Plasmonic/magnetic liposomes based on nanoparticles with multicore-shell architecture for chemo/thermotherapy

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Multifunctional liposomes containing magnetic and plasmonic nanoparticles (magnetic/plasmonic liposomes) are promising nanosystems for cancer therapy. Their structural and physical properties enable a synergistic effect between dual hyperthermia (magneto-photothermia) and local chemotherapy, allowing overheating of cancer cells while increasing drug toxicity [1,2].

In this work, multicore magnetic nanoparticles (NPs) of manganese ferrite were prepared using carboxymethyl-dextran and melamine as agglutinating agents. The NPs prepared exhibit a flower-shape structure and good capabilities for magnetic hyperthermia. Magnetoliposome-like structures containing the multicore NPs exhibit sizes in the range 250 – 400 nm, being suitable for biomedical applications. A new antitumor thienopyridine derivative was loaded in these nanocarriers with a high encapsulation efficiency. The stability of the nanosystem was confirmed, pointing to suitable characteristics of the magnetoliposomes for dual cancer therapy (combined photothermia/magnetic hyperthermia and chemotherapy).

Keywords: magnetic nanoparticles, plasmonic nanoparticles, multicore-shell nanostructures, magnetic hyperthermia, combination therapy

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