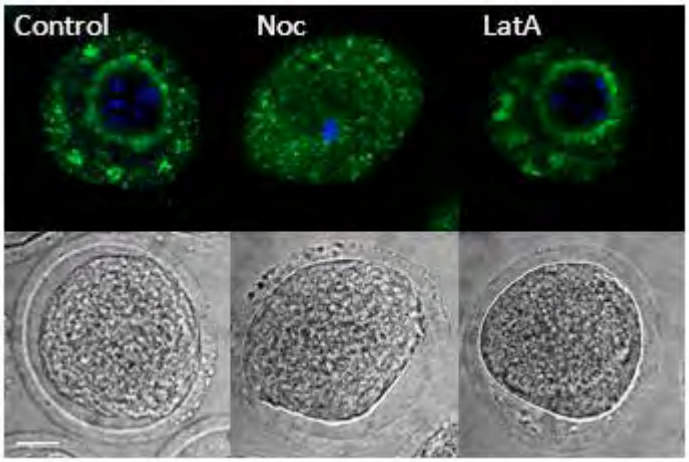


Fig. S1. Mitochondrial accumulation around the spindle is disrupted by nocodazole but not latrunculin A. GV oocytes were released from meiotic arrest and transferred into media containing either vehicle control (Con), 10 μM nocodazole (Noc) or 6 μM latrunculin A (LatA), and matured for 6 hours prior to fixing and staining for mitochondria (green) and DNA (blue). LatA-treated oocytes (n=13) displayed a mitochondrial distribution indistinguishable from that of control oocytes (n=32) whereas nocodazole-treated oocytes failed to display the characteristic mitochondrial ring (n=23).

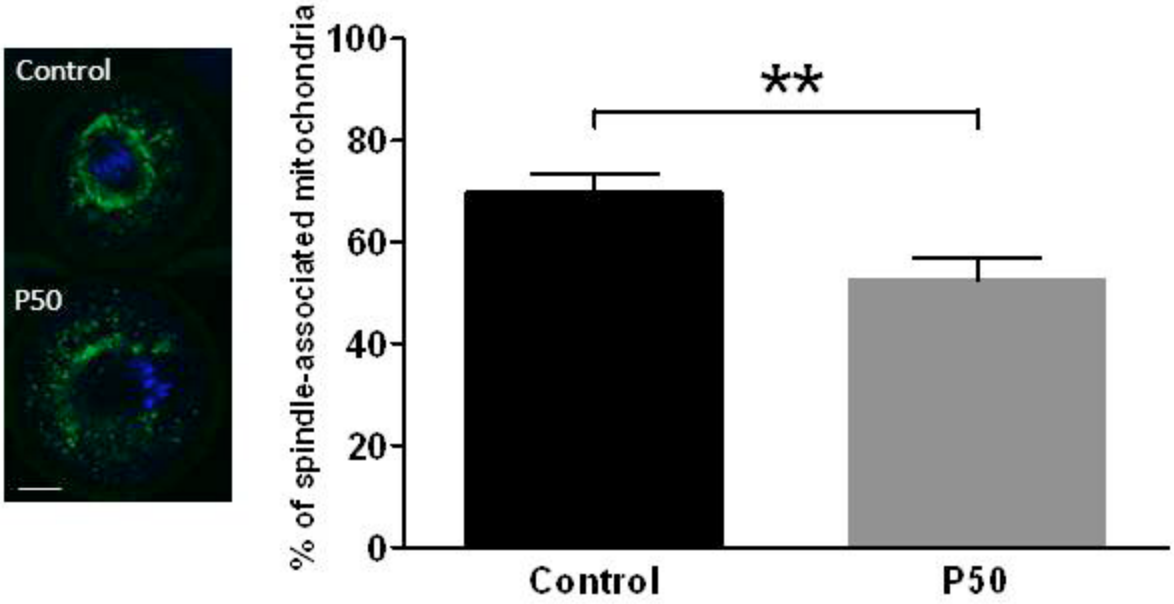
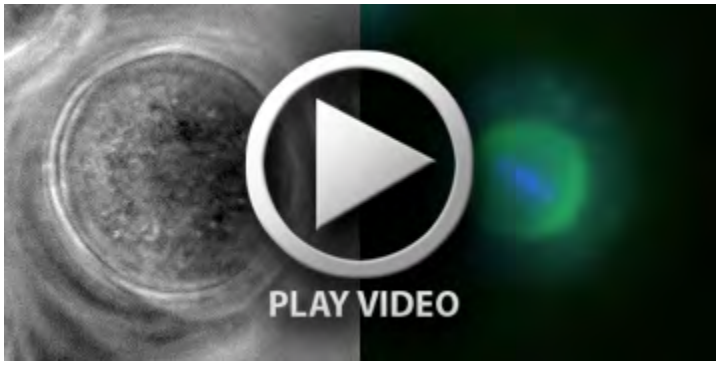


