Title of project:
Identification and characterization of a novel axon guidance receptor in the eye-specific visual projection

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Abstract:
Correct functioning of the nervous system critically depends on the formation of the precise neuronal network. In mammals with binocular vision, axons of retinal ganglion cells from the right and left eyes project to different domains of the lateral geniculate nucleus in the thalamus (Retinogeniculate projection). This eye-specific visual projection provides the anatomical basis for disparity-based stereopsis (perception of depth). However, the molecular mechanism that regulates the eye-specific visual projection is not well understood. Nell2 (neural epidermal growth factor (EGF)-like-like 2) is an extracellular glycoprotein that is predominantly expressed in the nervous system. Our lab has previously shown that Nell2 acts as an inhibitory axon guidance molecule in establishment of the eye-specific retinogeniculate projection. The current work aims to identify and functionally characterize the receptor molecule that transduces Nell2-mediated signaling in retinal ganglion cells. By using immunohistochemistry, we found that the receptor tyrosine kinase Ros1, which is known to bind to Nell2, is expressed in developing chick retinal ganglion cells, suggesting that Ros1 may act as a receptor for Nell2 in the visual projection. We are currently generating gene knock-down constructs for Ros1, which will be used in *in vitro* and *in vivo* axon guidance assays. We expect that this project will elucidate the function of Nell2-Ros1 interaction in establishment of the eye-specific retinogeniculate projection.