

## **Genomic and Developmental Studies of Early Spinal Development and Vertebral Birth Defects**

The research of the Kusumi lab is focused on studying the early development of the spine, and finding the genetic causes of vertebral birth defects. The vertebral column derives from embryonic precursors called somites, which are formed in a process regulated by molecular oscillator genes. Although we know that genes in the Notch and Wnt signaling pathway display oscillatory changes in expression that are synchronized with somite formation, the regulation of the genetic machinery of this segmentation clock is not well understood. Dr. Kusumi's lab has identified novel components of the segmentation mechanism, and they are currently studying the function of these genes in developmental studies. These novel genes will also be candidates genes for evaluation in cases of spinal birth defects.

The student will be expected to learn and apply molecular genetic and developmental techniques, including whole mount *in situ* hybridization, genotype determination by PCR, embryological imaging and micromanipulation, DNA sequencing and analysis. Alternately, the student will be expected to participate in bioinformatic and quantitative studies of molecular oscillator genes. Research or class experience in molecular biology, genetics, or developmental biology is preferred. Prior experience working with animal is also desirable. At least a one year commitment (at 10 hours/week or greater) is necessary to work on this project. Please contact Dr. Kusumi with any questions.

### **Contact:**

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