

PEG-DOX conjugate Nanoparticles for Real-time MRI-guided Chemotherapy of Cancer

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Recently, theragnosis which means a combination of treatment and diagnosis of cancer, has been attracted much attention. In this study, we prepared a self-assembled nano-theranostic system for real-time magnetic resonance imaging (MRI)-guided hyperthermia and chemotherapy of cancer. For anti-bio-fouling and long half-life in blood vessel, poly (ethylene glycol) (PEG) were chemically conjugated to the doxorubicin as an anti-cancer drug and then, the super paramagnetic iron oxide nanoparticles (SPIONs) used as a MRI agent and hyperthermia, were loaded into the hydrophobic doxorubicin core of the nanoparticles by self-assembly method under the aqueous condition. To observe in vitro physicochemical characterization, NMR and FT-IR were carried out to confirm the conjugation of PEG and doxorubicin, and shape of the nanoparticles also characterized by a particle size analyzer and TEM. Jobin-Yvon Ultima-C inductively coupled plasma-atomic emission spectrometer (ICP-AES) was used to measure the contents (%) of synthesized SPIONs and loading efficiency of SPIONs in the nanoparticles. Also, to evaluate the magnetic property of the NPs, the magnetization measurements were performed using a vibrating sample magnetometer (VSM). So, the SPIONs-loaded PEG-DOX system could be expected to apply MR imaging and therapeutic applications.

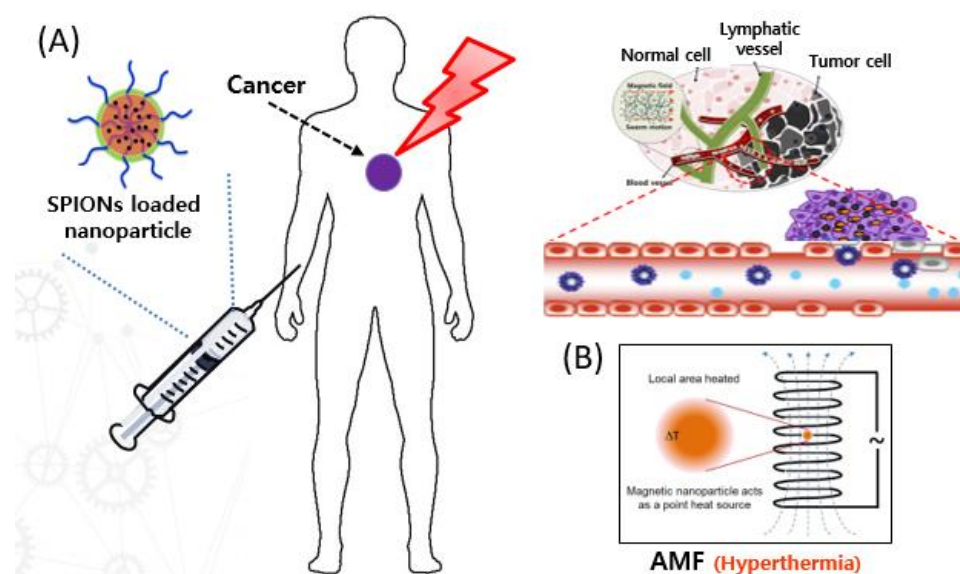


Figure (A) Tumor targeting and therapeutic diagram of drug/MNP-containing nanocarrier through intravascular circulation, (B) active drug release control by externally actuable system

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