



Tool for Breast Cancer Research -Reducing the need for Biopsy

Combined Scintimammography and Digital X-Ray

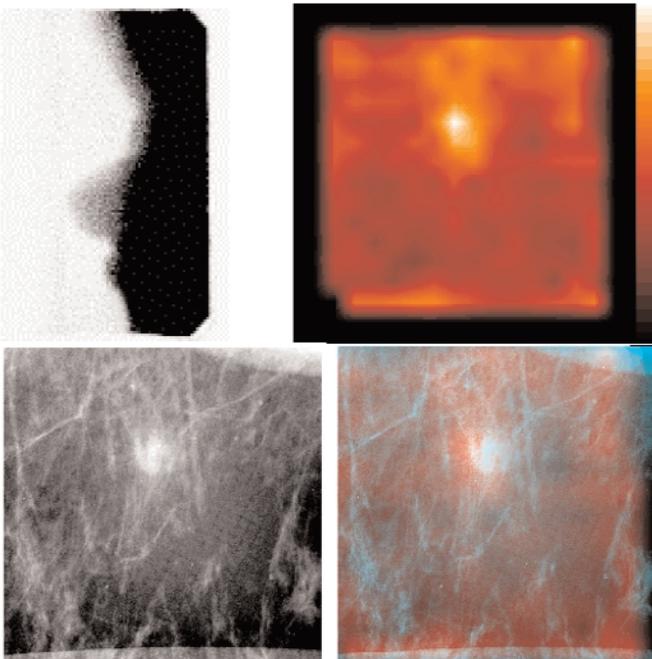
Researchers at the Department of Energy's Thomas Jefferson National Accelerator Facility (Jefferson Lab) are collaborating with Riverside Regional Medical Center in Newport News, VA and Hampton University in Hampton, Va on a medical imaging research program which could reduce the need for breast biopsies. The collaboration is conducting a clinical study employing a dual modality imaging system utilizing scintimammography and digital radiography. The purpose of the study is to obtain clinical data on the reliability of scintimammography in predicting the malignancy of suspected breast lesions. The ultimate goal is to reduce the number of false positives associated with conventional x-ray mammography. The scintimammography gamma camera built by the Jefferson Lab Detector Group is a custom mini gamma camera with an active imaging area of 5.3 cm x 5.3 cm, much smaller than a standard clinical full size gamma camera.

Advantages

The mini gamma camera is optimized for use in conjunction with a commercially available x-ray guidance system for stereotactically guided core needle breast biopsy. Stereotactic breast biopsy is an x-ray guided method for localizing and sampling suspect breast lesions identified from a patient's mammogram. Scintimammography uses standard radioactively-labeled biological tracers to distinguish the breast cancerous tissue from healthy tissue. This system allows researchers to accurately compare the ability of scintimammography to predict the occurrence of cancer since every volunteer patient in the study has already been scheduled for a breast biopsy.

Nuclear Physics Spin-off

This medical research tool came from medical research conducted by physicists at Jefferson Lab to develop new high-energy particle detector components. These components are called crystal scintillators and position sensitive photomultiplier tubes. This project was started in 1998 with patient studies commencing in 1999. Jefferson Lab is presently supporting the research as technical advisors.



The four images shown (clockwise from top left) were obtained with a standard clinical gamma-camera (top-left), the mini gamma camera (top-right), digital biopsy x-ray (bottom-left), and a co-registered overlay image of the mini gamma camera image with the digital x-ray blue image (bottom-right). The standard camera image shows no evidence of a lesion, whereas the dedicated camera shows uptake correlated with the suspected lesion. The biopsy tested positive for a malignancy of the suspected lesion.