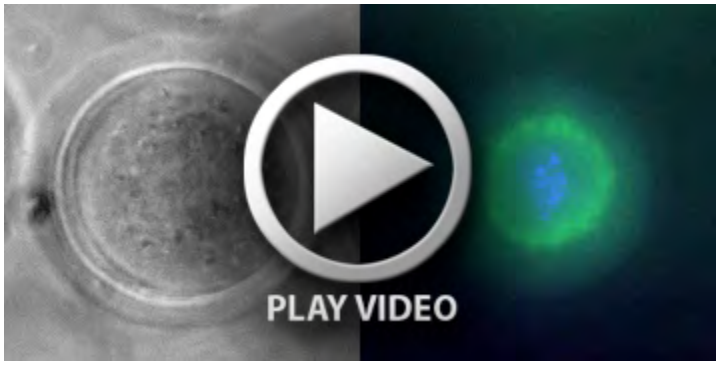
Fig. S2. Mitochondrial accumulation around the spindle is disrupted by overexpression of p50. Oocytes were microinjected with either p50-EGFP (n=15) or vehicle control (=19) and incubated overnight at GV stage to allow overexpression. Oocytes were subsequently released and fixed at 6 hours and stained for mitochondria (green). Oocytes in which dynein activity was inhibited by overexpression of p50 had reduced accumulation of mitochondria around the spindle ($P<0.01$).

Movie 1. Mitochondria are associated with presumed MTOCs during oocyte maturation. Live time-lapse imaging of mitochondria (green) shows their association with presumed MTOCs (see also Fig. S2), which move towards and join the spindle associated mitochondrial ring during oocyte maturation.

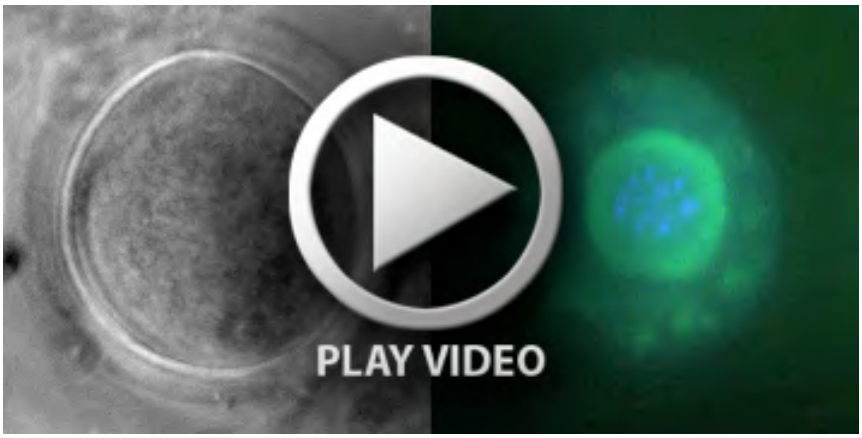


Movie 2. Mitochondria are retained in the oocyte during polar body extrusion. Live time-lapse imaging of mitochondria (green) and DNA (blue) shows that mitochondria distribute asymmetrically during polar body extrusion.

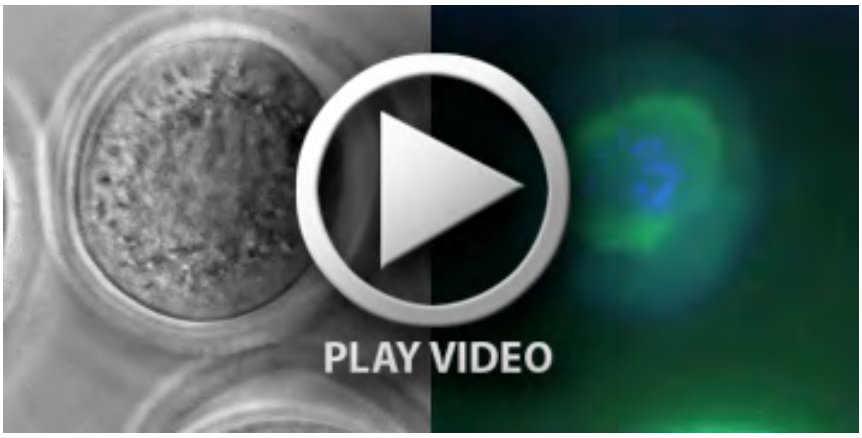
Movie 3. ER is retained in the oocyte during polar body extrusion. Live time-lapse imaging of ER (red) and DNA (blue) shows that mitochondria distribute asymmetrically during polar body extrusion. The oil droplet from DiI microinjection is visible in the brightfield images



