Abstract Submitted
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The Stampeding Crowd: Guiding Micro-Organisms in Microfabricated Environments[1] GUILLAUME LAMBERT, ROBERT AUSTIN, Princeton University — Custom-made microstructures are used to influence the motion of micro-organisms. By exploiting the runs-and-tumble swimming dynamics of bacteria, we show that their motion can be rectified using asymmetric funnel-shaped structures [Galajda et al. J. Bact. 2007]. However, a large enough population of cells is able to chemotactically "escape" an array of funnel barriers by collectively modifying their chemical micro-environment[Liao and Lambert, Submitted 2009]. This invasion-like behavior relates to that of metastatic cancer cells: cells leave an initially confined environment to populate neighboring tissues. We extend the use of microstructured devices to the study of cancer cells motility. We use microscopic channels and funnel-shaped barriers to physically constrain and guide mammalian cells. Cells with different motility are inoculated inside the devices and their collective motion is studied. We find that the difference in cell motility between cancer cells at different stages of progression may be used to sort them. These studies could prove important to the understanding of the dynamics of tissue invasion and metastasis.

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