



Effects of EMF on cytoskeleton – potential therapeutic applications

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Cellular skeleton (cytoskeleton) comprises three types of polymer fibers: actin filaments, intermediate filaments and microtubules. The function of cytoskeleton is crucial for cellular division, cellular motility and transport of intracellular cargo. Microtubules represent an intriguing target to electromagnetic field because the building blocks of microtubules, tubulin heterodimers, possess exceptional electric properties, particularly net electric charge and dipole moment. Microtubule are also a common target for drug-based cancer therapies, since microtubule perturbation stalls cell division.

In this contribution, we will highlight recent works on electromagnetic field effects on microtubules. We will particularly focus on mechanistic aspects of the effect of intense electric field on tubulin and microtubule structure, which include molecular dynamics modelling as well as experimental biomolecular and cell-level work. We will outline potential therapeutic applications of targeting microtubules by EMF.

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