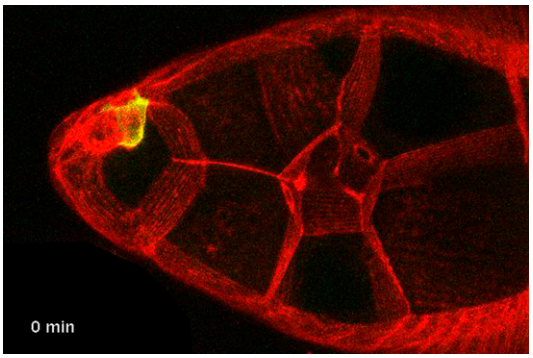
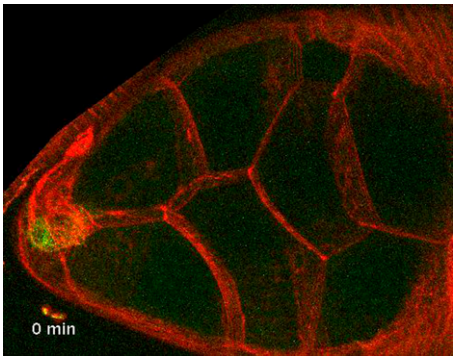
Supporting Information

Inaki et al. 10.1073/pnas.1115260109



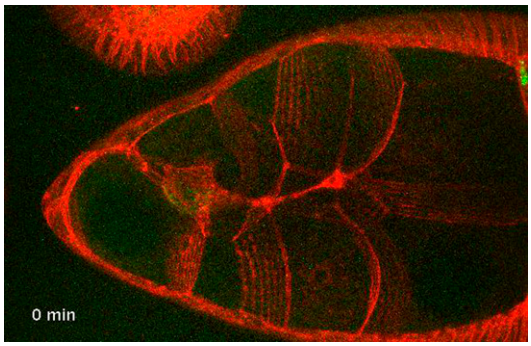
Movie S1. Stack of confocal sections derived from live recordings of stage 9 egg chambers from females of the genotype *Pvf1*^{1624}*, hs-FLP/ Pvf1*^{1624}*; slbo-flipout-EGFR-RNAi/+; c522 (Gal4), FRT82, tub-Gal80/FRT82, UAS-PVR-GFP* in which one cell of the border cell cluster expresses PVR–GFP (green). All cells are outlined with the membrane-dye FM4-64 (red); anterior is to the *Left* and the oocyte to the *Right*. Timestamp is in minutes and scale bar is in Fig. 1. The still image shown in Fig. 1*E* is derived from Movie S1.

Movie S1



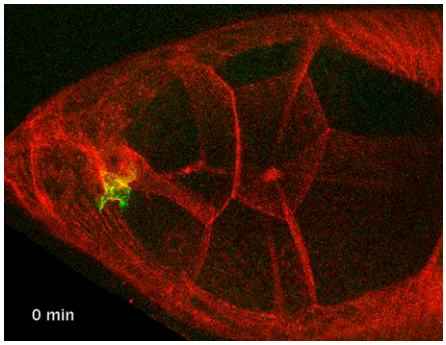
Movie S2. Stack of confocal sections derived from live recordings of stage 9 egg chambers from females of the genotype *Pvf1*^{1624}*, hs-FLP/ Pvf1*^{1624}*; slbo-flipout-EGFR-RNAi/+; c522 (Gal4), FRT82, tub-Gal80/FRT82, UAS-PVR-GFP* in which one cell of the border cell cluster expresses PVR–GFP (green). All cells are outlined with the membrane-dye FM4-64 (red); anterior is to the *Left* and the oocyte to the *Right*. Timestamp is in minutes and scale bar is in Fig. 1. The still image shown in Fig. 1*E* is derived from Movie S2.

Movie S2



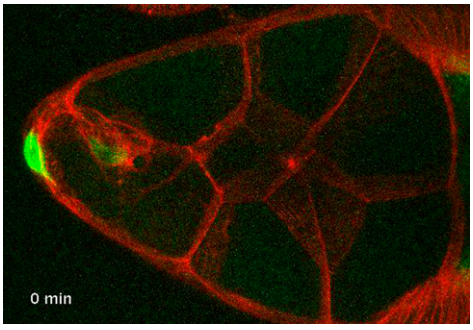
Movie S3. Stack of confocal sections derived from live recordings of stage 9 egg chambers from females of the genotype *Pvf1*^{1624}*, hs-FLP/ Pvf1*^{1624}*; slbo-flipout-EGFR-RNAi/+; c522 (Gal4), FRT82, tub-Gal80/FRT82, UAS-PVR-GFP* in which one cell of the border cell cluster expresses PVR–GFP (green). All cells are outlined with the membrane-dye FM4-64 (red); anterior is to the *Left* and the oocyte to the *Right*. Timestamp is in minutes and scale bar is in Fig. 1. In this example, the border cell cluster is fully inside the egg chamber and forward versus backward movement can be quantified properly.

