

Supplementary Material

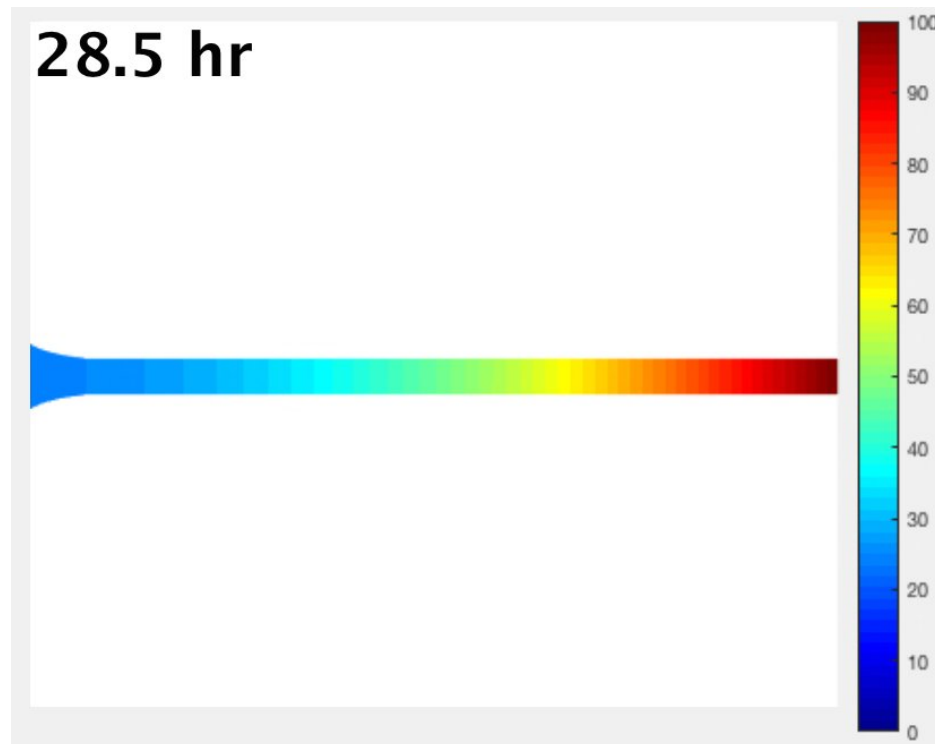
Contact guidance is cell cycle-dependent

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Supplementary Movies

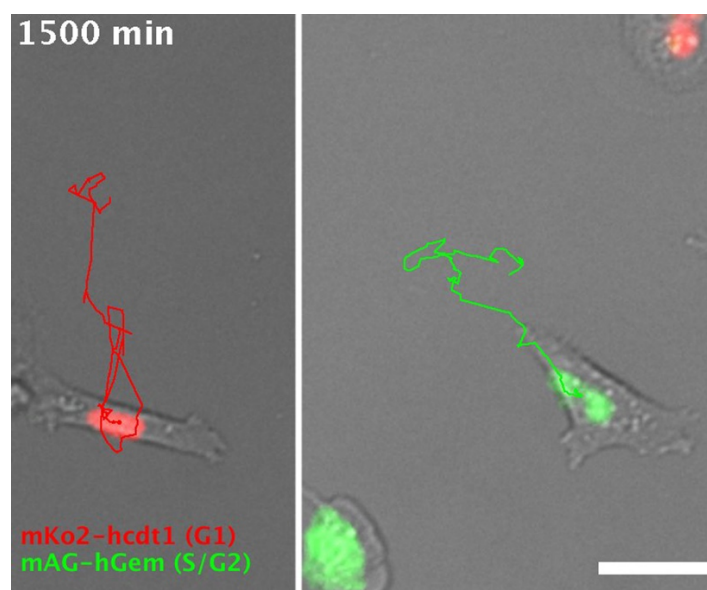
Movie S1. Mathematical simulation of EGF diffusion within the microchannels.

The results of the mathematical simulation of the formation and dynamics of EGF non-linear gradient within the microchannels is shown. Colors correspond to the EGF concentration indicated in the legend. Time between frames is 1.5 hours.



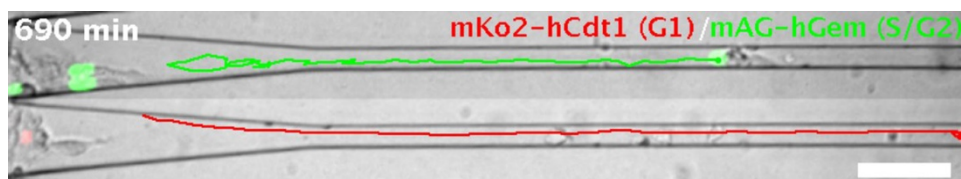
Movie S2. FUCCI-MDA-MB-231 cells migration on 2D gelatin.

Time lapse of two representative FUCCI-MDA-MB-231 cells in G1 phase (left, red nucleus) and S/G2 phase (right, green nucleus) of the cell cycle. Corresponding centroid tracks are shown in red and green. Time between frames is 10 minutes. Scale bar is 50 μm .



