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Wave Propagation in Expanding Cell Layers[1] KAZAGE J CHRISTOPHE UTUJE[2], Syracuse University, SHILADITYA BANERJEE[3], University of Chicago, M. CRISTINA MARCHETTI[4], Syracuse University — The coordinated migration of groups of cells drives important biological processes, such as wound healing and morphogenesis. In this talk we present a minimal continuum model of an expanding cell monolayer coupling elastic deformations to myosin-based activity in the cells. The myosin-driven contractile activity is quantified by the chemical potential difference for the process of ATP hydrolysis by myosin motors. A new ingredient of the model is a feedback of the local strain rate of the monolayer on contractility that naturally yields a mechanism for viscoelasticity of the cellular medium. By combining analytics and numerics we show that this simple model reproduces qualitatively many experimental findings, including the build-up of contractile stresses at the center of the cell monolayer, and the existence of traveling mechanical waves that control spreading dynamics and stress propagation in the cell monolayer.

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