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Volumetric Measurements of Amnioserosa Cells in Developing Drosophila DAVID MASHBURN, AROSHAN JAYASINGHE, SHANE HUTSON, Vanderbilt University — The behavior of cells in tissue in developing Drosophila melanogaster has become increasingly clearer over the past few decades, in large part due to advances in imaging techniques, genetic markers, predictive modeling, and micromanipulation (notably laser microsurgery). We now know apical contractions in amnioserosa cells are a significant factor in large scale processes like germ band retraction and dorsal closure. Also, laser microsurgery induces cellular recoil that strongly mimics a 2D elastic sheet. Still, what we know about these processes comes entirely from the apical surface where the standard fluorescent markers like cadherin are located, but many open questions exist concerning the remaining "dark" portion of cells. Does cell volume remain constant during contraction or do cells leak? Also, what shape changes do cells undergo? Do they bulge, wedge, contract prismatically, or something else? By using a marker that labels the entire membrane of amnioserosa cells (Resille, 117) and adapting our watershed segmentation routines for 4D datasets, we have been able to quantify the entire volumetric region of cells in tissue through time and compare changes in apical area and volume. Preliminary results suggest a fairly constant volume over the course of a contraction cycle.

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