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PLGA-based Nanoparticles: A New Paradigm in Biomedical Applications

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Highlights

- Structure-property relationship of PLGA on the concept of developing nanoparticles
- Surface modification for providing functional sites to improve surface properties
- Nanotechnology based applications in the field of therapeutic medicine
- Research in nano-probes for theragnostic and its potential future

Abstract

Three decades back polymers were first introduced as bioresorbable surgical devices. Since then polymer based nanoparticles have intrigued many research groups to be extensively used in a variety of fields. Nanocarrier formulated with the *US FDA* and *EMA* approved biocompatible and biodegradable polymers are being explored for the controlled delivery of various therapeutic agents. Amidst the various polymers synthesized for formulating polymeric nanoparticles PLGA has enticed considerable attention. PLGA possess many alluring properties such as controlled and sustained release properties, low cytotoxicity, long standing track records in biomedical applications, biocompatibility with tissues and cells, prolonged residence time, and targeted delivery. The prime objective of this review is to comprehensively address the issues related to PLGA based nanoparticles with special reference to methods of preparation, characterization techniques, surface modification, mechanism of drug release and the pitfalls. The review also critically addresses the developmental aspects of PLGA based nanocarriers in terms of targeted drug delivery, and exploring their efficacy in vitro and in vivo.

Keywords: Biodegradable; Poly (lactic-co-glycolic acid); Nanoparticles; Targeting; Sustained release.

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