Available online on 15.05.2019 at http://jddtonline.info

Journal of Drug Delivery and Therapeutics

Open Access to Pharmaceutical and Medical Research

Open Access Mini Review

Enhancing Drug Delivery Systems: Pegylated Drug delivery and Nanoparticle Aided Drug Delivery

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Article Info: Received 27 March 2019; Review Completed 06 May 2019; Accepted 10 May 2019; Available online 15 May 2019

Cite this article as:

He W, Enhancing Drug Delivery Systems: Pegylated Drug delivery and Nanoparticle Aided Drug Delivery, Journal of Drug Delivery and Therapeutics. 2019; 9(3):505-506 http://dx.doi.org/10.22270/jddt.v9i3.2667

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INTRODUCTION

Drug delivery systems, like pegylated drug delivery with modified albumin and catalase, and nanoparticles aided camptothecin, hold much promise for tumor patients. Both forms attempt a more targeted and efficient delivery and circulation time of the drug and this assures better results[1-9].

The success of a pegylated drug delivery system with modified albumin and catalase has been researched, and it was identified that. PEG chains modified with various molecular weights made them efficient in targeted therapy and diagnosis[10-17]. The below is the PEG PCL polymersomes and their actual effect on glioblastomas in-vitro and in-vivo (Figure 1)[18].

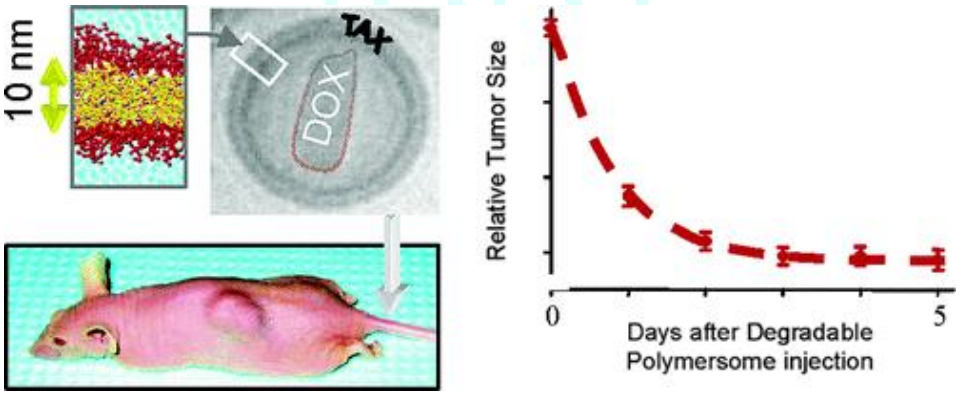

Figure 1: PEG-PCL polymersomes in vitro and in vivo actions-The mapping of relative tumor size against days after degradable polymersome injection

Pegylation is a procedure where hydrophilic polymer polyethylene glycol PEF is attached to a therapeutic module to deliver protein, peptides and other small molecules. In the history of PEG delivery, it has been identified that it enhances the circulation time of molecule or drugs in vivo given the drugs a more enhanced time to localize action. The possibilities, available in pegylation, present much potential for its use. For instance, the most frequently applied PEG is dual hydroxyl groups-the HO-PEG-OH or the monomethoxy PEG (mPEG) which is a single hydroxyl group[19-24]. While these are standard forms, the chemistry of pegylation means that active groups can be used to modify PEG, and this offers for more diverse uses. Research works specifically showed how pegylated gold nanorods that trigger the drug release improve the efficacy of the drug in mouse with human glioblastoma. Cancer cell apoptosis was enhanced.

Additionally, the ability of the pegylated liposomes to entrap anti-cancer drugs such as Doxorubicin for delivering targeted high payload to the tumor and the improved stability of the drug are reasons why modified PEG delivery systems warrant more research in the context of cancer. The nanoparticle-loaded active drug has the potential for target delivery of therapeutic agents into tumor cells[18,25-30]. Nanoparticles have the characteristics of enhanced permeability and retention, and this allows for the medicine to remain in the bloodstream for a much longer time. Drug retention in the bloodstream is reported, and this enables better-continued action. It was highlighted that the use of covalent camptothecin conjugates for nanomedical drug delivery also could carry similar benefits. All these studies aim to present an enhanced drug delivery system, identical to the pegylated drug delivery and the camptothecin conjugates in nanomedical drug delivery.

The review thus presented two critical methods used for enhancing therapeutic action on tumors through an improved drug delivery system. The improvement in the delivery method holds much promise for patients with tumors as it helps retain the drug in circulation for more extended periods and this is a more effective action[31-36]. More research in this area could reveal ways of combinatorial therapies that can be carried out with this form of drug delivery.

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