

# **Development of magnetic/plasmonic nickel ferrite/gold nanoparticles covered with lipid bilayers for applications in combined cancer therapy**

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The potential of nanosystems with combined magnetic and plasmonic properties for biomedical applications has been recognized. Magnetic nanoparticles can enable magnetic drug targeting and hyperthermia, while plasmonic gold nanoparticles ensure effective local heating (photothermia) using relatively low energies for gold excitation. Considering cancer therapy, the combination of magnetic and plasmonic capabilities in a single multifunctional nanosystem allows magnetic guidance and production of local heat, the latter promoting triggered drug release and synergistic cytotoxic effect in cancer cells (combined chemo/phototherapy) [1].

In this work, magnetic/plasmonic nanoparticles of nickel ferrite/gold were prepared and characterized, including core/shell nanoparticles (with a nickel ferrite magnetic core and a gold plasmonic shell) and nickel ferrite nanoparticles decorated with gold nanoparticles.

In order to develop applications in combined cancer therapy, the prepared nanoparticles were covered with a lipid bilayer, these systems being able to transport drugs. The heating capabilities of the nanosystems were evaluated through the fluorescence quenching of the dye rhodamine B incorporated in the lipid bilayer upon excitation with a light source. The developed multifunctional nanosystems have shown promising results for application combined cancer therapy (chemo/phototherapy).

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[1] A. Rodrigues *et al.*, *Pharmaceutics*, 2019, **11**(1), 10.