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Understanding the role of transport velocity in bio-motor powered microtubule spool assembly AMANDA TAN, University of California, Merced, DAIL CHAPMAN, University of California, Irvine, LINDA HIRST, JING XU, University of California, Merced — Microtubules and their associated motor proteins, such as kinesin are widely used to study active self-assembly of higher order structures. Kinesin motors convert ATP to energy through hydrolysis and walk along microtubules. In gliding assays, kinesin are immobilized on the surface and propel microtubules forward when they hydrolyze ATP. Microtubules functionalized with biotin and streptavidin will bind together and form bundles and spools when gliding. The spools are able to maintain its shape and continue to rotate in the presence of ATP. We examined the sensitivity of microtubule spools to transport velocity (by varying ATP concentration). We determined that the steady-state number and size of spools remained constant over a seven-fold range of velocities. Our data on the kinetics of spool assembly further suggest that the main mechanisms underlying spool growth vary during assembly.

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