

Characterization And Release Profile Of Hybrid PLGA-Lipid Nanoparticles Of 5-Fluorouracil: Superior Chemotherapeutic Potential And p53 Expression In Mammary Tumors



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The use of 5-fluorouracil (5FU) is associated with multifaceted challenges and dose-related toxicities due to the off-target accumulation and poor pharmacokinetics. Ehrlich carcinoma is a mouse breast cancer cell line which is highly similar to the human tumors and acquires high sensitivity to diverse types of antitumor agents. We aimed to utilize a modified single-step nanoprecipitation method for formulating hybrid PLGA-lipid 5-FU nanoparticles. We prepared 15 nanoformulas however, that # 11 showed the best characteristics and tested the chemotherapeutic potential against experimental mammary carcinoma. Determination of particle size by laser diffraction showed size ranges from 139 -210 nm. By increasing the PLGA concentration in the organic phase, size and the polydispersity index of nanoparticles were modified. It was found that release of drug was much sustained from formula PLNs11 and after 12 h, release was about 80 % of stated amount. Biological experiment included groups of female mice carrying mammary solid carcinoma (MC) were divided into groups: 1) MC control, 2&3) MC+ free 5-FU, 4&5) MC+ 5-FU nanoparticles. Mice treated with 5-FU nanoparticles showed the least tumor masses and very few histological tumor mitosis and giant cells. Immunohistochemical staining indicated that treatment with 5-FU nanoparticles increased intratumoral p53 expression compared to free 5-FU indicating superior chemotherapeutic potential. Our results support the validity of utilizing hybrid PLGA-lipid nanoparticle technique to improve the chemopreventive action of 5FU in treating mammary cancer.

Biography

Prof. Sawsan Zaitone has 82 peer reviewed publications in 42 different international Scopus or WOS journals in various fields of basic sciences such as: Physiology, Pharmacology, Toxicology and Molecular biology. She is classified within the top 2% scientist list released by Stanford University in October 2021. She is an international reviewer in more than 115 internationally recognized journals (listed in WOS) and performed more than 755 reviews for papers under evaluation for possible publications in these journals. She collaborated with many research groups and more than 200 scientists from different nationalities and specialties in Pharmacy, Medicine, Dentistry, Sciences and Veterinary Medicine.

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