The Mystery and Magic of Glia

We are interested in the development and function of glial cells in the mammalian central nervous system. To understand the interactions between neurons and glial cells we have developed methods to highly purify and culture retinal ganglion cells (neurons) as well as the glial cell types they interact with, oligodendrocytes and astrocytes, from the rodent optic nerve. We are using a large variety of methods to address these issues including cell purification by immunopanning, tissue culture, patch clamping, immunohistochemistry and molecular biology. Currently, we are focusing on several questions:

(1) What are the cell-cell interactions that control myelination and node of Ranvier formation?

(2) Do glial cells play a role in synapse formation and function?

(3) What are the signals that promote the survival and growth of retinal ganglion cells and can we use this knowledge to promote their survival and regeneration after injury?
(4) How do protoplasmic astrocytes, the main glial cell type in gray matter, develop and what is their function?

We have found evidence of several novel glial signals that induce the onset of myelination, the clustering of axonal sodium channels, the survival and growth of retinal ganglion cells, and the formation of synapses. We are characterizing these processes and are attempting to identify these glial-derived molecules.

**Teaching**

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**GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS**

- Developmental Biology (Phd Program)
- Neurosciences (Phd Program)

**Publications**

**PUBLICATIONS**

- **Diverse Requirements for Microglial Survival, Specification, and Function Revealed by Defined-Medium Cultures** *NEURON*
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