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Kinesin-5 mitotic nano-motors: Directionality and functions

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The conserved kinesin-5 nano-motor proteins, which crosslink and move along microtubules, play essential roles in the mitotic spindle dynamics. We combine biophysical, cell biology and genetic approaches to study the activity of *S. cerevisiae* kinesin-5 motors, Cin8 and Kip1. We show that Cin8 and Kip1 are important for spindle elongation, midzone organization and interpolar microtubule plus-end dynamics during anaphase. We also show that Cin8 is differentially phosphorylated during anaphase at Cdk1 sites located in its motor domain. This phosphorylation is required for detachment of Cin8 from the spindle. Finally, we show that in vitro, Cin8 and Kip1 move towards the minus-ends of microtubules and can switch directionality. We thus examine the regulation of their directionality using single-molecule fluorescence motility assays and live-cell microscopy. Our data shed light on the mechanism of directionality control of the remarkable kinesin-5 motors.

Biography

Leah Gheber has completed his PhD at the age of 31 years from Ben-Gurion University and postdoctoral studies from Johns Hopkins University, Biology Department. Currently, she is an Assistant Professor at the Chemistry Department Ben-Gurion University, PI of the molecular nano-motors group and a head of the Teaching Committee. She has published more than 28 papers in reputed journals and was awarded several prestigious grants.

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