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PEG-PLA Nanoformulation for Breast Cancer Therapy
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Abstract
Worldwide, breast cancer is the second most common type of cancer among women next to lung cancer. Recurrence is seen in 30% patients treated in their early stages of breast cancer due to therapeutic inefficiency. Breast cancer accounts for 25% of the women cancer patients. The major drawback of drugs are their side effects due to systemic delivery and non-Targeted drug uptake. Nano formulations based drug delivery systems have the potential to ameliorate the problems associated with non-Targeted delivery of potent drugs to the cancer cells thereby overcoming the side effects which at many times deprive the breast cancer patients the much-needed quality of life. Polymer nano formulations present advantageous properties as drug delivery systems when compared to conventional therapy. PEG-PLA nano formulations are biocompatible and biodegradable. The optimal size of nanoformulation is 10-200 nm. Polylactic acid (PLA) is a biodegradable polymer and in aqueous environments it is metabolized into water and carbon dioxide. Polyethylene glycol (PEG) presents outstanding properties like flexibility, biocompatibility, tailorable properties and good hydrophilicity. The copolymerised PEG-PLA has a great potential to be used for drug delivery systems as a nano carrier. In PEG-PLA composition, PLA is hydrophobic and PEG is hydrophilic. Wide spectrum of drug molecules like anastrozole (ANS), methotrexate (MTX), bortezomib (BTZ), thioridazine (Thio) and doxorubicin (Dox) are loaded very effectively thereby increasing their efficacy. The main aim of the polymeric nanoformulation is rate controlled and tissue targeted release of specific drugs. PEG-PLA nanoparticles can be used for their biodegradability and amphiphilic characteristics. The drug release of PEG-PLA nano formulations will be discussed in particular for their modifiable characteristics, chemico-mechanical properties and their therapeutic efficacy against breast cancer. We are delivering the drug using nano formulations to kill the cells; along with the drugs can we send anything else for targeted delivery thereby increasing the drug payload onto the breast cancer tumor surface. © (2022) Society for Biomaterials & Artificial Organs #20059722.

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breast cancer; controlled release; drug delivery; nanoformulation; PEG-PLA

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