

Polymeric Nano-Carriers with a Linear Dual Response Mechanism to Detect Disease

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BACKGROUND

The rapid progress of nanotechnology in the past decade has fueled a 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 are being explored.

Tissue homeostasis of pH, enzymes, reactive oxygen species and transition metals are highly regulated processes that are altered in pathological states. Mildly acidic pH and mildly oxidative environments are common in metabolic disorders such as cancer. pH-activation has long been a useful tool for differentiating between healthy and disease-state tissue in the pharmaceutical industry. Active targeting exploits atypical extra and intra cellular microenvironments and other physiological characteristics to distinguish between targeted and untargeted tissue.

TECHNOLOGY DESCRIPTION

Researchers from UC San Diego have designed 'smart' or 'sensing' nanoprobes (polymeric nano-carriers) responsive to pH and hydrogen peroxide stimuli, useful for amplifying contrast activation. Specifically, this technology comprises research designs and methods to deactivate and reactivate the contrast signal of magnetic resonance imaging (MRI) contrast agents and near infrared (NIR) contrast agents by the use of encapsulated dual response nano-carriers.

ADVANTAGES

Potential advantages from molecular engineering linear dual-response mechanisms in 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.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,687,553	06/27/2017	2010-189
United States Of America	Issued Patent	8,758,778	06/24/2014	2010-189

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OTHER INFORMATION

CATEGORIZED AS

- ▶ **Medical**
 - ▶ Delivery Systems
- ▶ **Nanotechnology**
 - ▶ NanoBio

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