**Determination of the Molecular Signaling Involved in Female Zebrafish Sex Determination**

Michelle Kossack and Bruce Draper

Zebrafish are a critical model species in the study of development and environmental health, yet the mechanisms of primary sex determination in laboratory zebrafish are still unknown. Early stage oocytes are necessary for primary female sex determination, and therefore it is hypothesized that oocytes produce a signal that acts on the somatic gonad to influence sex. In mammals, Wnt4 is a signaling ligand that is essential for female development. I have found that Wnt4a, the zebrafish orthologue of Wnt4, has similar expression patterns to mammals and is required for female sex differentiation, as homozygous mutants develop as males. Additionally, research from the Draper Lab has revealed that Cyp19a1a and Bmp15 are both critical for signaling in the female sex determination pathway. By employing functional genomics I will investigate the differential expression and target pathways of these molecules. This technique will not only validate current models of the genetic mechanisms, but it will also unveil novel genes involved in female sex determination. Fundamental understanding of the pathway involved in female zebrafish sex determination will provide invaluable insight into possible mechanisms of endocrine disruption from xenobiotic chemicals in the environment.