

Biochemistry & Molecular Biology
Spring 2008 Colloquium Series

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Thursday, March 27, 2008
11:30 a.m.
101 Biochemistry

Regulation of chromosome segregation

Research in the Biggins Laboratory

Chromosomes attach to the mitotic spindle via the kinetochore, the protein complex that assembles on centromeric DNA. A conserved feature of all eukaryotic kinetochores is a specialized centromeric nucleosome. We are therefore studying and characterizing the mechanisms that contribute to forming centromeric chromatin. Accurate chromosome segregation also depends on each pair of sister kinetochores biorienting such that they bind to microtubules from opposite poles. The conserved Ipl1/Aurora protein kinase is required for biorientation because it detects and destabilizes improper microtubule-kinetochore attachments. Ipl1 activity is opposed by Glc7, the sole protein phosphatase I in budding yeast. To understand how cells achieve kinetochore biorientation, it is critical to identify the key regulators and substrates of Ipl1 and Glc7. We therefore developed methods to isolate the budding yeast kinetochore. Using these techniques, we identified a protein that targets the Glc7 phosphatase to kinetochores and found that its activity is regulated by the yeast 14-3-3 proteins.

References

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Furuyama, Suzanne and Biggins, Sue. 2007. Centromere identity is specified by a single centromeric nucleosome in budding yeast. *PNAS*. 104: 14706-14711.

Pinsky, Benjamin A., Kung, Charles, Shokat, Kevan M. and Biggins, Sue. 2005. The Ipl1-Aurora protein kinase activates the spindle checkpoint by creating unattached kinetochores. *Nature Cell Biology*. DOI: 10.1038/ncb1341.

