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Dilon Technologies Explores Improvements in Molecular Breast Imaging

(Newport News, Virginia: November 7, 2007)– This past weekend study results on "Molecular Breast Imaging with Directly Opposing Compact Gamma Cameras" were presented at the Nuclear Science Symposium and Medical Imaging Conference in Honolulu, Hawaii.

The goal of the laboratory study was to evaluate the performance of a dual-head, breast-specific gamma camera system in a configuration in which the two imaging detectors are positioned on opposite sides of the breast. The detectors are aligned with each other such that the rows and columns of the pixilated crystal of each detector align precisely with the opposite detector. Imaging performance was evaluated to determine if there is any significant improvement of dual detectors vs. a single detector. The objective was to determine if the combination of the two resulting images allows for more sensitive detection of small lesions in all regions of the breast, independent of lesion location or depth, when compared to single-view imaging. The imaging system used in this study utilized two Dilon 6800 high-resolution, small field-of-view gamma detectors.

In one phantom study, contrast and signal-to-noise (SNR) ratio were calculated for simulated lesions located at various positions from the two detectors. Two methods of combining the opposing images from the two detectors were investigated – a summed image and a product image. The images from the two detectors were combined on a pixel-by-pixel basis, either by summing the pixels (summed image) or by multiplying them (product image). The study found that the contrast in the product image is a factor of two larger than in the summed image and is always better than a single-head image.

Relative to single-sided imaging there is an advantage to dual-sided breast imaging, provided the proper algorithm (product of two images) is used. Dual-sided breast imaging using the product algorithm provides improved contrast, spatial resolution and SNR and may allow for shorter imaging time. In addition, it allows for uniform lesion visibility throughout the breast volume, independent of lesion depth. Optimization of the algorithm for combining the images may further improve the performance beyond the presently used multiplication.

Some of the practical challenges of implementing a dual-head system over a single-head system include the substantial cost increase of adding a second detector as well as limited portability. In addition, having dual heads makes it difficult to do axilla views and image small body parts for various other nuclear medicine procedures, thus limiting the system's versatility.

While laboratory phantom studies with a dual-head system seem promising, it is not yet clear if or how much its utilization will improve the clinical sensitivity of molecular breast imaging over that of a single-head system. Dilon continues to believe that the single-head system provides broader clinical utility and cost-effectiveness than the dual-head approach and that the clinical imaging standard of craniocaudal and mediolateral oblique views provides excellent results, which has been demonstrated in clinical studies and private practice on over 20,000 patients. Dilon Technologies, through its relationship with the Thomas Jefferson National Accelerator Facility, is committed to the exploration of emerging technologies and will pursue those that are clinically viable. Collaborators of the study include: the Virginia Detector Development Group at the University of Virginia in Charlottesville, Virginia; the Detector and Imaging Group at Thomas Jefferson National Accelerator Laboratory in Newport News, Virginia; and Dilon Technologies, Inc. of Newport News, Virginia. About BSGI with the Dilon 6800 Gamma Camera Breast-Specific Gamma Imaging (BSGI) performed with the Dilon 6800, is a molecular breast imaging technique that can see lesions independent of tissue density and discover very early stage cancers. BSGI serves as a complementary diagnostic adjunct procedure to mammography and ultrasound for difficult-to-diagnose patients. With BSGI, the patient receives a radioactive tracing agent that is absorbed by all the cells in the body. Cancerous cells in the breast, due to their increased rate of metabolic activity, absorb a greater amount of the tracing agent than normal, healthy cells and generally appear as "hot spots" on the BSGI image. BSGI is ideal for patients with mammograms that are difficult to interpret due to a variety of factors, such as: dense breast tissue, suspicious areas on a mammogram, lumps that can be felt but not seen with mammography or ultrasound, implants and breast augmentation, scarring from previous surgeries and for women with a strong positive family history of breast cancer.

About Dilon Technologies

Dilon Technologies is bringing innovative new medical imaging products to market. Dilon's cornerstone product, the Dilon 6800, is a high-resolution, small field-of-view gamma camera, optimized to perform Breast-Specific Gamma Imaging (BSGI), a molecular breast imaging procedure which images the metabolic activity of breast lesions through radiotracer uptake. Many leading medical centers around the country are now offering BSGI to their patients, including: Cornell University Medical Center, New York; George Washington University Medical Center, Washington, D.C.; Northwestern Memorial Hospital, Chicago; and The Rose, Houston. For more information on Dilon Technologies please visit www.dilon.com.

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