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Cellular Contact Guidance Through Dynamic Sensing of Nanotopography XIAOYU SUN, SATARUPA DAS, CAN GUVEN, JOHN FOURKAS, WOLFGANG LOSERT, Univ of Maryland-College Park — We evaluated the contact guidance of nanoscale ridges on the cellular motion and actin waves in HL60 neutrophil- like cells, a model system for studying cell migration. By analyzing the velocity of cell motion and actin waves, we found that the nanoridges exert bidirectional guidance on migrating cells and actin wave propagation. More cells migrate parallel to the nanoridges than any other direction. Nanoridges nucleate actin polymerization waves which then proceed preferentially along the ridges. Contact guidance efficiency depends on the spacing between adjacent ridges. The greatest guidance efficiency occurs on 1.5-μm-spaced ridges. A larger average actin wave speed is observed on 5-μm-spaced than 1.5-μm-spaced ridges, which may arise from a larger portion of random propagation on 5-μm-spaced ridges rather than confined directional propagation along the 1.5-μm-spaced ridges.

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