Affinity Induced Surface Functionalization of Liposomes Using Cu-Free Click Chemistry - DTU Orbit (09/11/2017)

Affinity Induced Surface Functionalization of Liposomes Using Cu-Free Click Chemistry

Functionalization of nanoparticles is a key element for improving specificity of drug delivery systems toward diseased tissue or cells. In the current study we report a highly efficient and chemoselective method for post-functionalization of liposomes with biomacromolecules, which equally well can be used for functionalization of other nanoparticles or solid surfaces. The method exploits a synergistic effect of having both affinity and covalent anchoring tags on the surface of the liposome. This was achieved by synthesizing a peptide linker system that uses Cu-free strain-promoted click chemistry in combination with histidine affinity tags. The investigation of post-functionalization of PEGylated liposomes was performed with a cyclic RGDfE peptide. By exploring both affinity and covalent tags a 98 ± 2.0% coupling efficiency was achieved, even a diluted system showed a coupling efficiency of 87 ± 0.2%. The reaction kinetics and overall yield were quantified by HPLC. The results presented here open new possibilities for constructing complex nanostructures and functionalized surfaces.

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