

Abstract Submitted
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Dynamics of Traction Force Reinforcement in Smooth Muscle Cells¹ YI-CHIA LIN, CORINNE KRAMER, Johns Hopkins University, CHRISTOPHER CHEN, University of Pennsylvania, DANIEL REICH, Johns Hopkins University — Mechanical forces influence cell function in various ways. For instance, the force-induced contraction or relaxation of vascular smooth muscle cells (SMCs) is critical to regulating the properties of blood vessels. Here, we study the dynamics of cellular traction forces in SMCs using micro-scale magnetic nanowires together with flexible PDMS micropost arrays. We use dual magnetic tweezers to apply a sinusoidal magnetic torque on nickel nanowires which are internalized by the SMCs. The spatial and temporal responses of the SMCs cultured on the tips of the microposts are recorded by the deflected posts. We observe a global reinforcement of the cells' traction forces upon applying a localized torque via the nanowires. Interestingly, we also find that the contractile response depends on the frequency of the applied stimulation, with a greater percentage of the SMCs showing enhanced reinforcement at lower frequencies.

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