Conference paper

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Polymer engineering for drug/gene delivery: from simple towards complex architectures and hybrid materials

Abstract: The paper summarizes the history of the drug/gene delivery domain, pointing on polymers as a solution to specific challenges, and outlines the current situation in the field – focusing on the newest strategies intended to improve systems effectiveness and responsiveness (design keys, preparative approaches). Some recent results of the authors are briefly presented.

Keywords: controlled drug delivery systems; gene therapy; magnetic carriers; particulate polymer systems; POC-2014; stimuli-sensitive polymers.

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Introduction

Significant human and financial resources have been always invested in medical research and development. Nowadays, the annual growth of sales for medical systems using biomaterials and the development of connected industries is, by far, one of the highest [1]. According to recent healthcare market research reports systems for drug delivery, diagnostics and regenerative medicine are among the global top ten medical device technologies.

In this context, a major contribution to medical technologies comes from chemical engineering research, interfacing bioengineering and materials science. One main research direction is aimed at understanding how materials interact with the human body, i.e., twigging the factors affecting materials biocompatibility and therapeutic efficiency, while another one is dealing with new biomaterials and devices to address unsolved medical problems.

Specific requirements are to be met in the effort towards macromolecular materials with correct engineering, chemical and biological properties for the intended medical application. First, to reduce the costs of

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