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Texture sensing of cytoskeletal dynamics in cell migration SATARUPA DAS, Institute for Physical Science and Technology, University of Maryland, College Park, RACHEL LEE, Department of Physics, University of Maryland, College Park, MATTHEW J. HOURWITZ, XIAOYU SUN, Department of Chemistry and Biochemistry, University of Maryland, College Park, CAROLE PARENT, Center for Cancer Research, NCI, NIH, 37 Convent Drive, Bethesda, JOHN T. FOURKAS, Department of Chemistry and Biochemistry, University of Maryland, College Park, WOLFGANG LOSERT, Department of Physics, University of Maryland, College Park — Migrating cells can be directed towards a target by gradients in properties such as chemical concentration or mechanical properties of the surrounding microenvironment. In previous studies we have shown that micro/nanotopographical features on scales comparable to those of natural collagen fibers can guide fast migrating amoeboid cells by aligning actin polymerization waves to such nanostructures. We find that actin microfilaments and microtubules are aligned along the nanoridge topographies, modulating overall cell polarity and directional migration in epithelial cells. This work shows that topographic features on a biologically relevant length scale can modulate migration outcomes by affecting the texture sensing property of the cytoskeleton.

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