**Morphology of otic and lateral line efferent neurons in zebrafish hindbrain**

The otic and lateral line efferent (OLE) neurons are sensory neurons that are stimulated by vibrations and water displacement. This allows the zebrafish to detect nearby predators, prey, and obstacles. The OLE neurons are closely associated with a subtype of motor neurons called the facial branchiomotor neurons (FBMNs). However, the OLE neurons and the FBMNs cell bodies cannot be distinguished from each other. During development, the OLE neurons and FBMNs together migrate from their birthplace in rhombomere 4 to rhombomeres 6 and 7. Previous research in chickens and mice has shown that the OLE neurons have processes that extend across the midline of the embryo. In zebrafish, a group of neurons within the population of FBMNs have been observed to extend prominent processes across the midline.

The goal of this project is to distinguish the population of OLE neurons from the FBMNs and to determine whether the contralateral processes extending from the FBMN/OLE population belong to the OLE neurons. To investigate the morphology of the OLE neurons, a lipophilic dye, Dil, was applied to the axon projections of the OLE neurons after they separated from the FBMN axons, and their cell bodies were retrogradely labeled. If contralateral processes were observed, it would suggest that the contralateral processes extending from the FBMN/OLE population belong to the OLE neurons. Dil was applied in two locations after the OLE axons branched from the FBMN axons. The first injection site was not successful in labeling the OLE neurons. In the second, cell bodies with contralateral processes were observed, but the neurons could not be definitively identified as OLE neurons due to the close proximity of the injection site to the FBMN axons. To definitively characterize OLE neuron and FBMN morphology, we will employ DNA injection or cell transplantation to generate embryos containing few, isolated GFP-expressing OLE/FBMNs. In these embryos, the precise morphology of the neuronal cell bodies and axons can be examined by anti-GFP immunohistochemistry.