predictive tests of tumor radiosensitivity and define therapeutic treatments targeted to individual tumor subtype.

Ibuprofen containing mucus-penetrating nanoparticles as therapeutic tool for the treatment of inflammation in Cystic Fibrosis

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Conductance regulator protein (CFTR). The airways of CF patients are plugged with mucopurulent secretions containing abundant bacteria and neutrophils, and death results from progressive destruction of the lungs Cystic fibrosis (CF) is a lethal disease triggered by mutations in the gene encoding the CF transmembrane. Ibuprofen was found to significantly reduce this extreme inflammation, but despite the encouraging results obtained, in clinical the anti-inflammatory therapy is rarely practiced because of the poor penetration of drugs through mucus barrier. A novel approach could be allowed by designing particles with mucus-penetrating properties. Generally, particles with size lower than 500 nm and a neutral surface coated

by mucus inert materials are able to diffuse through pores generated by the dense fiber mesh of mucus. In this work, ibuprofen containing mucus-penetrating nanoparticles were realised starting from fluorescent derivatives of α,β-poly(N-2-hydroxyethyl)-D,L-aspartamide (PHEA), synthesized by derivatization of PHEA with Rhodamine (RhB), polylactide (PLA), and poly(ethyleneglycol) (PEG), to obtain PHEA-RhB-PLAPEG copolymers with different degrees of pegylation. Starting from these copolymers, fluorescent nanoparticles (FNPs) with different PEG content, empty and loaded with ibuprofen, were successfully prepared and showed colloidal size, slightly negative ζ potential, spherical shape and biocompatibility towards human bronchial epithelial cells (16-HBE). The presence of PEG chains and their brush-like conformation on the NPs surface was evaluated. Then, the ability of these FNPs to avoid interactions with mucus components and to penetrate CF artificial mucus (CF-AM) was properly demonstrated as a function of surface PEG density. Finally, ibuprofen release profile and uptake capacity within 16-HBE in presence of CF-AM was successfully verified.