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An Alternative Nano Design Strategy by Neutralized AMPS and Soy Bean Lecithin to Form Nanoparticles

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Abstract : Paclitaxel is used in treatment of different cancer types mainly breast, ovarian, lung and Kaposi's sarcoma. It is poorly soluble in water; therefore, currently used formulations tremendously show side-effects and high toxicity. Encapsulation of the drug in a nano drug carrier which causes both reducing side effects and increasing drug activity is a desired new approach for the nano-medicine to target the site of cancer. In this study, synthesis of a novel nano paclitaxel formulation made of a new amphiphilic monomer was followed by the investigation of its pharmacological properties. UV radical polymerization was carried out by using the monomer Lecithin-2-Acrylamido-2-methylpropane (L-AMPS) and the drug-spacer, to obtain sterically high stabilized, biocompatible and biodegradable phospholipid nanoparticles, in which the drug paclitaxel (Pxl) was encapsulated (NanoPxl). Particles showed high drug loading capacity (68%) and also hydrodynamic size less than 200 nm with slight negative surface charge. The drug release profile was obtained and in vitro cytotoxicity test was performed on MCF-7 cell line. Consequently, these data indicated that paclitaxel loaded Lecithin-AMPS/PCL-MAC nanoparticles can be considered as a new, safe and effective nanocarrier for the treatment of breast cancer.

Keywords : paclitaxel, nanoparticle, drug delivery, L-AMPS
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