عنوان مقاله:

Multilayer Nano-Micros tructures for Smart Drug Delivery

محل انتشار:

بیست و سومین کنگره بین المللی هیبریدی پزشکی تولید مثل و هجدهمین کنگره هیبریدی فناوری سلولهای بنیادی رویان (سال: 1401)

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خلاصه مقاله:

Nano and Micro-based delivery sys tems are representing rapidlydeveloping science where materials in the nano and/or microscale range are employed to deliver therapeutic agents tospecific targeted sites in a controlled manner. Right selection ofthe biomaterials and the applied fabrication technique dependingon the delivery route of interes t (oral, dermal, nasal, etc.)are the key factors to guarantee an efficient, noninvasive andconvenient drug delivery.An example is local chemotherapy with the advantage of providinga high concentration of drug directly into the tumor siteand thereby decreasing the side effects associated with drug cytotoxicity.In one of our s tudies, we fabricated an electrospuncomposite patch including a co-drug-loaded graphene oxidebasednanocarrier for local breas t cancer application and demonstrated a synergis tic cytotoxicity effect of the applied drugs.Oral drug delivery is another attractive method among variousdelivery routes. Oral dosage forms are s till the gold s tandard forthe treatment and management of chronic and debilitating diseases.Compared to conventional single-unit dosage forms, microand nanoparticles have gained increasing interes t for developmentof novel gas trointes tinal drug delivery sys tems. Whils tsome superiorities are reported for nanoparticles including largersurface-area-to-volume ratio, more uniform dis tribution andhigher cellular uptakes, microparticles also benefit from severaladvantages such as enhanced peptide s tability, improvedprotection agains t enzymatic degradation, and facilitated oralabsorption. Such characteris tics raise the need to make use ofboth nano and microparticulate formulations for maximum benefit.To this end, we have designed, fabricated and characterizednovel Multilayer Nanofibrous Microparticle sys tems for smartoral drug and cell delivery applications. The multilayer construct provides us with the potential to load various drugs orbioactive agents in different layers where other factors such ashydrophilicity/hydrophobicity of the applied biopolymers, thethickness of each layer and the compression pressure duringcutting can alter the delivery site or change the release trend.

کلمات کلیدی: