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Nanoscopic tubulin rings* HACENE BOUKARI, NIH, DAN SACKETT, NIH, PETER SCHUCK, NIH, SUSAN KRUEGER, NIST, RALPH NOSSAL, NIH — We describe results of analysis of fluorescence correlation spectroscopy, small-angle neutron scattering, and sedimentation measurements of nanoscopic polymer rings formed following interactions of tubulin (100 kDa) and a small peptide, cryptophycin (340 Da). Tubulin is a ubiquitous dimeric protein found in eukaryotic cells, and is the building block of microtubules, which are dynamical biopolymers involved in many critical cell functions. The peptide, which is a marine natural product, inhibits the formation of microtubules and, instead, induces the formation of the rings. Under the studied conditions these rings appear rigid, have circular geometry ($\sim$ 25 nm dia.), are monodisperse in size (8 tubulin dimers/ring), and are stable even with tubulin concentration as low as 1 nM. Remarkably, no intermediate oligomers (partial rings or others) are observed. Further, structural and hydrodynamic modeling confirms the number (8) of tubulin dimers per ring and shows that the tubulin monomers are not spherical, consistent with their known crystallographic structure.
*H. Boukari, R. Nossal, D. Sackett, and P. Schuck, PRL 93, 98106 (2004).

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