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Building a Leading Edge: Influence of Gradients on Mobility and Rheology of Actin Networks

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The leading edge of a migrating cell contains steep gradients in actin concentration and actin affiliated proteins. Using microfluidics and photo-uncaging of salt and ATP, we generate controlled gradients of actin concentration as well as the associated proteins fascin and Arp2/3. Tracers embedded in polymer networks with gradients do not show directed motion, but do have increased mobility compared with uniform polymer networks of the same concentration. We compare the experimental results to a dissipative dynamics simulation of the experimental conditions.