

Polymer-based particles for controlled drug delivery

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Abstract

In a number of biomedical applications, an important challenge is related to the possibility of controlling the availability of some active molecules both in space and in time so as to get the most efficient action.

Indeed, some active molecules lack of solubility in the biological medium. Alternatively, it may be relevant to regulate the amount of some molecules in time so as to avoid certain undesirable side effects. Other applications require inducing the preferential accumulation of the drug in the neighborhood of some specific organs with the aim of increasing efficiency and selectivity.

Encapsulation of active molecules in micro- or nanoparticles with well-controlled characteristics like shape, size distribution and surface coverage, may be a way to address the previous challenges. Elaboration of convenient polymeric particles can be achieved by the use of specific processes involving intermediate emulsification steps and using polymers which exhibit biocompatibility. It is then necessary to carry out chemical modification of some biopolymers or to take the opportunity of spontaneous complexation to obtain and control their accumulation at interfaces. This is of fundamental importance for ensuring colloidal stability. In addition, encapsulation efficiency and kinetics of drug release also depend on such considerations.

Several examples of recent works on that topic will be given and commented.

Keywords: Polysaccharide, Micro- and Nanoparticles, Encapsulation, Emulsion.

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