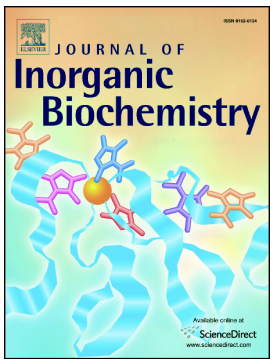

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Silica nanoparticles with Tb(III)-centered luminescence decorated by Ag^0 as efficient cellular contrast agent with anticancer effect

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Abstract

The present work introduces composite luminescent nanoparticles (Ag^0-Tb^{3+}-SNs), where ultra-small nanosilver (4±2 nm) is deposited onto amino-modified silica nanoparticles (35±6 nm) doped by green luminescent Tb(III) complexes. Ag^0-Tb^{3+}-SNs are able to image cancer (Hep-2) cells in confocal microscopy measurements due to efficient cell internalization, which is confirmed by TEM images of the Hep-2 cells exposed by Ag^0-Tb^{3+}-SNs. Comparative analysis of the cytotoxicity of normal fibroblasts (DK-4) and cancer cells (Hep-2) incubated with various concentrations of Ag^0-Tb^{3+}-SNs revealed the concentration range where the toxic effect on the cancer cells is significant, while it is insignificant towards the nonmalignant fibroblasts cells. The obtained results reveal Ag^0-Tb^{3+}-SNs as good cellular contrast agent able to induce the cancer cells death, which makes them promising theranostic in cancer diagnostics and therapy.

Keywords: silica nanoparticles, lanthanide, silver nanoparticles, cytotoxicity, celular uptake, anticancer activity

1. Introduction

Multifunctional nanoparticles combining both luminescence and cytotoxicity or so-called theranostics are of particular importance in medicine due to their potential in anticancer therapy