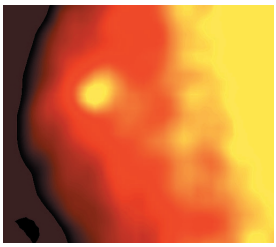
Medical Imaging for Breast Cancer –Scintimammography

Scintimammography

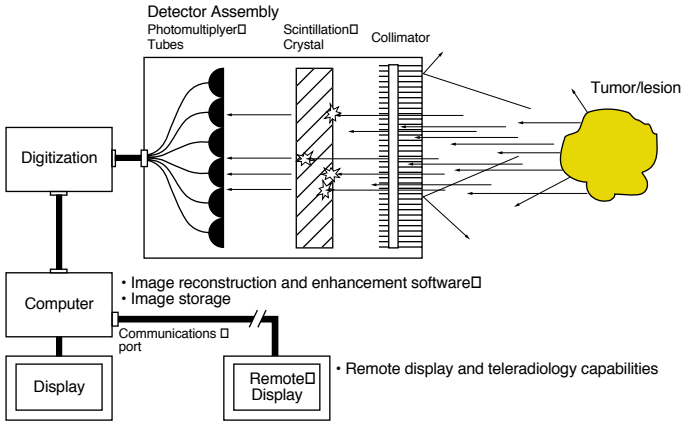
Researchers at the Department of Energy's Thomas Jefferson National Accelerator Facility (Jefferson Lab) are collaborating with a start-up company, Dilon Technologies, Newport News, Virginia, Johns Hopkins University (Dr. Cahid Civelek) and George Washington University on a new medical imaging device that improves scintimammography—a nuclear medicine method of breast tumor detection.



Scintimammography used at Johns Hopkins during clinical trials after mammogram identified an area of uncertainty.

Scintimammography scan of a malignant breast tumor (Dilon Technologies)

Scintimammography uses standard biological tracers to locate the tumor. Biological tracers are specially prepared chemicals carrying a gamma-ray emitting radioactive isotope that can mark certain biological processes. Medical researchers have shown that several types of cancer cells uptake and accumulate these markers more readily than normal cells. The new device "senses" the gamma-rays emitted by the tumor and using those gamma rays, the device builds an image of the tumor.



Simplified schematic of imaging system

Advantages of Scintimammography

- Improves evaluation of positive mammograms
- Differentiates between benign and malignant tissue
- Detects small tumors in cases where mammograms are difficult or impossible to read
- Could reduce the need for biopsy
- Allows images where none were possible before

Unlike standard devices, this imaging detector is capable of capturing close views of the tumor, and increasing accuracy in detection and localization of small lesions.

Other Possible Applications Include:

- Thyroid Studies
- Cardiac Diagnosis
- Stress Fracture Imaging
- Renal Transplant Studies
- Brain Death Determination

Current Status

The gamma imager has undergone clinical trials at Johns Hopkins University, Baltimore, MD. Dilon Technology is presently marketing the device. Further clinical trials are planned at George Washington University.

Partners

Development supported via Cooperative Research And Development Agreement (CRADA) between Dilon Technologies and Jefferson Lab with the support of the Department of Energy's Division of Nuclear Physics.

Nuclear Physics Spin-off

This medical application spin-off came from research conducted by physicists at Jefferson Lab to develop new high energy particle detector components. These components are called crystal scintillators and position sensitive photo multiplier tubes. The time from initial detector development to this medical application is three years.