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Probing the Dynamics of Cellular Traction Forces with Magnetic Micropost Arrays CORINNE KRAMER, Johns Hopkins University, CHRISTOPHER CHEN, University of Pennsylvania, DANIEL REICH, Johns Hopkins University — Mechanical forces on living cells are associated with changes in cellular function. For example, vascular smooth muscle cells are known to undergo a mechanical feedback response to increased stress, which can result in atherosclerosis. We have recently developed a magnetic micropost array, a novel device for measuring cellular traction forces that simultaneously enables the application of localized external forces to cells. The device consists of an array of micrometer scale elastomeric posts that act as force sensors for cells cultured on their tips. An external force is applied to the adherent surface of a cell via a magnetic torque on a cobalt nanowire embedded in a single post. Initial results showed an active and non-local cellular response to applied forces in mouse fibroblast cells.[1] We will present results on the spatially resolved dynamics of traction forces exerted by smooth muscle cells over time in response to constant and time-varying stimulation. The observation of biochemical and mechanical regulation of the subcellular redistribution of force may allow insights into cellular mechanotransduction and control of cell function.

[1]N. Sniadecki, et. al, *Proc Natl Acad Sci*, **104**, 14553 (2007).

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