regeneration of the destroyed neurons and functional recovery.

Our studies indicate that neuronal regeneration in the retina of adult fish utilizes the cellular and molecular mechanisms that are present in the embryonic retina and brain; retinal regeneration recapitulates retinal ontogeny. In contrast to the mammalian retina, the retina of the adult fish remains permissive for events normally confined to the embryo. A variety of approaches are being used to study regenerative neurogenesis, from examining the cellular and synaptic anatomy of the regenerated retina to testing the function of genes that participate in the injury response and the regeneration of new neurons.

Current studies are focused on the cellular expression patterns and function of genes that encode developmental regulatory proteins, growth factors and growth factor receptors.

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