

Son et al., <http://www.jcb.org/cgi/content/full/jcb.201505058/DC1>

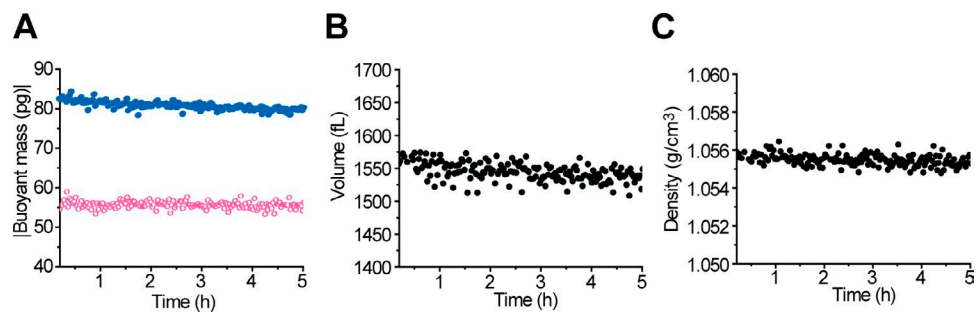


Figure S1. **Measurement error of the buoyant mass, volume, and density.** (A) Buoyant mass of a nongrowing cell is measured in two different fluids for 5 h (blue circle, buoyant mass measured in the normal medium; magenta circle, buoyant mass measured in the dense medium). Root mean square error is 0.67 pg (0.82%, blue) and 0.85 pg (1.52%, magenta). (B and C) Volume and density are computed based on the buoyant mass pairs shown in a. Root mean square error is 12.2 fl (0.78%) for volume and 0.00029 g/cm<sup>3</sup> (0.028%) for density.

