

A Novel Role for Collapsin Response Mediator Protein 2 (CRMP2) in the Development of the Vertebrate Visual System

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The development of a functional nervous system is dependent on neurons extending their axons to form appropriate connections with their targets. This migratory process is dependent on the growth cone of the neuron responding to repulsive and attractive signals in the environment. Repulsive guidance cues, such as Semaphorins, induce the growth cone to collapse and change direction via interaction with Plexin and/or Neuropilin receptors. Collapsin Response Mediator Proteins (CRMPs) are a family of microtubule-associated proteins that are regulated by phosphorylation through a signaling cascade initiated by Semaphorins. CRMPs have important functions in the proper positioning and lamination of cortical neurons. However, the function of CRMPs is not yet understood in laminated, non-cortical areas of the brain, such as the retina. The objective of this study is to determine the function of CRMP2 in the development of the retina and optic tract, using zebrafish as a model. We show that decreasing CRMP2 protein levels results in impaired optic tract formation and retinal lamination. These data suggest a novel role for CRMP2 in the appropriate lamination of the retina as well as the development of the optic tract.