

Abstract Submitted
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A Phenomenological Model of Durotaxis¹ GUANGYUAN YU, JINGCHEN FENG, HERBERT LEVINE, Rice Univ, CENTER FOR THEORETICAL BIOLOGICAL PHYSICS COLLABORATION — Cells exhibit qualitatively different behaviors on substrates with different rigidities. The fact that cells are more polarized on the stiffer substrate motivates us to construct a two-dimensional cell with the distribution of focal adhesions dependent on substrate rigidities. Our model reproduces the experimental observation that the persistence time is higher on the stiffer substrate. We show that stiffness dependent polarization will lead to the so-called durotaxis, the preference in moving towards stiffer substrates. This propensity is then characterized by the durotactic index first defined in experiments. We also derive and validate the 2D corresponding Fokker-Planck equation associated with our model. Our model highlights the role of focal adhesion arrangement in durotaxis. It may be applied to manipulate the movement of cells for clinical purposes.

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