

NEW METABOLIC IMAGING METHOD HELPS BETTER TAILOR CHEMOTHERAPY

Toronto, ON (May 19, 2010) – For the first time ever, Sunnybrook researchers demonstrate in as early as four weeks, breast cancer tumour response during patients' neoadjuvant chemotherapy using diffuse optical spectroscopy, a less expensive, "metabolic activity" detecting imaging modality. The study is published in this month's [Clinical Cancer Research](#) and tracks responses over multiple times during patient therapy.

Diffuse optical spectroscopy shows strong potential over conventional imaging, providing functional imaging to better monitor tumour activity such as changes in oxyhemoglobin, deoxyhemoglobin, lipid and water content. This imaging modality uses risk-free near infrared light and does not require the patient to be injected with a contrast agent. Diffuse optical spectroscopy is relatively less expensive than modalities such as MRI and PET, and can be used more readily in smaller settings. Diffuse optical spectroscopy measures near infrared absorption and light scattering spectra across tissue and provides three-dimensional metabolic maps of tumour activity in the breast.

"We now have evidence at multiple times during pre-surgical chemotherapy that shows significant differences between patients responding to therapy and those who were not at four weeks after starting therapy. An accurate, faster determination means better potential to individualize treatment," says Dr. Gregory Czarnota, principal investigator and radiation oncologist at [Sunnybrook's Odette Cancer Centre](#) and assistant professor, departments of [Radiation Oncology](#) and [Medical Biophysics](#), University of Toronto.

"Our goal is to continue to reduce toxicity for women while ensuring the chemotherapy is optimal in reducing the tumour. With conventional imaging it is many months of chemotherapy before one might better tell how a patient is responding and whether to alter the regimen or the treatment approach. With this new, more functional imaging, we can see more tumour activity early on which means a better therapeutic ratio and better chance there will be no cancer after surgery," says Dr. Rebecca Dent, study co-investigator and medical oncologist and co-lead, Locally Advanced Breast Cancer Clinic at Sunnybrook's Odette Cancer Centre.

Joanne Nevison, age 50, was a participant in the trial. Her case was very responsive to the specific neoadjuvant chemotherapy she was on. This was very apparent from the diffuse optical spectroscopy scans taken of the tumour. "It's worth a lot to know *that* much sooner, the type of chemo I was on, was right for me," says Joanne.

The researchers conducted diffuse optical spectroscopy scans with ten women diagnosed prior with locally advanced breast cancer. Five scans per patient were taken up to three days before treatment and at one, four and eight weeks after neoadjuvant treatment before surgery. Responders to treatment and non-responders were significantly different for all functional parameters at the four-week scan. These measurements were confirmed by whole-mount pathology outcomes.

Locally advanced breast cancer involves tumours greater than five centimetres in size, involve the skin or chest wall and include inflammatory breast cancer. Pre-surgical neoadjuvant chemotherapy, and sometimes radiotherapy, are often used to decrease tumour bulk to allow for more breast-conserving surgery. Locally advanced breast cancer represents up to 20 per cent of all newly diagnosed breast cancers in women in North America.

The device used to conduct the study is the SoftScan system developed by [ART Advanced Research Technologies Inc.](#), Montreal, Canada. The study was funded by a [Cancer Care Ontario](#)

Research Chair in Experimental Therapeutics and Imaging, [Natural Sciences and Engineering Council of Canada](#), [Ontario Institute for Cancer Research](#) and the Odette family.