Surface Functionalization of Polymeric Nanoparticles for Tumor Drug Delivery: Approaches and Challenges

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Abstract:

Introduction: For years, injectable polymeric nanoparticles (NPs) have been developed for delivering therapeutic agents to the tumors. Frequently, NPs surface have been modified with different moieties and/or ligands to impart stealth effect and/or elicit specific cellular interactions, both known to dramatically affect the in vivo fate and efficacy of these NPs. Areas covered: We discuss different types of ligands and molecules used for surface functionalization of polymeric NPs for tumor drug delivery. First, we summarize methods used through the literature for surface modification of polymeric NPs, then discuss challenges that face researchers either in decorating NPs with desired surface functionalities, characterizing functionalized surfaces or achieving intended cellular interactions and in vivo effects. Expert opinion: Modification of NP surfaces dramatically alters their behavior and favorably enhances their therapeutic efficacy. Choice of surface ligand/functionality should be based on intended therapeutic outcomes, taking into consideration the potential of clinical translation and scale up of the developed systems.

Keywords:

Nanoparticles, polymeric, tumor therapy, ligands, functionalization, cell targets

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