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**SEMINAR TITLE: “GAP-43, GUIDANCE FACTORS, AND RETINAL GANGLION CELL GROWTH”**

**ABSTRACT**

Neuronal growth during development and regeneration relies on guidance factors to direct axons to their final destinations. These factors include netrin-1, semaphorins, ephrins, and slit proteins, along with their receptors DCC, plexins, eph receptors, and Robo, respectively. Intracellular palmitoylated proteins such as the growth-associated protein GAP-43 must also be present. However, neuronal regeneration in the central nervous system, including the visual system, is blocked by the presence of various myelin-derived factors, including members of the reticulon family known as Nogo. These proteins bind to the Nogo receptor (NgR)-Lingo-1 complex present on neurons. In damaged axons of the optic nerve, this interaction results in the activation of RhoA, leading to eventual retinal ganglion cell death and blindness. Results will be presented showing how these various factors act in the retinal ganglion cell line RGC-5 and N1E-115 neuroblastoma cells. Antibodies directed toward Nogo-A, Lingo-1, PlexinA2, and Robo-1 were applied to both undifferentiated and differentiated RGC-5 and N1E-115 cells. Staurosporine induces RGC-5 cells to differentiate by an undefined mechanism, while we have shown that it is lethal for N1E-115 cells. Oncomodulin has been shown to promote optic nerve regeneration. Results obtained following the treatment of cells with oncomodulin peptide, netrin-1, Sema3A, brimonidine, and norepinephrine will be presented. Results will also be presented dealing with the interactions of GAP-43 with other proteins. These results suggest that GAP-43 interacts with calmodulin but not extensively with F-actin in living N1E-115 cells.