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Unidirectional Contact guidance via surface nanotopography[1]
WOLFGANG LOSERT, XIAOYU SUN, MEGHAN DRISCOLL, CAN GUVEN, JOHN FOURKAS, University of Maryland — Unidirectional cell migration plays a key role in many critical physiological processes. Guidance of cells in a preferred direction has been explored in the context of chemotaxis and durotaxis. However, a stable field of gradient within a dynamic range needs to be maintained to achieve persistent unidirectional guidance. Hence the spatial extent of gradient sensing is limited. Contact guidance on the other hand can be achieved on surfaces with large spatial extent without changes in guidance efficiency. However, contact guidance is generally bidirectional. Here we demonstrate that unidirectional guidance efficiency is achievable by nanofabrication of asymmetrically shaped surfaces. We analyze cell velocity and orientation, as well as the dynamic changes in cell shape in response to surface topography.

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