Multifunctional Bionanostructured Materials

Abstract

Author: **Mariana Oana Mihaela FUFĂ (GHERASIM)**

PhD. Supervisor: Prof. Ecaterina ANDRONESCU

Given the challenges and shortcomings of classical pharmacotherapy – related to the partial efficacy of pharmaceutical drugs, complexity of pathophysiological processes, continuous evolution of drug resistance mechanisms – there is an immediate global need towards the fabrication of new and effective pharmacologically active platforms.

Owing to their attractive and versatile physicochemical and microstructural features, impressive biofunctionality and tunable outcomes, nanosized and nanostructured biomaterials are promising candidates for the development of safe and performance-enhanced pharmacotherapeutics.

With the aim of developing nanostructured bioactive systems for antimicrobial therapy and tissue engineering applications, the experimental activity within this thesis included the synthesis, optimization and evaluation of new biomaterials, such as: (i) biopolymer systems that potentiate the pharmacological effects of antibiotics and anti-inflammatory drugs; (ii) nanostructured thin films that prevent and limit the microbial contamination and colonization of biomedical surfaces; and (iii) nanostructured coatings modified with bioactive molecules that modulate periprosthetic infections and the osseointegration of metallic implants.