Nanoporphyrin Nanoparticles for Combination Phototherapy and Drug Delivery to Infantile Hemangiomas

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Technology description

Infantile hemangiomas are benign, vascular tumors of childhood affecting 5-10% of all infants, with lesions appearing shortly after birth and growing rapidly to cause potential disfigurement, functional loss, or even life-threatening complications in a significant proportion of patients. Surgical treatment of IH is difficult because of the highly vascular nature of the tumors, and current non-surgical treatment modalities are far from curing the disease. There is thus a need for non-invasive, high efficacy methods for the treatment of IH.

Researchers at the University of California, Davis have developed a novel treatment method for IH that combines photodynamic therapy and the therapeutic compound propranolol using nanoporphyrin nanoparticles. Proof of concept studies in a reproducible mouse model have shown that photodynamic therapy delivered by nanoporpyhrin nanoparticles is effective in ablating IH tumors. When injected into mice, nanoporphyrin nanoparticles accumulate in IH tumors and are triggered by laser light to produce reactive oxygen species that destroy vascular cells in IH. Additionally, propranolol can be loaded into nanoporphyrin nanoparticles, and when triggered by laser light nanoparticles, release propranolol in IH creating a second treatment effect. Researchers are expecting that this combined treatment will be more effective than the existing methods in the treatment of IH. Because of its minimally invasive, tissue-specific nature, this composition has the potential for delivering higher levels of therapeutic to IH tumors with fewer systemic side effects while preventing the disfiguring consequences of IH.

Researchers at the University of California Davis have developed a novel treatment method that combines photodynamic therapy and the therapeutic compound propranolol using a nanoparticle platform to treat infantile hemangiomas (IH).

Application area

Infantile hemangiomas and other vascular malformations

Advantages

Minimally invasive
Tissue specific
Fewer systemic side effects compared to other treatments
Double therapeutic action of photodynamic therapy and propranolol

Institution

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