Movie S3



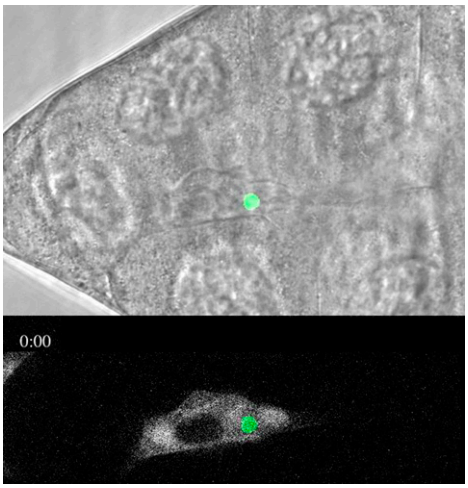
Movie S4. Stack of confocal sections derived from live recordings of stage 9 egg chambers from females of the genotype *Pvf1*^{1624}*, hs-FLP/ Pvf1*^{1624}*; slbo-flipout-EGFR-RNAi/+; c522 (Gal4), FRT82, tub-Gal80/FRT82, UAS-PVR-GFP* in which one cell of the border cell cluster expresses PVR–GFP (green). All cells are outlined with the membrane-dye FM4-64 (red); anterior is to the *Left* and the oocyte to the *Right*. Timestamp is in minutes and scale bar is in Fig. 1. The still image shown in Fig. 1*H* is derived from Movie and S4.

Movie S4



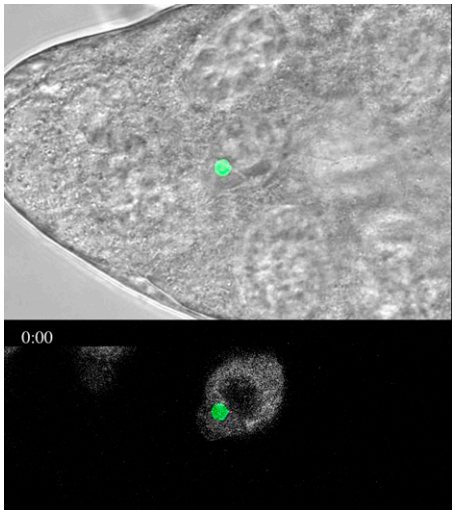
Movie S5. Stack of confocal sections derived from a live recording of a stage 9 egg chamber, genotype *Pvf1*^{1624}*, hs-FLP/ Pvf1*^{1624}*; slbo-flipout-EGFR-RNAi/+; c522 (Gal4), FRT82, tub-Gal80/FRT82, UAS-hE-PVR-GFP,* in which one cell of the border cell cluster expresses hE-PVR-GFP (green). The border cell cluster is inside the egg chamber; the very bright GFP cell on the *Left* is not part of the cluster. All cells are outlined with the membrane-dye FM4-64 (red); anterior is to the *Left* and the oocyte to the *Right*. Timestamp is in minutes and scale bar is in the still images from this movie shown in Fig. 2*G*.

Movie S5



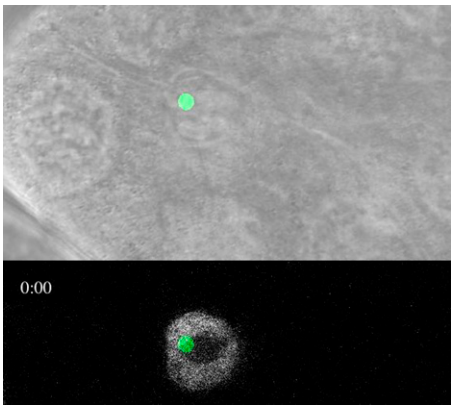
Movies S6. Single confocal sections from live recordings of stage 9 egg chambers from females of the genotype *UAS-mCherry-PA-RacQ61L/+; slbo-Gal4/+*; (*Top*) transmission channel and (*Bottom*) red fluorescence channel of the central area, both overlayed with the ROI used for photoactivation false colored in green. Timestamp is in minutes and scale bar is in the still images shown in Fig. 3*C*. Photoactivation is done in the middle of the front cell and movement looks normal.

