1 ELECTRONIC SUPPLEMENTARY INFORMATION

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Fig. S1: Median speed, V (A) and the percentage of CCW trajectories (B) for swimming *E*. *coli* near a solid surface versus the fluidity of the methylcellulose (blue) and ficoll (green)
solutions. The fluidity was calculated from calibration curves established from the viscosity
of the polymer stocks solutions (Table 1). Numbers of trajectories are reported in parentheses,
standard deviation is reported as error bar for *V*.

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Fig. S2: (A) Selected trajectories for *E. coli* swimming on glass surfaces in TN supplemented with 0.2% alginate showing alternate CCW (red) and CW (blue) instantaneous curvature. κ . Frame is 28 x 28 μ m². (B) Box-plots showing the speed *v* along the trajectories reported above for the CCW (in red) and the CW (in blue) instantaneous curvature κ . Box-plot conventions as in Fig. 2.

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Fig. S3: Rheological properties of 0.33% alginate media in contact with glass surfaces (Glass in black symbols) and with polylysine-glass surfaces (PLL-Glass in red symbols). The symbols represent experimental measurements while the dashed lines are fits. Elastic modulus, G' (open symbols), and loss modulus, G'' (filled symbols) vs. oscillating frequency, ω (A).

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