Supplemental Data

Movie S1, Live imaging of appendage formation, related to Figure 3.

Time-lapse imaging of E-cad:GFP labeled egg chamber undergoing dorsal appendage formation. Total length of the movie is 182 minutes, with frames imaged at 2.25 minute intervals. Imaging conditions are described in the Experimental Procedures section of the main text. The 3D reconstructions shown in Figure 3A-I and Movie S2 are derived from the data represented in this movie.

Movie S2, Three-dimensional reconstruction of a nascent appendage, related to Figure 3.

A 3D reconstruction of the nascent appendage depicted in Figure 3G, showing the general procedure for image visualization in Figure 3D-I. A zoomed view of a single time frame from a movie of dorsal appendage formation (Movie S1) was divided along a single plane into two regions, indicated here in magenta and cyan. The magenta-colored region consists primarily of floor cells, while the cyan-colored region consists primarily of roof cells. The images in Figure 3D-I were all rotated and cropped along one plane in a similar manner to allow for the visualization of the floor cells without obstruction from the overlying roof cells.

Movie S3, Simulation of appendage formation, related to Figure 6.

A series of frames for a simulation of appendage formation. A peaked distribution of tension along the floor-midline boundary cable, as indicated in Figure 6A, was imposed. In this simulation, the flat primordium first buckles out of plane while the floor cells begin twisting slightly beneath the roof cells. This leads to ordered intercalation and a fully formed appendage. Since different phases of appendage formation proceed with different time-scales, the movie's sampling rate varies; note however, that during the process of ordered intercalation, the sampling rate is uniform.

In this movie, the distributions of tensions T_{fm} and T_{fr} are set at the beginning, with $T_{\text{fm}} = 1.4 + 2e^{-\phi^2/50}$ and T_{fr} = 1.4. Other parameters are as in Figure 6. The version of the model allowing for neighbor exchange is used for the entirety of this simulation. This demonstrates that parameters do not need to be varied in time to achieve appendage formation in our model. The results do not appear to be sensitive to the time dependence of the parameters, since when this model was alternatively implemented such that T_{fm} and T_{fr} were ramped up slowly from 1, the flat sheet was transformed into a tube in a nearly identical way. This simulation was also performed either with the pressure term described in the Methods, or without the pressure term (as in the movie here); the two methods yield very similar results. Note that the white spaces that appear are a result of Mathematica's visualization process, and do not represent gaps in the sheet.