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**Theoretical Description of Microtubule Dynamics in Fission Yeast During Interphase** YUNG-CHIN OEI, ANDREA JIMÉNEZ-DALMARONI, University College London, UK, ANDREJ VILFAN, Jozef Stefan Institute, Ljubljana, Slovenia, THOMAS DUKE, University College London, UK
— Fission yeast (S. pombe) is a unicellular organism with a characteristic cylindrical shape. Cell growth during interphase is strongly influenced by microtubule self-organization - a process that has been experimentally well characterised. The microtubules are organized in 3 to 4 bundles, called "interphase microtubule assemblies" (IMAs). Each IMA is composed of several microtubules, arranged with their dynamic "plus" ends facing the cell tips and their "minus" ends overlapping at the cell middle. Although the main protein factors involved in interphase microtubule organization have been identified, an understanding of how their collective interaction with microtubules leads to the organization and structures observed in vivo is lacking. We present a physical model of microtubule dynamics that aims to provide a quantitative description of the self-organization process. First, we solve equations for the microtubule length distribution in steady-state, taking into account the way that a limited tubulin pool affects the nucleation, growth and shrinkage of microtubules. Then we incorporate passive and active crosslinkers (the bundling factor Ase1 and molecular motor Klp2) and investigate the formation of IMA structures. Analytical results are complemented by a 3D stochastic simulation.

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