Axons are an integral part of a neuron responsible for transmitting electrical signals within the brain. It is important to understand the mechanisms of axon growth, including: how growth cones function and which proteins are involved in axon migration and how they co-exist with other proteins. This hierarchy of information is essential to combat certain types of cancers and neurological disorders such as Alzheimer’s disease, a common form of dementia which involves the progressive deterioration of brain cells leading to loss in cognitive abilities. We currently know of several families of proteins that play major roles in regulating axon growth and migration of developing neurons (Wright, et al, 2007). Roundabout1 (ROBO1), also a member of the immunoglobulin superfamily, plays a role in axon guidance in the developing forebrain by serving as a receptor for the guidance cue, SLIT1 (Andrews, et al, 2007). Close Homolog of L1 (CHL1), a CAM, is part of the mammalian L1 family, which is known to play a role in axon growth and migration of developing neurons (Wright, et al., 2007). Our objective in this study is to investigate a potential interaction between CHL1 and ROBO1. We hypothesize that these two proteins function together to regulate SLIT-mediated axon growth in developing neurons. The first step in our investigation involved the use of co-immunofluorescence staining to visualize CHL1 and ROBO1 colocalization. We demonstrate here that CHL1 and ROBO1 do colocalize in the intermediate zone of the cerebral cortex during axonal outgrowth (E15) and axonal targeting (E16). This colocalization suggests an interaction between these two proteins that may help promote axon growth and guidance. The results of this study demonstrate a potential cooperation between CHL1 and ROBO1 to control axon targeting. An interaction was demonstrated in vitro using co-capping experiments and co-localization was observed during the time of axonal cortical targeting (E16). Other studies (Andrews, et al, 2007 and Wright, et al, 2007) indicate a separate role for both ROBO1 and CHL1 in axon growth, thus a link between the two proteins is possible. To further investigate this interaction, the binding will be confirmed using co-immunoprecipitation. References Motohiro, N. et al. (2009) Identification of functional marker proteins in the mammalian growth cone. J. Neurosci. Research 106: 17211-17216. Wright, AG. Et al. (2007) Close Homolog of L1 and Neuropilin 1 Mediate Guidance of Thalamocortical Axons at the ventral Telencephalon. J. Neuroscience 27 (40): 13667-13679. Andrews, WD. Et al. (2007) SLIT-Robo interactions during cortical development. J. Anat. 211, pp188-198. Acknowledgements We would like to thank Marymount University’s DISCOVER program and the Clare Boothe Luce Foundation for financial support.