

Abstract Submitted  
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**Mechanics of morphogenesis during cell sheet movements<sup>1</sup>**

GLENN EDWARDS, HENG LU, ADAM SOKOLOW, DAN KIEHART, Duke University — We have been investigating the mechanics of dorsal closure, a stage of *Drosophila* embryogenesis. Over 2-3 hours a “hole” in the dorsal surface changes its 2-D geometry from an ellipse to an eye shape, which eventually closes edge to edge. This hole initially is filled with a monolayer of amnioserosa cells, a transient tissue under tension. Beyond the dorsal hole are two flanks of epithelial tissue, also under tension, which are zipped together at each “corner of the eye.” The net result of dorsal closure is to form a continuous epithelium on the outer surface of the embryo. High-resolution, *in vivo* images of amnioserosa cells will be presented. Experimental time series of apical shape changes have been assessed with the methods of signal analysis to quantify a band of reversible oscillations and a set of ingression processes. A generalized-force model was formulated to account for changes in cross-sectional areas. High-resolution, 3-D images of dorsal closure also will be presented. The amnioserosa was observed to bulge outwards, where the asymmetric dome was analyzed with Laplace’s formula to quantify the turgor pressure. The 3-D zipping process includes substantial remodeling of tissue interfaces and significant intracellular remodeling.

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