

Exploring the Mechanism of MCAK's Microtubule Depolymerization Activity

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Dynamic microtubules are essential for the correct segregation of chromosomes during cell division

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are needed to see this picture.

In dividing cells, microtubule fibers:

- Organize at two separate poles
- Attach to chromosomes
- Grow and shrink in order to solidify correct attachments and destroy incorrect attachments
- Shrink in order to pull the chromosomes apart after the correct attachments are formed.

Rusan et. al., *J. Cell Biol.*, 2002

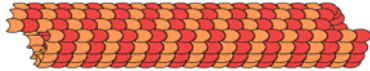


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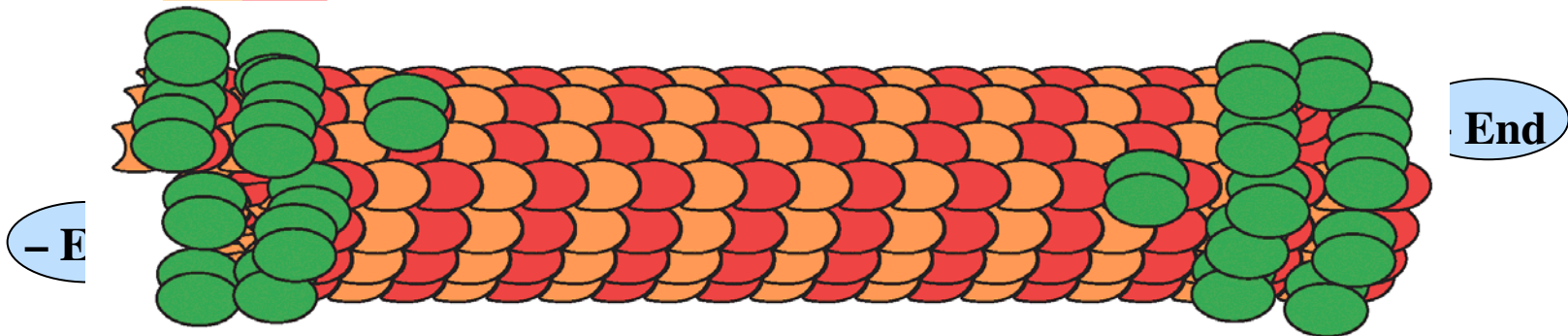


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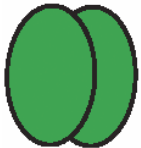
Microtubules



- Composed of $\alpha\beta$ -tubulin heterodimers
- Heterodimers bind both head-to-tail and laterally to form a tube shaped polymer
- The polymerized tube has structural polarity (plus end and minus end)



MCAK



- MCAK is a homodimeric protein of the kinesin-13 family
- MCAK binds strongly to microtubule ends (Desai et al. Cell 1999)
- MCAK depolymerizes microtubules (Maney et al. JCB 1998)



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GFP labeled MCAK binds to the microtubule and depolymerizes it from the microtubule end.

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DV/DVCPRO - NTSC decompressor
are needed to see this picture.

Future Direction:

Study the rates of microtubule depolymerization with various MCAK concentrations to characterize the kinetic parameters of this interaction



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