File S1
Supporting Materials and Methods

**Drosophila Stocks**

*w; P(mw+, ubi-GFP.nls), sec5^1, FRT40A, en-GAL4, UAS-FLP/CyO*

*y, w, ey-FLP; P(mw+, ubi-GFP.nls), sec5^1, FRT40A/SM6-TM6b*

*w; P(mw+, ubi-RFP.nls), FRT40A*

*w; FRT40A*

**Immunohistochemistry**

Antibodies used for supplemental data were rabbit anti-cleaved Caspase3 (1:100, Cell Signaling); mouse anti-GFP (1:500, Roche). Phalloidin was used to stain the actin cytoskeleton and outline cells (1:200, Sigma). Click-iT EdU labeling kit (Invitrogen) was used to mark cells in S-phase. Incorporation and detection was performed according to manufacturer’s instructions. A 10 minute incubation in 10μM EdU was used. Images of eye and wing imaginal discs shown in Supplemental Figure 1 were captured on a Zeiss Axio Imager M1 and processed using Adobe Photoshop.

**Developmental timing**

Eggs were collected on agar grape juice plates at room temperature for 4-6 hours. After 48 hours at 18°C, 55 L1 larvae per a vial were transferred to standard fly food supplemented with fresh yeast paste. Vials were either maintained at 18°C or shifted to 30°C 7.5 dAEL for 48 hours, after which they were returned to 18°C. Pupae were counted every 10-14 hours until all animals had pupariated. Data are presented as the fraction of larvae pupariated or the time to 50% pupariated. Data points represent the average of at least 4 vials. Error bars are one STDEV.