University of Fribourg / Faculty of Science and Medicine / Adolphe Merkle Institute

Magnetic nanoparticles: A multifunctional approach to modern cancer therapy

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Superparamagnetic iron oxide nanoparticles (SPIONs) are promising candidates for a variety of biomedical applications and hence form the centerpiece of this thesis. What makes this superparamagnetic material particularly interesting is that it is biocompatible, biodegradable, and able to convert magnetic into thermal energy. This thesis focusses on a better understanding of clinical relevant parameters, which are imperative for applied magnetic hyperthermia treatments, and how they influence the thermal dissipation efficiency. In this regard, the fundamental work of this thesis was to establish SPION synthesis protocols which lead to defined sizes and shapes, to ensure colloidal stable nanoparticle systems by the means of surface coatings, and to apply adequate characterization techniques to capture relevant signals. Furthermore, this work addresses the improvement of magnetoliposomes, a promising alternative as modern drug delivery carrier, which is a hybrid system consisting of temperature-sensitive liposomes and SPIONs.

Jury:
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