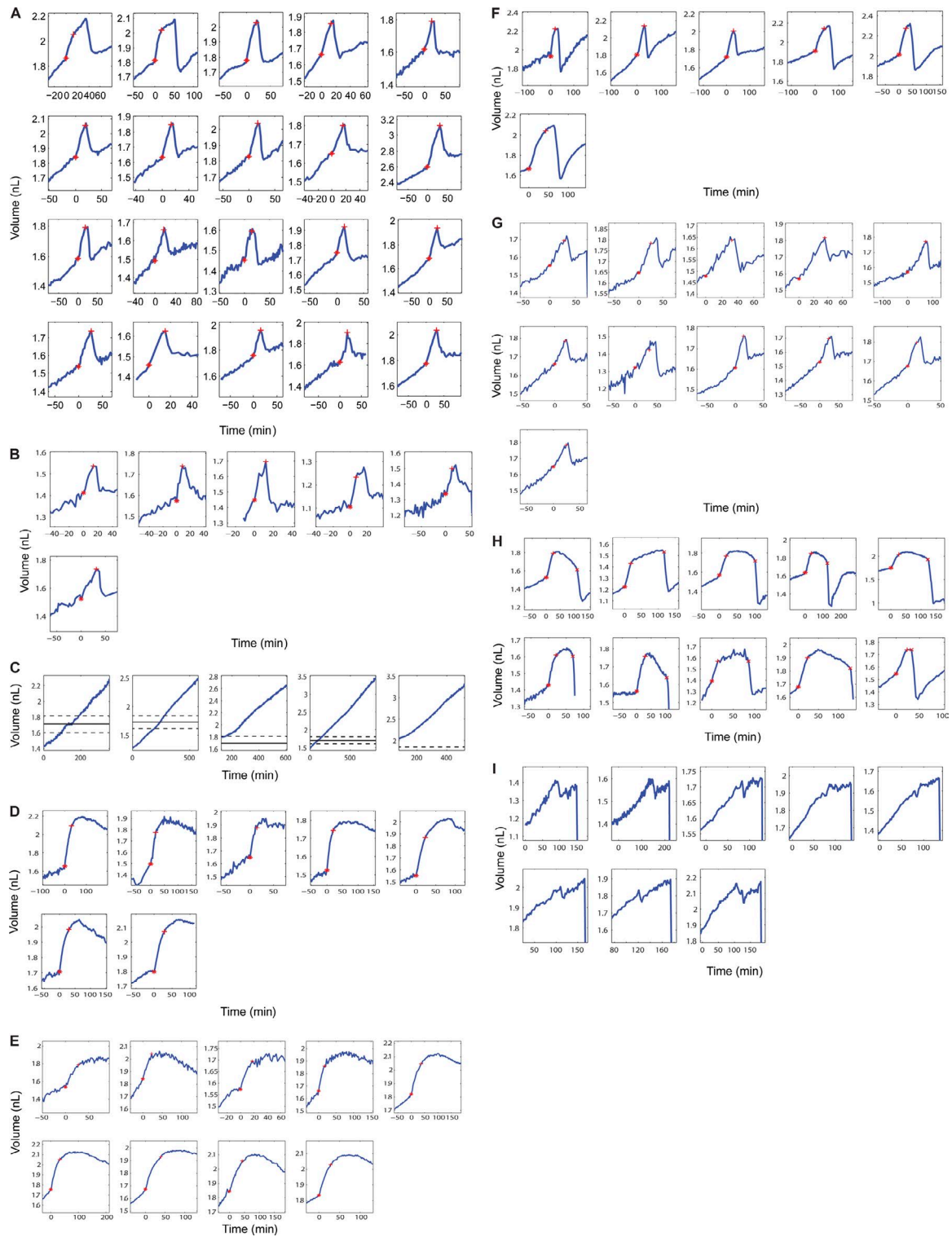


Figure S2. **Single-cell volume during mitosis aligned in time by the onset of swelling.** (A) L1210 cells. \*, beginning of swelling; +, end of swelling. (B) FL5.12 cells. (C) L1210 cells treated with 20 ng/ml ICRF-193. The straight line and dotted lines indicate the mean and SD of normal L1210 cell volume upon mitosis entry. L1210 cells treated with 1  $\mu$ g/ml nocodazole (D), 5  $\mu$ M STLC (E), 20  $\mu$ M blebbistatin (F), 2  $\mu$ M RO-3306 (G), 10  $\mu$ g/ml ICRF-193 and 5 mM caffeine (H), and 5  $\mu$ M EIPA (I). x, beginning of shrinking. The beginning and end of the swelling and shrinking were detected based on the point-by-point derivative of cell volume trajectory.

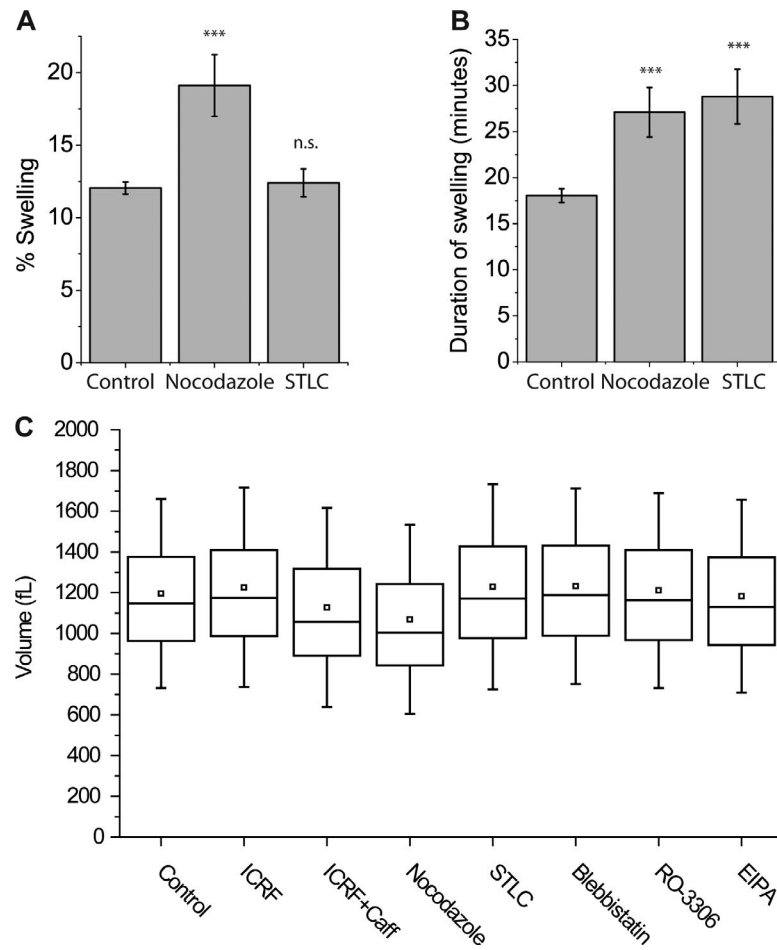


Figure S3. **Swelling of L1210 cells treated with drugs.** (A) Magnitude of swelling of control L1210 cells ( $n = 20$ , SEM = 0.42) and L1210 cells treated with 1  $\mu\text{g}/\text{ml}$  nocodazole ( $n = 7$ , SEM = 2.13, \*\*\*,  $P < 0.001$ ) or 5  $\mu\text{M}$  STLC ( $n = 9$ , SEM = 0.96,  $P = 0.66$ ) measured using SMR. n.s., not significant. (B) Duration of swelling of control L1210 cells ( $n = 20$ , SEM = 0.75) and L1210 cells treated with nocodazole ( $n = 7$ , SEM = 2.70) or STLC ( $n = 9$ , SEM = 2.98); \*\*\*,  $P < 0.001$ . P-values were calculated with Welch  $t$  test. (C) Volume of L1210 cells treated with various drugs measured using the Coulter counter. Each data point is plotted based on >3,000 single-cell volume measurements. Boxes, upper and lower quartiles and median; squares, mean; error bars, SD. Concentrations of drugs are 20 ng/ml ICRF-193, 10  $\mu\text{g}/\text{ml}$  ICRF-193 + 5 mM caffeine, 1  $\mu\text{g}/\text{ml}$  nocodazole, 5  $\mu\text{M}$  STLC, 20  $\mu\text{M}$  blebbistatin, 2  $\mu\text{M}$  RO-3306, and 5  $\mu\text{M}$  EIPA. Cell volume was measured 1 h after drug treatment.