Supporting Information

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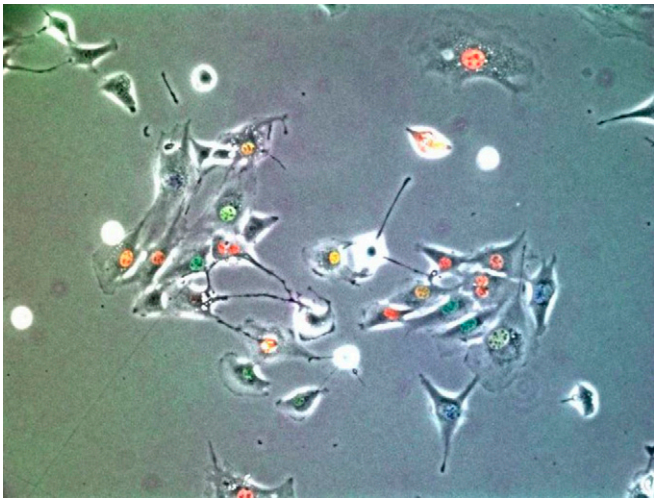
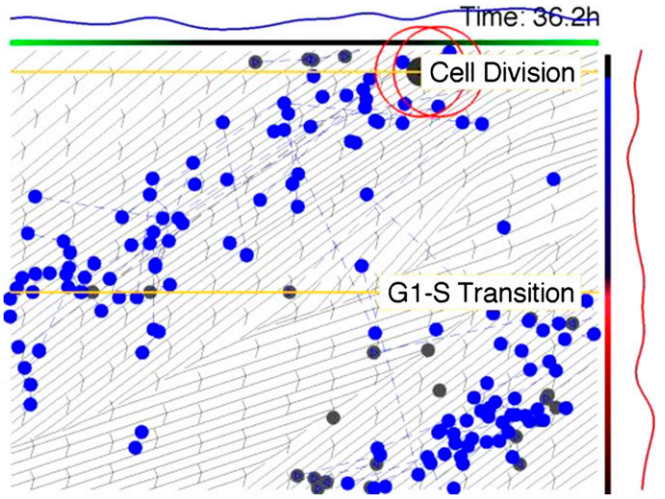


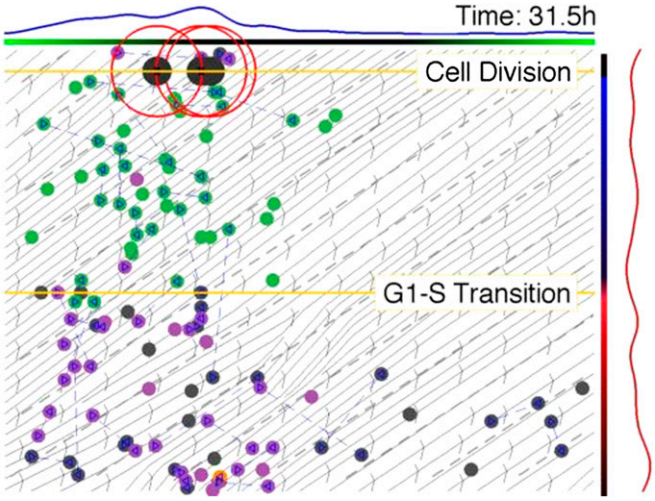
Movie S1. Dividing cells cultured in 15% FBS. We overlay the brightfield image with the three channels for the nuclear markers (red, Cdt1:mKO2/G1 phase; blue, Geminin:E2Crimson/S–G2–M phases; and green, Reverba:Venus/Clock). We can see many cells start transparent or green (corresponding to low/high levels of the clock marker) then turn red during the G1 phase. Many cells will in fact turn yellow (i.e., a mixture of red and green), indicating that the clock marker is at a high level during the G1–S transition. Around the G1–S transition, the red marker drops to near zero, and the blue marker starts rising, reaching its maximum level (making blue or cyan nuclei) just before cell division.

Movie S1



Movie S2. Temporal progression of clock and cell-cycle phases for unstimulated cells in 15% FBS. We show the clock phase on the horizontal axis, illustrated by a green and black bar on the top that shows the relative clock marker level (high on the sides, low in the middle). The vertical axis shows the progression of the cell cycle. The colored bar on the right-hand side illustrates the relative levels of the cell cycle markers (black to red in G1, and red to blue in S–G2–M). We also mark the G1–S transition and cell division as horizontal yellow lines. Cells are drawn as blue dots (turning gray once they become confluent) that move from the bottom to the top as they progress through the cell cycle, and from the left to the right according to their clock phase (in this diagram measured as the normalized time between two clock peaks). In the background, we show an estimated vector field that indicates the mean direction cells are taking at each point in this phase space. On the sides, we show density estimates for the fraction of cells in each phase. We see that most cells follow a main stream through the middle of the image, crossing the G1–S transition and cell-division lines at a distinct mean clock phase each. Moreover, we observe that some cells skip: They leave the main stream of cells because they progress through the cell cycle phase at a slower speed and rejoin the other cells once they arrive at the main trajectory again. Note that we connect sibling cells by a dashed line when possible.

Movie S2



Movie S3. Temporal progression of clock and cell-cycle phases for dexamethasone-stimulated cells in 10% FBS. This movie is similar to Movie S2; however, we now color the cells according to their division time. The density histogram on the top shows that cells most cluster around similar clock phases owing to the dexamethasone synchronization. Also, there is no main stream of cells anymore like in SM2. Rather, cells go through cell division in groups at a wider range of clock phases than in the unstimulated case. Toward the end of the movie, most cells become confluent.

Movie S3

Other Supporting Information Files

SI Appendix (PDF)