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Patterning of Cytokinetic ring

Cytokinesis is a fundamental step of cell division. This event results in the assembly of circumferential actomyosin-based contractile ring at the equatorial cortex of the cell. The contractile ring is positioned properly by the spatiotemporal cues from the mitotic spindle to the cortex. Experiments have revealed that the localization of myosin in the contractile ring is controlled via the RhoA GTPase, which receives signals from the mitotic spindle through centralspindlin and the chromosomal passenger complex. The general link between a particular spindle morphology and the density of cytokinetic regulators is however poorly understood. Here, we aim to combine single-molecule TIRF imaging of myosin, myosin-regulators and tubulin in C.elegans single-cell embryos with genetic perturbations to investigate the spindle-cortex communication during cytokinesis. To do so, we aim to do image analysis on quantities like microtubule densities, densities of antiparallel microtubules, myosin densities to understand how microtubule distribution and orientation can regulate the actomyosin cortex. This study aims at unraveling the transport rules of cytokinetic regulators during the active ring formation and establish the bridge between the spindle and the cortex communication.

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