SUPPLEMETARY MATERIALS CONTENTS: A Minimal Mechanosensing Model Predicts Keratocyte Evolution on Flexible Substrates

April 7, 2020

Supplemental Materials comprise nine items

ONE Supplementary Information file: SupplementaryInformation.pdf

EIGHT Supplemental Videos

Eight supplemental videos are cited in the main text:

Video SV1.avi

Model simulation of full transition from static annulus to fully developed steady state locomotion in the well-known crescent or banana shape (standard parameters (see Eq.(14) in our paper) except for $e = 1.5$, low polarisation regime.)

Video SV2.avi

Excerpt from Video SV3.avi (standard parameters (see Eq.(14) in our paper) except for $e = 3$, intermediate polarisation regime), with shorter duration but higher time resolution, to show bipedal oscillations.

Video SV3.avi

Model simulation of bipedal oscillatory motion (standard parameters (see Eq.(14) in our paper) except for $e = 3$, intermediate polarisation regime). The displacement field (red arrows) oscillates between symmetry and antisymmetry about the x axis. Note the rather regular oscillatory centroid trajectory with slight deviation from the x axis. (blue curve). Observe upper/lower trailing edges alternating between pointed/rounded and rounded/pointed. shapes, respectively. See also Video SV2.avi

Video SV4.avi

Model simulation of severe irregular oscillations with lamellipodial travelling waves (standard parameters (see Eq.(14) in our paper) except for $e = 11$, high polarisation regime). See also Video SV5.avi

Video SV5.avi

Excerpt from Video SV4.avi (standard parameters (see Eq.(14) in our paper) except for $e = 11$, high polarisation regime), with shorter duration but higher time resolution, to show erratic oscillations and lamellipodial travelling waves (kinks).

Video SV6.avi

Modelling a needle pulling the substrate behind a locomoting cell and away from it (red arrows in ellipse pointing roughly left). The cell turns, moves away transversally to the original direction, elongates toward the needle, then gradually turns toward the needle. Similar behaviour [?] was recently observed with human epithelial keratinocytes.

Video SV7.avi

Model simulation of durotaxis. A locomoting cell turns toward the top boundary, where zero displacement boundary conditions hold. These are equivalent to an interface with an infinitely stiff region, which attracts the cell.

Video SV8.avi

Model simulation of reverse durotaxis. A locomoting cell turns away from the top boundary, where zero traction boundary conditions hold. These are equivalent to an interface with an infinitely soft region, which repels the cell.