

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 μM 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°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.