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Physico-chemical and biological evaluation of zinc doped hydroxyapatite in collagen matrix

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The human bone is an extracellular matrix composed of an inorganic part, where a major component is hydroxyapatite (HAp), $Ca_{10}(PO_4)6(OH)_2$, and an organic part consisting of collagen fibrils [1]. In order to enhance the properties of synthetic HAp, researchers have tried and succeeded in doping it with different metallic ions with specific properties.

Incorporation of zinc into implants facilitates the bone formation process around the material [2-4] due to its ability of stimulating bone formation *in vivo* and *in vitro* and of inhibiting osteoclastic bone resorption *in vivo* [5-6]. Therefore, our objective was to obtain a superior material comprised of zinc doped hydroxyapatite embedded in a collagen matrix.

Our goal was to achieve a material that could mimmic as good as possible the natural human hard tissue. The present study focuses on the physico-chemical and biological characterization of new material based on zinc doped hydroxyapatite in collagen matrix (Zn:HAp-CBc). XRD studies revealed that Zn:HAp-CBc nanocomposites generated a hexagonal structure characteristic to hydroxyapatite. Moreover, the optical properties evaluated by Raman and FTIR spectroscopy showed specific absorption bands associated to hydroxyl and phosphate groups characteristic to the hydroxyapatite structure. The mapping studies have evidenced an uniform distribution of the constituent elements. The cytotoxicity of Zn:HAp-CBc was studied on HeLa cells. Cell cycle distribution after treatment was examined by flow cytometry analysis. Our preliminary *in vitro* studies revealed that Zn:HAp-CBc have excellent biocompatibility and support their further characterization by in vivo approaches and development as a biomaterial used in bone regeneration.

Biography

Cristina Liana Popa is a young scientific researcher graduated from the University of Bucharest with a Master degree in theoretical physics. She is a PhD student both at University of Bucharest (Romania) and University of Le Havre (France). She is involved in research activities in the field of multifunctional materials with medical applications, the synthesis, and structural, morphological as well as ultrasonic characterisation of bioceramic materials. She already has co-authored more than 15 relevant papers in her field of work. .

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