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Engineering drug nanocarriers for delivery of chemotherapeutic drugs

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Abstract

Nanocarriers have seen a growing interest in drug delivery technologies and the success of the carrier depends on the size, shape and the surface structure and chemistry of the carrier in the context of the delivery pathway. This article develops a map of guildelines for design of nanoparticle based chemotherapy. It reviews the mechanism of delivery in different pathways, physiology and chemistries involved and barriers to transport and delivery of nanocarrier based drugs, specifically for chemotherapeutic drugs. The microenvironment and physiology of a tumor site and its chemical environment is also reviewed, focusing on the impact on delivery. For each of these primary pathways including transdermal, parenteral, mucosal, and oral, nanoparticle size, method of formation and functional characteristics are defined based on the hurdles to transport and mechanisms that aid delivery. Targeting and release mechanisms with these different kinds of nanocarriers are also reviewed. Successful lab and commercially available solutions are compared to these design parameters and a map of nano-carrier design guidelines are developed and presented.

Biograpgy

Rahul Misra has studied bachelor of technology in biotechnology and received his M.Tech degree in biotechnology from National Institute of Technology, Durgapur, INDIA in 2011. Currently he is pursuing his Ph.D on “Chromonic nanoparticles for controlled release of cancer drugs” from Indian Institute of Technology-Delhi, INDIA. He has 4 international publications and 3 book publications on environmental health and textile wastewater treatment. He has presented several research papers in national & international conferences worldwide. His areas of interests are Nanoparticles mediated drug delivery, Nanomaterials, Adsorption, Environmental biotechnology.