Entrapment of ROS Generating Quinones in Stimuli-Responsive Peptide Beads

P. U. Richard[1], J. Gaitzsch[1], I. Craciun[1], L. Weiner[2]*, C. G. Palivan[1]*

[1]University of Basel, [2]Weizmann Institute of Science, Israel

Quinones, specifically anthraquinones, have been reported to act as DNA intercalant and to mediate the production of reactive oxygen species (ROS), thus inhibiting cell growth [1]. These properties make anthraquinones interesting candidates for cancer therapy. However, their mechanism of action does not confer them selectivity for cancer cells. Systemic toxicity can be reduced by the use of a delivery system capable of releasing its cargo in tumor tissue.
Short amphiphilic peptides have been reported to self-assemble into various nano-structures, including multi-compartment micelles that can entrap small hydrophobic molecules. Stimuli-responsive release of the payload can be achieved, for instance, by insertion of a reduction sensitive bond between the hydrophilic and hydrophobic parts of the peptide [2].
This project aims at entrapping ROS generating quinones in peptide beads self-assembled from an amphiphilic peptide. The hydrophobic sequence of the peptide is linked to a hydrophilic oligo-histidine sequence by a disulfide bond. This system should prevent systemic toxicity and allow release of the active compound in a reducing environment such as cancer tissue.
Preliminary in vitro experiments showed reduced toxicity of the compound when entrapped in peptide beads and further experiments aim at showing an increase in toxicity in a reductive environment resulting from the release of the quinones.

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