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**Irina V. Dokukina.** *A model of fibroblast motility with substrate rigidity sensing.*

To function efficiently in the body, the biological cells must have the ability to sense the external environment. Mechanosensitivity towards the extracellular matrix was identified as one of such sensing mechanisms that affects cell behavior. It was shown experimentally that a fibroblast cell has preference for locomoting over the stiffer substrate when given a choice between a softer and a stiffer substrate. We develop a discrete model of a fibroblast motility with substrate rigidity sensing. Our model allows to understand the interplay between the cell-substrate sensing and the cell bio-mechanics. The model cell exhibits experimentally observed substrate rigidity sensing which allows us to gain additional insights into the cell mechanosensitivity. (Received February 04, 2010)