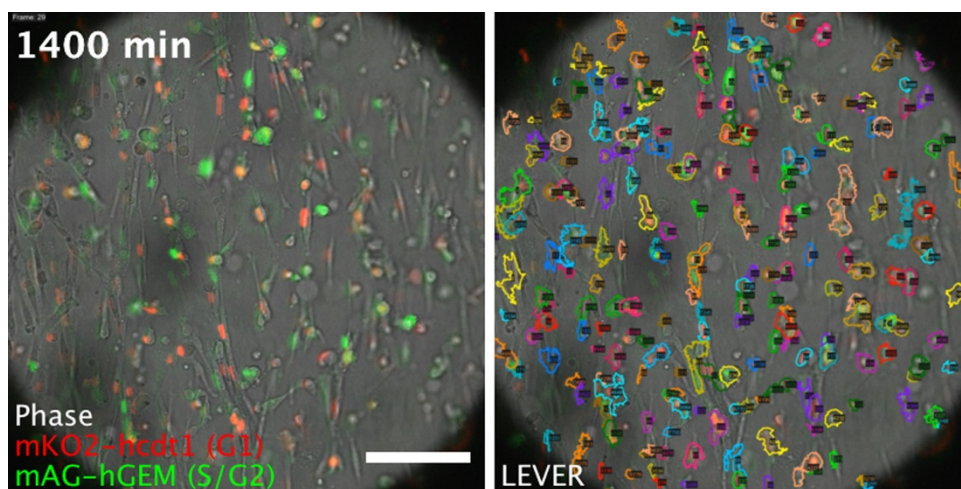
Movie S3. FUCCI-MDA-MB-231 cells migration inside the microchannels.

Time lapse of two representative FUCCI-MDA-MB-231 cells in G1 phase (bottom, red nucleus) and S/G2 phase (top, green nucleus) of the cell cycle migrating inside microchannels. Centroid tracking is shown in red and green. Time between frames is 10 minutes. Scale bar is 50 μm .



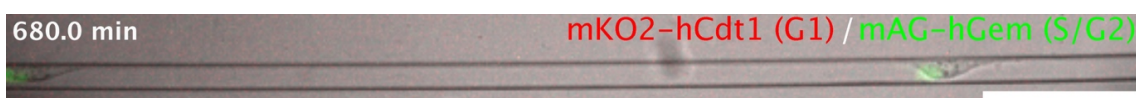
Movie S4. Computational image segmentation and tracking performed by LEVER

The movie is a merged view of mKO2-hcdt1 (red, nucleus marker of G1 phase), mAG-hGEM (green, nucleus marker of S/G2 phase) and phase channels. Left panel depicts a time lapse movie of FUCCI-MDA-MB-231 cells migrating inside vertically aligned fibers of 3D collagen. Right panel demonstrates results of cell segmentation via LEVER. Time between frames is 10 minutes.



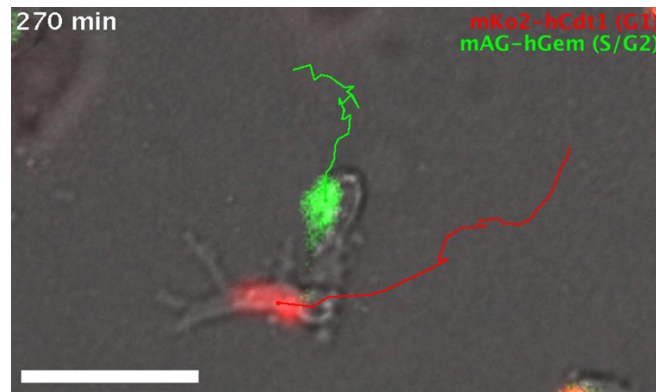
Movie S5. Monitoring FUCCI-MDA-MB-231 cells while transitioning from G1 to S/G2 phases of the cell cycle

Time lapse of a representative FUCCI-MDA-MB-231 cell transitioning from G1 phase (red nucleus) to S/G2 phase (green nucleus) of the cell cycle while migrating inside a 10 μm -wide microchannel. Time between frames is 10 minutes. Scale bar is 50 μm .



Movie S6. FUCCI-MDA-MB-231 cells migration in 3D collagen with random fiber orientation

Time lapse of representative FUCCI-MDA-MB-231 cells in G1 (red) and S/G2 (green) phase of the cell cycle, migrating in the 3D collagen with random fiber orientation. Corresponding centroid tracks are shown in red and green. Time between frame 10 minutes. Scale bar is 50 μ m.



Movie S7. FUCCI-MDA-MB-231 cells migration in 3D collagen with aligned fibers

Time lapse of representative FUCCI-MDA-MB-231 cells in G1 (red, left) and S/G2 (green, middle) phase migrating in vertically aligned 3D collagen fibers. Right panel is a merged view of red (mKO2-hCdt1), green (mAG-hGEM) and phase channels overlaid with corresponding centroid tracks. Time between frame 10 minutes. Scale bar is 50 μ m.

