Researcher Finds Early Photon Imaging Detects Lung Cancer

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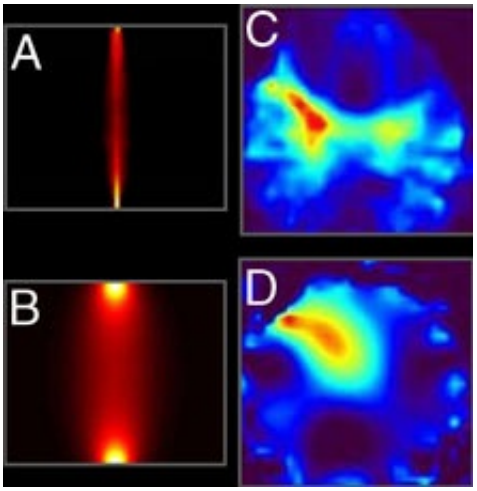

(PhysOrg.com) -- A novel, high-resolution fluorescence imaging system may be used to detect lung cancer at early stages. According to a report recently published in the *Proceedings of the National Academy of Sciences,* researchers from Northeastern University and the Technical University of Munich have developed a way to use near-infrared light in molecular imaging to peer deep into the body's diseased cells and tissues.

The near-infrared imaging system uses an ultra-fast laser source and high-speed cameras to generate three-dimensional images of fluorescent bio-markers. So far this system has been used to create richer, high-fidelity

images of lung cancer in mice and associated biochemical changes in surrounding tissues.

The team, including lead author Mark Niedre, assistant professor of Electrical and Computer Engineering at Northeastern University, and Vasilis Ntziachristos, professor and Chair for Biological Imaging at the Technical University of Munich, used a fluorescent molecular probe that was specific to a tumor-associated protease to image the lung cancer.

"We were able to capture fluorescent photons that arrived at the detector earliest and therefore underwent significantly less scattering" said Niedre. "In doing so, we were surprised to find that, not only were we able to see tumors in lungs with more clarity, but we were able to resolve features in the image that were not visible with more conventional optical methods."

The enhanced images allowed detection of primary tumors, but also systemic biochemical changes in surrounding tissue associated with inflammatory response and disease progression, in this case yielding complementary information to that obtained with standard X-ray CT. Although at an early stage of development, researchers are hopeful that the technique will become a valuable biomedical research tool, and one day possibly even applied clinically.

Titled "Early photon tomography allows fluorescence detection of lung carcinomas and disease progression in mice in vivo," the study was conducted while Niedre was a post-doctoral fellow at Massachusetts General Hospital in Boston. Niedre is continuing his research at Northeastern University where his interests include diffuse fluorescence tomography, time-domain imaging and photodynamic therapy.

Provided by Northeastern University