

Abstract Submitted
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Lipid-Protein Nanotubes with Open or Closed Ends, Microtubules Bundles and Inverted Tubulin Nanotubes¹ URI RAVIV, DANIEL J. NEEDLEMAN, MIGUEL A. OJEDA-LOPEZ, YOULI LI, HERB P. MILLER, LESLIE WILSON, CYRUS R. SAFINYA, University of California, Santa Barbara — We describe synchrotron x-ray diffraction, electron microscopy, and optical imaging data of the self-assembly of microtubules (MTs) with various cationic agents. We established the conditions under which cationic liposomes can coat MTs and form lipid-protein nanotubes (LPNs). The LPNs exhibit a rather remarkable architecture with the cylindrical lipid bilayer sandwiched between a MT and outer tubulin oligomers forming rings or spirals. By controlling the cationic lipid/tubulin stoichiometry it is possible to switch between two states of nanotubes with either open ends or closed ends with lipid caps, a process which forms the basis for controlled chemical and drug encapsulation and release (Raviv et al, PNAS, 2005). Multivalent (3+,4+ and 5+) cations can form three dimensional MT bundles that in some cases become tubulin based inverted nanotubules. Divalent cations form two dimensional MT necklaces (Needleman et al, PNAS, 2004).

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