

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Mechanical Properties of Chicken Embryo Somites to Analyze Cell Migration during Somitegenesis SARIT ZHUKOVSKY, Fischell Department of Bioengineering, LISA TANEYHILL, CHYONG WU, Department of Animal and Avian Sciences, HELIM ARANDA-ESPINOZA, Fischell Department of Bioengineering — Somites develop as round segments on the sides of the neural tube and are responsible for the development of the vertebrae and other structures. Using Atomic Force Microscopy and Micropipette techniques, we were able to apply a known force to obtain data about the differences in the mechanical properties of the somites. Using contact mode in AFM, we obtained graphs that relate distance travelled by the cantilever versus deflection of the sample. We then used Matlab to analyze the data and find the material properties of the somites. We measured the Young's modulus of the anterior and posterior parts of the somites to be around 2 ± 0.8 kPa, but further data is needed to finalize our conclusion. Finding the mechanical properties of the posterior and anterior parts of the somites helped us to mimic those mechanical properties on polyacrylamide gels with different stiffness to determine the physiological functions of the somites and predict any mechanical abnormalities that might affect the migration of stem cells. By observing the major steps of migration, we were able to better understand how cell migration orchestrates embryonic morphogenesis with respect to their known mechanical properties.

Sarit Zhukovsky
Fischell Department of Bioengineering

Date submitted: 17 Nov 2012

Electronic form version 1.4