

Bismuth nanoparticles provide high fidelity images of breast tumors

January 20 2012

By combining a nanoparticle that is readily visible in X-ray computed tomography (CT) scans with a molecule that targets tumor lymph vessels and other tumor tissues, a research team from the University of California, San Diego (UCSD) and the Sanford-Burnham Medical Research Institute has developed a new imaging agent that provides high-fidelity CT images of tumors and their edges. This work, led by Michael Sailor of UCSD and Erkki Ruoslahti of the Burnham Institute, was published in the journal *Angewandte Chemie International Edition*.

The researchers chose to create a nanoparticle from bismuth, the same element that forms the active ingredient in Pepto-Bismol. Bismuth, with its relatively large and massive nucleus, interacts strongly with X-rays, making it an ideal agent to increase contrast in CT images. To target their bismuth nanoparticles to tumors, the investigators used a small cyclic peptide known as LyP-1. This peptide, discovered in Dr. Ruoslahti's laboratory, homes specifically to the [lymphatic vessels](#) that drain many tumors, as well as to tumor tissues themselves.

Safety tests showed that the bismuth-LyP-1 nanoparticle was well-tolerated when injected into mice and that the nanoparticles cleared from blood and accumulated in tumors within 24 hours. [CT imaging](#) of tumor-bearing mice clearly revealed the presence of tumors and provided a very sharply-detailed image of the tumor margins for a full week after injection. Eventually, the nanoparticles clear from the body through the intestines.

This work, which is detailed in a paper titled, "X-ray computed tomography imaging of [breast cancer](#) by using targeted peptide-labeled bismuth sulfide [nanoparticles](#)," was supported in part by the NCI Alliance for Nanotechnology in Cancer, a comprehensive initiative designed to accelerate the application of nanotechnology to the prevention, diagnosis, and treatment of cancer. [An abstract of this paper](#) is available at the journal's website.

Provided by National Cancer Institute

Citation: Bismuth nanoparticles provide high fidelity images of breast tumors (2012, January 20) retrieved 22 June 2024 from <https://phys.org/news/2012-01-bismuth-nanoparticles-high-fidelity-images.html>

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.