Removal of Ruthenium-Initiator from Brush-Arm Star Polymers (BASPs) via Core-to-Surface Ring-Opening Methathesis Polymerization (ROMP)

Technology #19525

Applications

This technology is an improved method for manufacturing nanoparticles that has applications as a research tool or therapeutic drug delivery platform

Problem Addressed

Small (<30 nm) nanoparticles are promising drug delivery carriers for cancer therapy. Brush arm star polymer (BASP) nanoparticles are simple to assemble and customize. This technology significantly expands upon the functionality of BASP nanoparticles.

Technology

BASP nanoparticles are typically assembled in two steps. First, bottlebrush-like structures with many polymer arms are synthesized using ring opening metathesis polymerization (ROMP) with a ruthenium initiator. Second, many bottlebrushes are crosslinked to form the nanoparticle structure. This technology adds a third step that simultaneously adds additional polymer arms to the nanoparticle thus providing a way to greatly improve the drug loading and functionality of BASPs. These improved BASP-out nanoparticles can be easily loaded with therapeutic drugs or imaging agents, and the inventors demonstrated highly efficient uptake of fluorophore labeled BASP-out nanoparticles into human cancer cells *in vitro* as well as outstanding efficacy and safety profiles *in vivo*.

Advantages

- Greatly increases the functionality of BASP nanoparticles for use *in vivo*
- Highly efficient uptake into cancer cells
- Nanoparticles can be loaded with therapeutics and/or imaging agents

Categories For This Invention:

Life Sciences
Clinical Applications
Oncology
Imaging
Research Tools
Therapeutics
Drug Delivery

255 Main Street, room NE 18-501
Cambridge, MA 02142-1601
Phone: 617-253-6966 Fax: 617-258-6790
http://tlo.mit.edu
Contact the Technology Manager: tlo-inquiries@mit.edu

Intellectual Property:

Core-to-surface polymerization for the synthesis of star polymers and uses thereof
PCT
2019-006422
Core-to-surface polymerization for the synthesis of star polymers and uses thereof
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Inventors:

Jeremiah Johnson
Matthew Golder

External Links:

Johnson Group
http://web.mit.edu/johnsongroup/

255 Main Street, room NE 18-501
Cambridge, MA 02142-1601
Phone: 617-253-6966 Fax: 617-258-6790
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