PDMS-PMOXA-Nanoparticles Featuring a Cathepsin B-Triggered Release Mechanism

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Author(s) Ehrsam, Daniel; Porta, Fabiola; Hussner, Janine; Seibert, Isabell; Meyer Zu Schwabedissen, Henriette E.
Author(s) at UniBasel Meyer zu Schwabedissen, Henriette ; Hussner, Janine ; Seibert, Isabell ; Porta, Fabiola ; Ehrsam, Daniel ;
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It was our intention to develop cathepsin B-sensitive nanoparticles for tumor-site-directed release. These nanoparticles should be able to release their payload as close to the tumor site with a decrease of off-target effects in mind. Cathepsin B, a lysosomal cysteine protease, is associated with premalignant lesions and invasive stages of cancer. Previous studies have shown cathepsin B in lysosomes and in the extracellular matrix. Therefore, this enzyme qualifies as a trigger for such an approach.; Poly(dimethylsiloxane)-b-poly(methyloxazoline) (PDMS-PMOXA) nanoparticles loaded with paclitaxel were formed by a thin-film technique and standard coupling reactions were used for surface modifications. Despite the controlled release mechanism, the physical properties of the herein created nanoparticles were described. To characterize potential in vitro model systems, quantitative polymerase chain reaction and common bioanalytical methods were employed.; Stable paclitaxel-loaded nanoparticles with cathepsin B digestible peptide were formed and tested on the ovarian cancer cell line OVCAR-3. These nanoparticles exerted a pharmacological effect on the tumor cells suggesting a release of the payload.
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