CDB SEMINAR

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16:00~17:00 A7F Conference Room

## Dissecting the Role of Rho-mediated Signaling in Contractile Ring Formation

**Summary**

Proper positioning of the cleavage plane ensures chromosome separation and asymmetric cell division-critical steps for genome stability and cell differentiation, respectively. After the onset of anaphase, the actin and myosin fibers assemble at the equatorial cell cortex and form the contractile ring. The central spindle provides a specification signal for positioning of the contractile ring but the nature of the signal remains unknown. Although the small GTPase Rho is essential for cytokinesis, the role of Rho in contractile ring formation is controversial. We have found that Rho accumulates at the equatorial cell cortex before cleavage furrow ingression. The Rho specific inhibitor C3 exoenzyme or siRNA to the Rho GDP/GTP exchange factor ECT2 prevents the accumulation of Rho at the equatorial cell cortex and disrupts contractile ring formation. These results indicate that accumulation of active Rho at the equatorial cell cortex is required for contractile ring formation. Centralspindlin, a protein complex of the GTPase activating protein MgcRacGAP and the kinesin-like protein MKLP1, is critical for assembly of the central spindle. During anaphase, ECT2 forms a complex with centralspindlin and is localized at the central spindle. MgcRacGAP or MKLP1 RNAi mislocalizes ECT2 from the central spindle and prevents accumulation of Rho at the equatorial cell cortex, resulting in disruption of contractile ring formation. Our study provides strong evidence that the Rho-mediated signaling acts as a link between the central spindle and contractile ring formation.

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