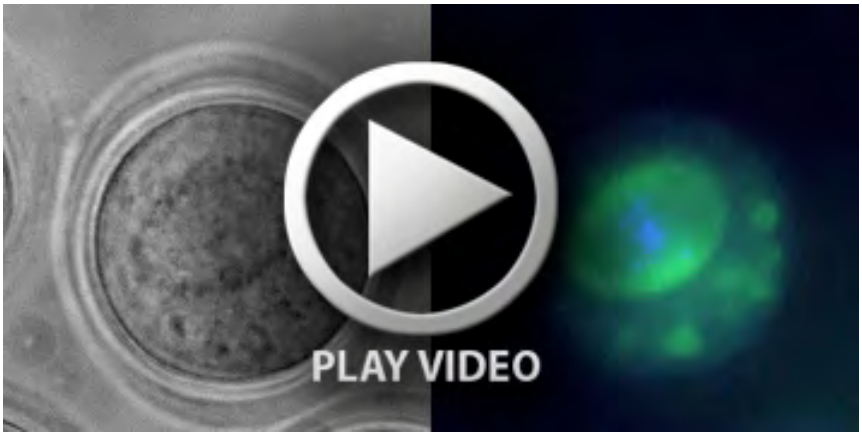
Movie 4. Asymmetry does not develop in the presence of LatA. Live time-lapse imaging of mitochondria (green) and DNA (blue) shows that mitochondria remain symmetrically distributed when spindle migration is prevented with 6 μM LatA.



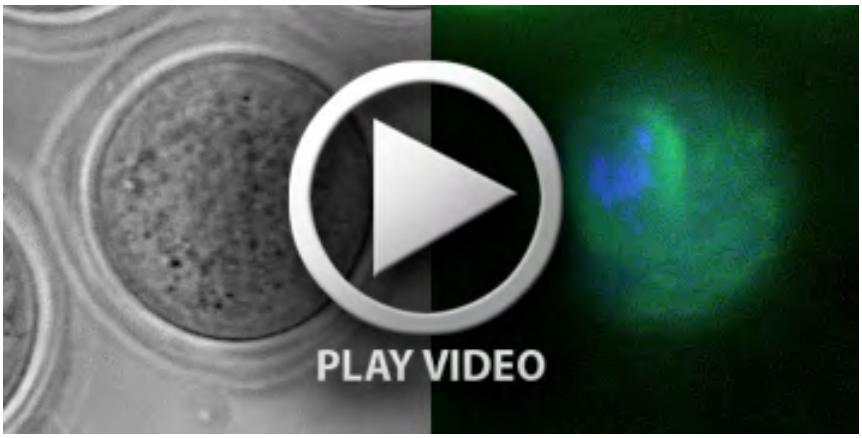
Movie 5. Asymmetry does not develop in the presence of CK-666. Live time-lapse imaging of mitochondria (green) and DNA (blue) shows that mitochondria remain symmetrically distributed when spindle migration is prevented with 100 μM CK-666.



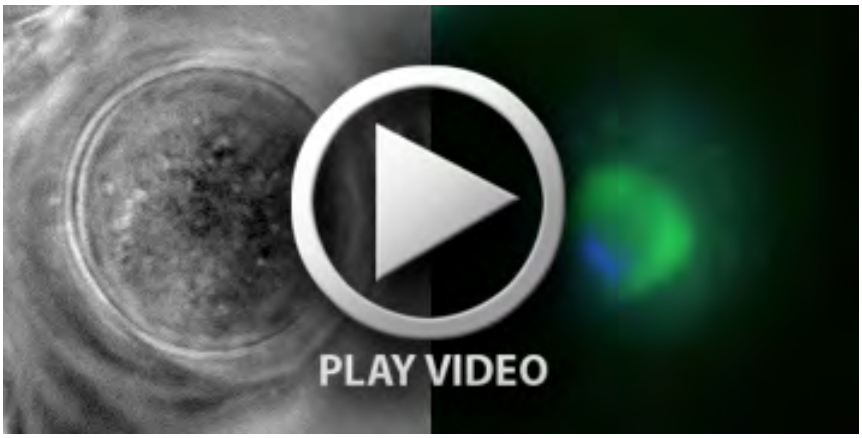
Movie 6. Asymmetry does not develop in the presence of BFA. Live time-lapse imaging of mitochondria (green) and DNA (blue) shows that mitochondria remain symmetrically distributed when spindle migration is prevented with 5 μM BFA.



Movie 7. Asymmetry does not develop in the presence of MG132. Live time-lapse imaging of mitochondria (green) and DNA (blue) shows that mitochondria remain symmetrically distributed when the cell cycle is arrested at metaphase with 50 μM MG132.



Movie 8. Mitochondrial asymmetry can be restored by MG132 washout. Live time-lapse imaging of mitochondria (green) and DNA (blue) shows that wash out of MG132 allows the cell cycle to resume and mitochondrial asymmetry initiates at anaphase as in control oocytes.



Movie 9. Mitochondria accumulate around the second meiotic spindle. Live time-lapse imaging of mitochondria (green) and DNA (blue) shows that mitochondria accumulate around the forming second meiotic spindle after extrusion of the first polar body.