The sensory organs in the inner ear, the cochlea (for hearing) and vestibular organs (for balance and motion sensation), rely on special cochlear and vestibular neurons, respectively, to convey sensory information to the brain for perception. My lab is interested understanding the normal development of the inner ear neurons, specifically the genes/proteins that are important for directing their maturation.

Inner ear neurons begin as a homogenous population of progenitor cells. Over several days these progenitor cells become cochlear or vestibular neurons. I am interested in identifying the genes that direct this decision for a neuron to become cochlear or vestibular. In order for inner ear neurons to relay information to the brain they must form connections with the cochlear/vestibular sensory organs in the periphery and the brain centrally. I am interested in understanding the growth and guidance mechanisms used by inner ear neurons to reach their targets in the periphery. Techniques utilized in my lab are chicken embryo dissections, RNA isolation, Reverse Transcription PCR, Agarose Gel Electrophoresis, Cryosectioning and Immunohistochemistry (Figure 1). Our model organism the chicken embryo.

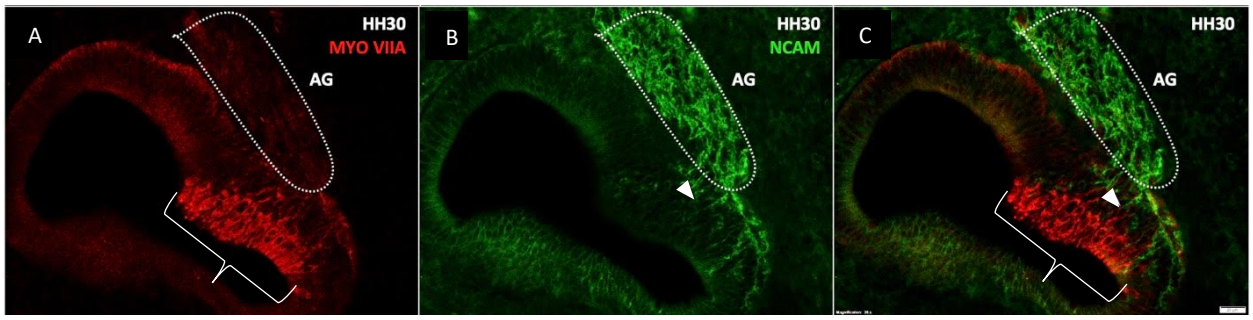

Figure 1. NCAM expression in auditory neurons in the chick at HH30 (embryonic day 7.5). Tissue cross-sections were co-labeled with Myosin VIIA Antibody (red) and Neural Cell Adhesion Molecule, NCAM, (green). A. Expression of Myosin VIIa is seen in auditory hair cells (bracket). B. Expression of NCAM is seen in the auditory ganglion (AG) and neuron projections entering the otic epithelium (arrowhead). C. Merged image showing neuron projections (arrowhead) making contact with hair cells (bracket).