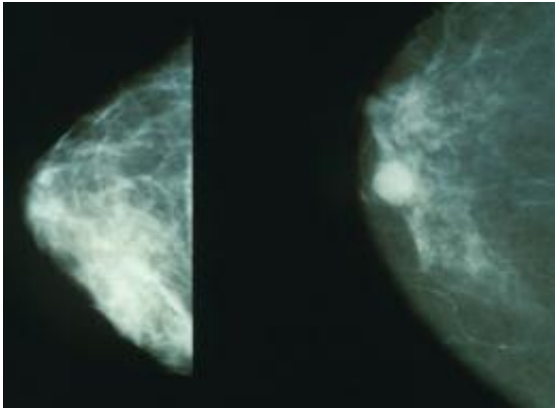


Study measures breast cancer tumor response to neoadjuvant chemotherapy

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Mammograms showing a normal breast (left) and a cancerous breast (right).
Credit: Wikipedia.

A Dartmouth study suggests that it may be possible to use Diffuse Optical Spectroscopic Tomographic imaging (DOST) to predict which patients will best respond to chemotherapy used to shrink breast cancer tumors before surgery. These findings could eliminate delays in effective early treatment for tumors unlikely to respond to neoadjuvant chemotherapy (NAC). The study, "Predicting breast tumor response to neoadjuvant chemotherapy with Diffuse Optical Spectroscopic Tomography prior to treatment," was published online in *Clinical Cancer Research* on October 7, 2014.

Breast cancer is the most common non-skin cancer in women worldwide,

and the second leading cause of women's cancer mortality in the United States. A common treatment strategy after diagnosis is to shrink [breast cancer](#) tumors larger than 3 centimeters with a 6- to 8-month course of NAC prior to surgery. Clinical studies have shown that patients who respond to NAC have longer disease-free survival rates, but only 20 to 30 percent of patients who receive NAC fit this profile.

"Our work represents the first clinical evidence that tumor total hemoglobin (estimated from DOST images) is different in the women with locally [advanced breast cancer](#) who respond to [neoadjuvant chemotherapy](#)," said lead author Shudong Jiang, associate professor of Engineering at the Thayer School of Engineering at Dartmouth. "We were able to predict breast tumor response to NAC based on image data acquired before the initiation of therapy."

DOST imaging is used to measure tumor tissue for hemoglobin and oxygen saturation levels—key indicators of the presence the tiny blood vessels [cancer tumors](#) need to grow. This study suggests that biomarkers obtained through DOST imaging could help physicians determine the best treatment strategy for patients.

"The implication of this information is that certain tumors are pre-disposed to responding to neoadjuvant [chemotherapy](#), and that this predisposition could be known prior to choosing the therapy," says Jiang. "The study also could dramatically accelerate future randomized clinical trials on optimal NAC regimes. By using a validated imaging surrogate as an outcome measure, we could potentially reduce the number of patients required, and the length of time they need to be followed."

Jiang says the next step will be to develop a portable and compact system to more accurately measure changes in the breast prior or/and during neoadjuvant chemotherapy. This system could be integrated into the workflow of clinical oncology practice to maximize patient participation,

and determine whether additional prognostic information could be obtained that would influence patient management.

Provided by The Geisel School of Medicine at Dartmouth

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