

Biocompatible Polymeric Nanoparticles Responsive to Biologically Relevant Levels of Hydrogen Peroxide

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BACKGROUND

Oxidative stress is caused predominantly by accumulation of hydrogen peroxide and distinguishes inflamed tissue from healthy tissue.

Hydrogen peroxide could potentially be useful as a stimulus for targeted drug delivery to diseased tissue. However, current polymeric systems are not sensitive to biologically relevant concentrations of H2O2.

TECHNOLOGY DESCRIPTION

University researchers have developed compositions and synthesis methods that pertain to biocompatible polymeric capsules capable of undergoing backbone degradation and cargo release upon exposure to biologically relevant concentrations of hydrogen peroxide (50-100 μ M of H2O2). In the invention, a bioresponsive polyester bearing boronic ester triggers groups that degrade upon exposure to low concentrations of H2O2. Applications are in the field of targeted drug delivery to diseased tissue (e.g., associated with inflammatory diseases like chronic obstructive pulmonary disease and rheumatoid arthritis), using hydrogen peroxide as trigger. Advantages of the invention are good synthetic accessibility and hydrolytic stability, fast H2O2 triggered cleavage kinetics, good biocompatibility, and the formation of only small degradation molecules that should be easily cleared by the body.

RELATED MATERIALS

- “Biocompatible Polymeric Nanoparticles Degrade and Release Cargo in Response to Biologically Relevant Levels of Hydrogen Peroxide” J. Am. Chem. Soc., 2012, 134 (38), pp 15758–15764, DOI: 10.1021/ja303372u - 09/04/2012

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,333,264	05/10/2016	2013-058

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OTHER INFORMATION

CATEGORIZED AS

- **Medical**
 - Delivery Systems
 - Devices
- **Nanotechnology**
 - Tools and Devices

RELATED CASES

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