BIOCOMPATIBLE SUPERPARAMAGNETIC POLY(THIOETHER-ESTER) NANOPARTICLES VIA MINIEMULSION TECHNIQUE

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Biocompatible polymeric nanoparticles were obtained via thiol-ene polymerization of a biobased monomer in miniemulsion. The α,ω-diene-diester monomer was synthesized through esterification reaction of a glycerol derivative, namely 1,3-propanediol, with 10-undecenoic acid, a long-chain diene carboxylic acid. The biobased poly(thioether-ester), PTEE, nanoparticles were submitted to cytotoxicity and hemolysis analyses. High cell viability and no significant changes in cell morphology were observed. Lastly, hemolysis assays revealed blood compatibility and therefore PTEE nanoparticles have been shown to be a potential alternative drug delivery vector for intravenous administration. The poly(thioether-ester) was also employed to encapsulate magnetic nanoparticles (MNPs) by miniemulsification technique. MNPs were successfully incorporated in PTEE nanoparticles and VSM analysis showed that the resulting hybrid nanoparticles presented superparamagnetic behavior. According to the cell viability assays, MNPs-PTEE nanoparticles did not present any cytotoxic effect on HeLa cells. Fluorescence microscopy analysis demonstrated that the cellular uptake of MNPs-PTEE nanoparticles increased up to three times when an external magnetic field was applied. Therefore, the results indicated that the MNPs-PTEE nanoparticles can be an excellent alternative for the targeted delivery of antitumor drugs

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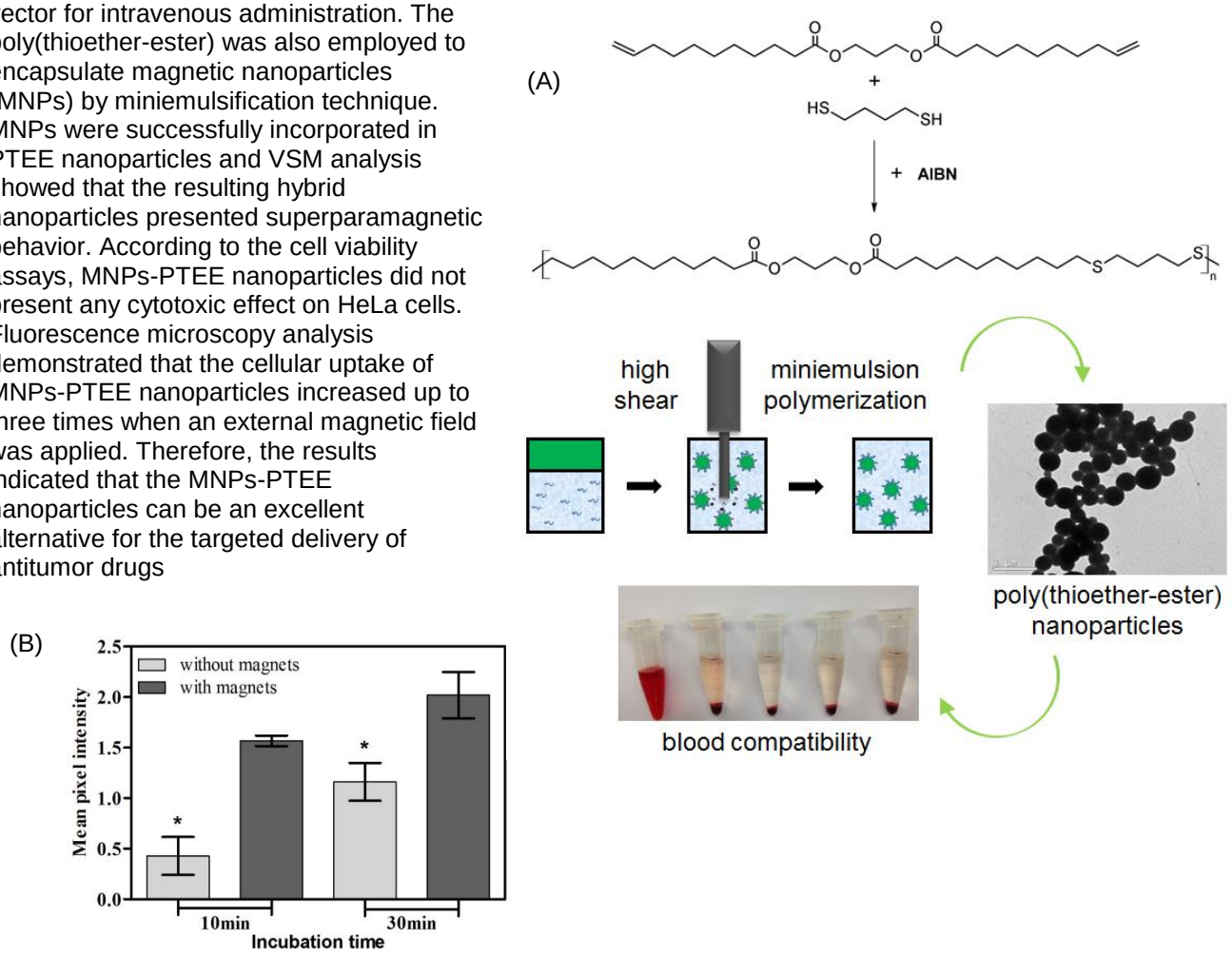

Figure . (A) Biocompatible superparamagnetic poly(thioether-ester) nanoparticles were obtained via thiol-ene polymerization of a biobased monomer in miniemulsion. (B) MNPs-PTEE nanoparticles showed an increased cellular uptake when an external magnetic field was applied