The Effects of Varying Calcium Ion Levels on Neuronal Axon Morphology

Synaptotagmin-1 (Syt-1) is a Ca^{2+} sensor protein found on vesicles, and it is involved in the process of neurotransmitter release at the synapse. Recently, Syt-1 has been implicated in having a role in axonal branching and morphology, which is also activated by Ca^{2+}. Syt-1 might contribute to axon morphology by facilitating the formation of filopodia, projections that form from the developing axon, by responding to Ca^{2+} signals. We would predict there exists a correlation between Ca^{2+} levels and filopodia formation, resulting in increased filopodia formation as a result of increased Ca^{2+} levels and vice versa. Our laboratory has identified Lanthanum (La^{3+}) and Cadmium (Cd^{2+}) ions as Ca^{2+} channel blockers; however, Cd^{2+} was not as effective as the La^{3+}. Therefore, we will examine La^{3+} and Cd^{2+} as channel blockers in a reduced Ca^{2+} concentration medium (F12H) in order to validate their effectiveness in reducing filopodial formation in embryonic day 8 chicken forebrain neurons in culture. We will then use Ca^{2+} sensitive dyes to monitor Ca^{2+} levels in response to the channel blockers to confirm the blockage of the Ca^{2+} channels. This research is supported by a grant from Bryn Mawr College.