An individualized approach to breast cancer treatment

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Not all breast cancers are the same, and not all will have fatal consequences. But because clinicians find it difficult to accurately determine which tumors will metastasize, many patients do not receive the therapy fits their disease.

Tel Aviv University has now refined breast cancer identification so that each course of treatment is as individual as the woman being treated.

The new approach -- based on a combination of MRI and ultrasound -- is able to measure the metabolism rates of cancer cells. The approach helps determine at an earlier stage than ever before which cells are metastasizing, and how they should be treated.

The method, expected to start clinical trials in 2010, is currently being researched in Israel hospitals.

Leading the Way to a New Field of Medicine

"We have developed a non-intrusive way of studying the metabolism of breast cancer in real time," says Dr. Ilan Tsarfaty, a lead researcher from TAU's Sackler Faculty of Medicine. "It's an invaluable tool. By the time results are in from a traditional biopsy, the cancer can already be radically different. But using our technique, we can map the tumor and its borders and determine with high levels of certainty — right away — which patients should be treated aggressively."

The research falls in a new field called "translational and personalized medicine", and Dr. Tsarfaty says it has the potential to save thousands of lives. Papers describing his methodologies were published recently in the journals *Cancer Research* and *Neoplasia*.

"Current breast cancer treatments are not tailored to individual patients," Dr. Tsarfaty says. "Our approach to profiling individual tumors will not only help save lives today, it will provide the basic research for developing cancer drugs of the future," he says.

An Application to Other Cancers

The new research can be applied to all solid tumors, including those resulting from lung and brain cancer, and could be used to respond to a wide spectrum of neurodegenerative diseases, such as Alzheimer's, Dr. Tsarfaty reports.

Dr. Tsarfaty's MRI-and-ultrasound-imaging application monitors the metabolic changes that occur during cancer metastasis. Increased blood flow (which can be sensed by ultrasound) and an increase of oxygen consumption (measured with an MRI) can indicate cancer metastasis with unprecedented levels of sensitivity.

Normally scientists look for structural changes in the body, such as the presence of a tumor. But with their new methods, Dr. Tsasfaty and his team -- which includes his wife, a radiologist -- are actually able to "see" cancer metastasis within a small group of cells long before the cancer spreads to other organs in the body.

Earlier Detection, Earlier Treatment

"Today, clinicians only diagnose cancer when they see a tumor several

millimeters in size. But our diagnosis can be derived from observing only a few cells, and looks specifically at the activation levels of a protein called Met. Activated Met is an oncogen," he says. "If the tumor cells show activation of Met, we can design personalized medicine to treat a specific kind of breast cancer."

At Tel Aviv University, Dr. Tsarfaty is now working to establish a Molecular Imaging Center — one of the first to encompass a multi-discipline approach to cancer imaging and treatment. The Breast Cancer Research Foundation of America supports his research.

Source: American Friends of Tel Aviv University