Biophysics of Magnetic Fields Effect on Tubulin Polymerization

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Abstract
At physiological temperature and in presence of Mg^2+ and GTP purified tubulins self-assemble into microtubules[1]. Several parameters can affect microtubule assembly; among them the effects of magnetic fields on tubulin polymerization will be considered. Several techniques such as turbidometry, dynamic light scattering(DLS) and electron microscopy can be used as a probe of tubulin polymerization [2,3,4]. Orientational behavior of microtubules is the most reported result of the application of magnetic fields during tubulin polymerization [5,6]. Any changes in kinetics of tubulin polymerization, positive/microtubule length increase) or negative(microtubule length decrease) can open new clinical perspectives. In one hand positive effects can be used for design of nerve regeneration strategies[7] and at the other hand the negative effects of magnetic fields on tubulin polymerization can disrupt cell replication and promise novel methods of cancer therapies[8].

Methods for Evaluation of microtubule polymerization

- Turbidometry [2]
- Dynamic light scattering(DLS) [3]
- Birefringence [9]

Microtubules Self-Organization is both dependent upon, and triggered by external factors, such as gravity and magnetic fields

Growth cone microtubules are potential targets for promoting axon regeneration by induction of Tubulin polymerization under Magnetic fields

Disruption of Cancer Cells By Inhibition of Tubulin Polymerization Under Magnetic Fields

Engineering tubulin: New classes of nanoscale molecular devices have been developed using knowledge obtained through the in vitro motility assay of tubulins

Literature Cited