Peptide mediated targeting angiogenesis with nanoparticles.

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ABSTRACT

Robust angiogenesis underlies aggressive growth of tumors. Therefore, one of the mechanisms to inhibit angiogenesis is to starve tumor cells. Angiogenesis is regulated through a complex set of mediators and recent evidence shows that integrin αvβ3 and vascular endothelial growth factors (VEGFs) play important regulator roles. Therefore, selective targeting of αvβ3 integrin and VEGFs is a novel anti-angiogenesis strategy for treating a wide variety of solid tumors. One approach is to coat nanoparticles with peptides that bind specifically to the αvβ3 integrin and the VEGF receptor .The synthetic peptide bearing Arg-Gly-Asp (RGD) sequence is known to specifically bind to theαvβ3 integrin expressed on endothelial cells in the angiogenic blood vessels, which can potentially inhibit the tumor growth and proliferation. Following hydrophobic modifications, glycol chitosan is capable of forming self-aggregated nanotube and has been used as a carrier for the RGD peptide, labeled with fluoresein isothiocyanate (FITC-GRGDS) .These nanotubes loaded with FITC-GRGDS might be useful for monitoring or destroying the angiogenic tissue/blood vessels surrounding the tumor tissue. (RGDSK-RNT) rosette nanotubes are a G/C motif which imparts functional versatility to the nanotubes for specific medical or biological applications. Therefore, the RNTs can be potentially modified to target a variety of therapeutic molecules in vivo to treat cancer and novel class of nanotubes that are biologically inspired and naturally water soluble upon synthesis. These nanotubes are formed from guanine-cytosine motif as building blocks. However, one of the novel properties of the RNT is the ability to accept a variety of functional groups at the inflammatory diseases.

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