

Polymer Nanotubes as Molecular Probes and DNA Carriers

May 1 2006

By growing polymers on a porous aluminum oxide template, researchers at the Seoul National University in Korea have fabricated polymer nanotubes to which they can attach two different types of molecules. These new nanoscale structures could be used to deliver imaging and therapeutic agents to targeted cells.

Reporting its work in the journal *Advanced Functional Materials*, a group headed by Jyongsik Jang, Ph.D., describes the methods it used to create polymeric nanotubes with two different types of reactive molecules on their surfaces. By growing the nanotubes on a porous aluminum membrane, the researchers are able to control the overall structure of the nanotube, including the thickness of its walls and its diameter.

With the nanotubes in hand, the investigators then attached a variety of targeting, imaging and therapeutic molecules to the surface of the nanotubes. The researchers then performed detailed physical characterizations of the functionalized nanotubes.

In addition, the investigators conducted a set of imaging experiments in which they used a short stretch of DNA as a targeting molecule and a fluorescent dye as the imaging agent. The piece of DNA that the researchers chose recognizes and binds to the BRCA1 tumor suppressor gene, mutations in which increases susceptibility to developing breast cancer. When administered to breast cancer tumor cells, the targeted nanotubes were taken up by the cells and bound to the mutant gene. The nanotubes bound to the BRCA1 gene were clearly visible under a

fluorescence microscope.

This work is detailed in a paper titled, “Dual-functionalized polymer nanotubes as substrates for molecular-probe and DNA-carrier applications.” An abstract of this paper is available at the [journal's website](#).

Source: National Cancer Institute

Citation: Polymer Nanotubes as Molecular Probes and DNA Carriers (2006, May 1) retrieved 9 April 2024 from <https://phys.org/news/2006-05-polymer-nanotubes-molecular-probes-dna.html>

| |
|--|
| <p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p> |
|--|