

Abstract Submitted  
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**Measuring the viscosity of embryonic epithelia *in vivo* by magnetic tweezers**<sup>1</sup> XIAOYAN MA, M. PAULA ANGARITA, MERSHARD FRIERSON, DREW SHELDON, M. SHANE HUTSON, Vanderbilt University — During early development, sheets of epithelial cells are reshaped by cellular forces. Several recent investigations in fruit fly (*Drosophila*) embryos have used laser microsurgery and video force microscopy to measure these forces; however, these measurements are actually limited to force/viscosity ratios because the effective viscosity of epithelial cells in a living embryo is largely unknown. This effective viscosity may vary spatially within the embryo and temporally as development progresses. To address this issue, we use microinjection, magnetic tweezers and confocal microscopy to measure the effective viscosity of epithelial cells in fruit fly embryos *in vivo*. We inject fluorescent magnetic beads (2- $\mu\text{m}$  diameter) into GFP-labeled embryos at the multi-nuclear syncytial blastoderm stage. The beads are pulled to embryo's surface by a permanent magnet and become engulfed by individual epithelial cells during cellularization. During later stages of development, we supply current pulses to an electromagnet to apply force pulses to the beads with a magnitude of  $\sim 100$  pN. The effective viscosity is inferred from the movement of these beads as tracked by confocal microscopy. We will report initial results on amnioserosa cells during dorsal closure.

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