Movie S6



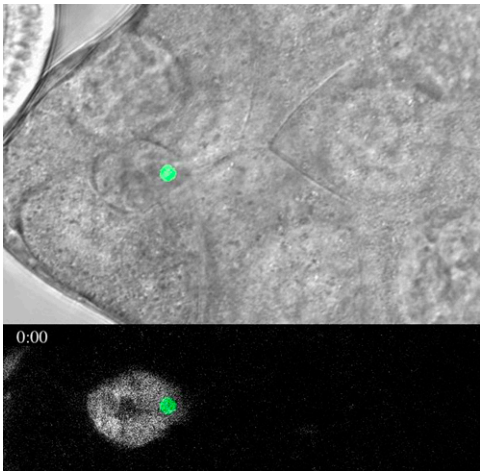
Movies S7. Single confocal sections from live recordings of stage 9 egg chambers from females of the genotype *UAS-mCherry-PA-RacQ61L/+; slbo-Gal4/+*; (*Top*) transmission channel and (*Bottom*) red fluorescence channel of the central area, both overlayed with the ROI used for photoactivation false colored in green. Timestamp is in minutes and scale bar is in the still images shown in Fig. 3C. Photoactivation is done in the middle of a back/side cell and this cell finds its way backward between two nurse cells, "pulling" the cluster (three time points shown in Fig. 3*C*).

Movie S7



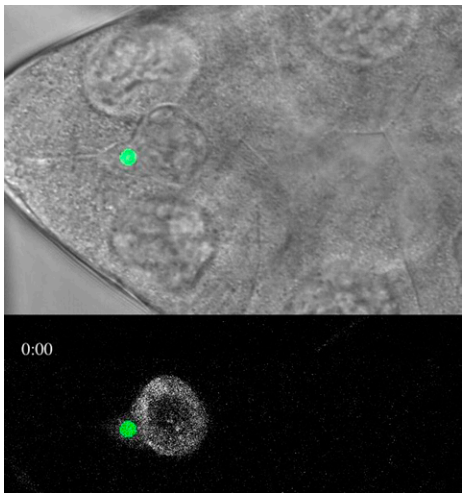
Movies S8. Single confocal sections from live recordings of stage 9 egg chambers from females of the genotype *UAS-mCherry-PA-RacQ61L/+; slbo-Gal4/+*; (*Top*) transmission channel and (*Bottom*) red fluorescence channel of the central area, both overlayed with the ROI used for photoactivation false colored in green. Timestamp is in minutes and scale bar is in the still images shown in Fig. 3*C*. Photoactivation is done in the inner part of a back cell (away from the leading edge of this cell). This cell still manages to counteract the normal forward movement of the cluster and force it to move slightly backward instead.

Movie S8



Movies S9. Single confocal sections from live recordings of late stage 9 egg chambers from females of the genotype *UAS-mCherry-PA-RacQ61L/UAS-DN-PVR, UAS-DN-EGFR; slbo-Gal4/+*. (*Upper*) Transmission channel. (*Lower*) Red fluorescence channel of the central area. Both are overlayed with the ROI used for photoactivation false-colored in green. Timestamp is in minutes and scale bar is in the still images shown in Fig. 3*C*. Without photoactivation, the clusters will show disorganized, tumbling movement. Photoactivation is done in the middle of the front cell, inducing cluster movement toward the oocyte.

Movie S9



Movies S10. Single confocal sections from live recordings of late stage 9 egg chambers from females of the genotype *UAS-mCherry-PA-RacQ61L/UAS-DN-PVR, UAS-DN-EGFR; slbo-Gal4/+*. (*Upper*) Transmission channel. (*Lower*) Red fluorescence channel of the central area. Both are overlayed with the ROI used for photoactivation false-colored in green. Timestamp is in minutes and scale bar is in the still images shown in Fig. 3*C*. Without photoactivation, the clusters will show disorganized, tumbling movement. Photoactivation is done in the middle of the back cell and this and the cluster moves "backward," away from the oocyte.

Movie S10