

## Supplementary Movie Captions

**Movie S1: Growth of *E. coli* cells in microchannels wider than cell diameter.** The GFP expressing *E. coli* cells (*E. coli* strain BW25113 carrying the PKK\_PdnaA\_GFP plasmid) were growing at room temperature ( $\sim 25^{\circ}\text{C}$ ) and in M9 minimal media supplemented with 0.4% glucose and 1% casamino acids and 50  $\mu\text{g}/\text{mL}$  ampicillin. The mean cell diameter under this growth condition is measured as  $\sim 0.8 \mu\text{m}$  and the growth channels are  $\sim 1.0 \mu\text{m}$  wide and  $\sim 1.1 \mu\text{m}$  deep.

**Movie S2: Growth of *E. coli* cells in microchannels with width roughly equal to cell diameter.** The GFP expressing *E. coli* cells (*E. coli* strain BW25113 carrying the PKK\_PdnaA\_GFP plasmid) were growing at room temperature ( $\sim 25^{\circ}\text{C}$ ) and in M9 minimal media supplemented with 0.4% glucose and 1% casamino acids and 50  $\mu\text{g}/\text{mL}$  ampicillin. The mean cell diameter under this growth condition is measured as  $\sim 0.8 \mu\text{m}$  and the growth channels are  $\sim 0.8 \mu\text{m}$  wide and  $1.1 \mu\text{m}$  deep.

**Movie S3: Flow in the growth channels.** The upper feeding channel was filled with 50  $\mu\text{M}$  fluorescein sodium solution and the lower channels with M9 media. The initial flow rates in the upper and lower channels were 0.4  $\mu\text{L}/\text{min}$  and 0.2  $\mu\text{L}/\text{min}$ , respectively. Then the flow rates in the two feeding channels were switched upside down for four times. The growth channels #2, 3, 5, 6, 7, 8, 9, 10 and 12 (left to right) were filled with *E. coli* cells. The movie was captured at 5s intervals and played at 12 frames/second.

**Movie S4: Continuous growth of *E. coli* cells with a *PgyrA*-GFP reporter gene construct in different growth media.** The experiment begins with M9 minimal media supplemented with 0.4% glucose (glu), switches to M9 with 0.4% glucose and 1% casamino acids (CAA), and then returns to the original medium. Both media contained 50  $\mu\text{g}/\text{mL}$  kanamycin. Growth temperature was maintained constant at  $30^{\circ}\text{C}$ .

**Movie S5: Time-lapse movie of loci tracking.** The *E. coli* cells with fluorescently tagged loci were growing at room temperature ( $\sim 25^{\circ}\text{C}$ ) in M9 media supplemented with 0.4% glucose and 0.5% casamino acids and 50  $\mu\text{g}/\text{mL}$  ampicillin. The growth channels are  $\sim 0.8 \mu\text{m}$  wide and  $1.1 \mu\text{m}$  deep. The movie was captured at 0.1s intervals and played at 30 frames/second.