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Combined approach of biosimilar trastuzumab monoclonal antibody with nanoparticles targeted to prostate tumor cells

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The objective of this study was to develop Trastuzumab monoclonal antibody (TMAB) Biosimilar, Docetaxel (DTXL) poly lactide-co-glycolide acid (PLGA)-Nanoparticles (TMAB-DTXL-PLGA-NPs) by the conjugation of Trastuzumab monoclonal antibody with Nanoparticles for targeting delivery of Docetaxel to prostate cancer cells. Biosimilars also known as follow-on biologics are biologic medical products whose active drug substance is made by a living organism or derived from a living organism which can locate tumor cells and either kill them or deliver tumor-killing substances to them without harming normal cells. Combining monoclonal antibody therapy with chemotherapy Docetaxel may kill more tumor cells. Here the developmental approach of nanoparticulate systems that offer improved chemotherapeutic delivery through increased solubility and sustained retention times is an area of intense focus in Nanomedicine. In additionally, active targeting of DTXL-PLGA-NPs through conjugation of tumor-specific cell surface markers as Trastuzumab monoclonal antibodies can enhance the efficacy of nanoparticle drug delivery systems while significantly reducing toxicity. The polyethylene glycol (PEG) groups on the surface of the PLGA Nanoparticles were functionalized using maleimide groups. Trastuzumab, a monoclonal antibody against human epidermal growth factor receptor 2 (HER2) antigens of cancer cells, used as the targeting moiety, was attached to the maleimide groups on the surface of PLGA Nanoparticles. Nanoparticles prepared by a nanoprecipitation method were characterized for their size, size distribution, surface charge, surface morphology, drug-loading and *in vitro* drug release profile. The cytotoxicity of TMAB-DTXL-PLGA-NPs against HER2-positive cell lines was significantly higher than that of non-targeted PLGA Nanoparticles (DTXL-PLGA-NPs) and free Docetaxel (DTXL).

Biography

Dubey Satendra Kumar is currently pursuing his PhD in Pharmaceutical Biotechnology at JSS College of Pharmacy, Ooty, Tamilnadu (JSS University, Mysore). He received his BPharm & MPharm in Pharmaceutics from RGPV, Bhopal and BPUT, Rourkela, respectively. He holds also BSc & LLB from APSU, Rewa and LLM in IPR from UOU, Nainital. He has over seven years of experience in industrial and academic. He has an excellent academic record to his credit and has published papers in peer reviewed journals. He is life-member of APTI & IPA. Presently He is engaged in research on Antibody based Nano-Drug delivery targeted to Prostate cancer.

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