IRON OXIDE MAGNETIC NANOPARTICLES MODIFIED WITH BIOMOLECULES FOR THERANOSTIC APPLICATIONS

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Iron Oxide Magnetic Nanoparticles (IONPs) attract great interest on the scientific community due to their broad spectrum of applications. As theranostic agents can be used aiming to improve cancer diagnosis and treatment in early stage, reducing simultaneously the side effects on normal tissues (magnetic drug targeting) [1]. One of the most known therapeutic approach is hyperthermia on the site of tumor by using alternate magnetic field. Furthermore, the IONPs used as contrasts agents (*in vivo*) in MRI, in gene transformation, biosensors, enzyme immobilization, immunoassays, purification (*in vitro*) and so on [2].

In the present work we synthesized, full characterized and evaluated the modified carboxylate mNPs that coated first with the co-polymer PEG-*co*-PLA (mNPs@PEG-*co*-PLA) through carbodiimide chemistry. The coated mNPs are studied about their loading and release ability of the anticancer drug doxorubicin (DOX). Following the mNPs conjugated with the cyclic Arg-Gly-Asp peptide cRGDfK-Orn3-CGG (mNPs@cRGD) as a targeting peptide through maleimide. Morphological and structural characterization as well as hyperthermia measurements were performed in order to evaluate their heating ability. Both targeted and non- targeted mNPs were radiolabeled with ^{117}Lu performing *in-vitro* stability as well as *in-vivo* biodistribution in healthy mice. To investigate the cellular uptake of IONPs we used Prussian Blue assay to identify the mNPs localization and endocytosis mechanism.

References:

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