Chemically Amplified Response Strategies for Medical Sciences

Tech ID: 19815 / UC Case 2010-089-0

BACKGROUND

With the rapid progress of nanotechnology over the past decade, there is growing interest in polymeric biomaterials that can be remotely disassembled in a controlled fashion upon an external stimulus but otherwise stable under physiological conditions. Various internal and external stimuli, such as pH, specific enzymes, temperature, and ultrasound, are being explored. Optical stimulus is especially attractive as it can be remotely applied for a short period of time with high spatial and temporal precision. Near-infrared (NIR) light can penetrate deeper into tissue and has many in vivo applications. Despite these advantages, there is a dearth of biomaterials that can efficiently respond to light, especially NIR light.

TECHNOLOGY DESCRIPTION

Researchers from UC San Diego have designed a new light-sensitive degradable polymer containing a quinone-methide, self-immolative moiety, which can be triggered to degrade through multiple light-sensitive groups. Nanoparticles formulated from this polymer are capable of releasing their molecule payload upon irradiation by UV and NIR light. The details of this technology are published in the patent application (2011/038117).

ADVANTAGES

Potential advantages from molecularly engineering linear dual-response mechanisms into the backbone of polymeric nanoparticles include enhanced stability and prolonged shelf life, while also increasing the response sensitivity and efficacy of targeted delivery to diseased environments. In addition, this polymeric nano-carrier technology may reduce overall toxicity by decomposing into easily excretable fragments. This technology is designed to be versatile where the triggering group can be sensitive to a number of wavelengths.

INTELLECTUAL PROPERTY INFO

International patent application, published 31Mar2011 (2011/038117).

RELATED MATERIALS

- Fomina N, McFearin C, Sermsakdi M, Edigin O, Almutairi A. UV and Near-IR Triggered Release from Polymeric Nanoparticles. J Am Chem Soc. 2010 Jul 21;132(28):9540-2.

RELATED CASES

2012-355

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,724,417	08/08/2017	2010-089
United States Of America	Issued Patent	8,828,383	09/09/2014	2010-089

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OTHER INFORMATION

KEYWORDS

non-invasive medicine, medical devices, nanotechnology

CATEGORIZED AS

- **Medical**
  - Devices
  - Diagnostics
- **Nanotechnology**
  - Tools and Devices

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