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Model of Rho-Mediated Myosin Recruitment to the Cleavage Furrow during Cytokinesis ALEXANDER VEKSLER, DIMITRIOS VAVYLONIS, Lehigh University — The formation and constriction of the contractile ring during cytokinesis, the final step of cell division, depends on the recruitment of motor protein myosin to the cell's equatorial region. During cytokinesis, the myosin attached to the cell's cortex progressively disassembles at the flanking regions and concentrates in the equator [1]. This recruitment depends on myosin motor activity and activation by Rho proteins. Central spindle and astral microtubules establish a spatial pattern of differential Rho activity [2]. We propose a reaction-diffusion model for the dynamics of myosin and Rho proteins during cytokinesis. In the model, the mitotic spindle activates Rho at the equator. Active Rho promotes, in a switch-like manner, myosin assembly into cortical minifilaments. Mechanical stress by cortical myosin causes disassembly of myosin minifilaments and deactivates Rho. Our results explain both the recruitment of myosin to the cleavage furrow and the observed damped myosin oscillations in the cell's flanking regions [1]. Spatial extent, period and decay rate of myosin oscillations are calculated. Various regimes of myosin recruitment are predicted. [1] Zhou & Wang, Mol. Biol. Cell **19**:318 (2008) [2] Murthy & Wadsworth, J. Cell Sci. **121**:2350 (2008)

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