**Cellular and Genetic Pathways Required for Development of the Vertebrate Brain**

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Neural tube defects (NTD) are some of the most common birth defects in humans, occurring in approximately one in every thousand births. NTD are caused by a failure of the initially flat neuroepitheilum to roll or bend to form the neural tube, the precursor to the brain and spinal cord. When the anterior neural tube fails to close in humans, it results in a fatal birth defect called anencephaly. Our laboratory discovered that defects in the Nodal signaling pathway cause defects analogous to anencephaly in zebrafish embryos. We are building on this finding to identify additional genes and cellular pathways that are required for anterior neural tube closure. Most recently, we have carried out a RNA sequencing based screen that identified genes that are differentially expressed between zebrafish embryos with NTD and those without. We are now carrying out functional assays of these genes to determine if they are involved in anterior neural tube closure. Ultimately, we hope that this work will identify new genes involved in human NTD.