Biodegradable Luminescent Porous Silicon Nanoparticles for In Vivo Applications

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BACKGROUND

Nanomaterials that can circulate in the body hold great potential to diagnose and treat disease. For such applications, it is important that the nanomaterials be harmlessly eliminated from the body in a reasonable period of time after they carry out their diagnostic or therapeutic function. Despite efforts to improve their targeting efficiency, significant quantities of systemically administered nanomaterials are cleared by the mononuclear phagocytic system before finding their targets, increasing the likelihood of unintended acute or chronic toxicity. However, there has been little effort to engineer the self-destruction of errant nanoparticles into non-toxic, systemically eliminated products.

TECHNOLOGY DESCRIPTION

UC San Diego researchers have developed luminescent porous silicon nanoparticles (LPSiNP) that can carry a drug payload and whose intrinsic near-infrared photoluminescence allows in-vivo monitoring of accumulation and degradation. Unlike most optically active nanomaterials (e.g., carbon nanotubes, gold nanoparticles, quantum dots), LPSiNP self-destruct into renally cleared components relatively quickly with little evidence of toxicity. The invention also provides imaging agents (e.g., tumor imaging using dextran-coated LPSiNP). It presents a new type of multifunctional nanostructure with a low-toxicity degradation pathway for in vivo applications.

RELATED MATERIALS

- Park, J.-H.; Gu, L.; Maltzahn, G. v.; Ruoslahti, E.; Bhatia, S. N.; Sailor, M. J., "Biodegradable Luminescent Porous Silicon Nanoparticles for *In Vivo* Applications." Nature Mater. 2009, 8, 331-336.
- Safer Nanoparticles SpotlightTumors, Deliver Drugs, see the following two links:
  http://ucsdnews.ucsd.edu/newsrel/science/02-09safenano.asp
  http://ucsdnews.ucsd.edu/video/safenano.html
- NSF Discovery: Safer Nano Cancer Detector

INTELLECTUAL PROPERTY INFO

This invention has patent pending and is available for sponsored research and/or licensing.

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OTHER INFORMATION

KEYWORDS

porous silicon, luminescence, near-infrared photoluminescence nanomedicine, nanotechnology, nanoparticles, drug delivery, imaging agent, tumor targeting

CATEGORIZED AS

- **Medical**
  - Delivery Systems
  - Diagnostics
- **Nanotechnology**
  - NanoBio

RELATED CASES

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