Proteins do not predict outcome of herceptin treatment in HER2-positive breast cancer

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Precisely quantifying the amount of three different HER growth proteins, along with several other proteins believed linked to breast cancer, did not predict a patient's outcome after treatment for HER2-Positive Breast Cancer with Herceptin, say Mayo Clinic researchers. HER2-positive breast cancer gets its name from a protein called human epidermal growth factor receptor 2 that promotes cancer cell growth.

The finding, presented at the 2011 CTRC-AACR San Antonio Breast Cancer Symposium, represents a disappointment to oncologists who had hoped to find distinct biomarkers beyond standard HER2 testing that could help them gauge how well Herceptin will work for patients.

"This study debunks the hopeful notion, strongly felt in the breast cancer community, that measuring levels of a number of different proteins in the HER2 family could help oncologists better tailor their use of Herceptin," says the study's senior investigator, Edith Perez, M.D., director of Mayo Clinic's Breast Program in Florida.

"Improving our ability to predict the benefit of Herceptin treatment beyond testing for HER2 protein and genes remains an important goal, but we are not there yet," she says.

Currently, patients are considered eligible for Herceptin if a pathologist estimates that at least 10 percent of their tumor samples test positive for HER2 growth proteins. However, the test is relatively subjective, based on a HER2 stain on a slide of tumor tissue. While the test can predict the outcome of Herceptin treatment, which shuts down the HER2 growth receptor for some patients, it cannot do so for all patients, Dr. Perez says.

Researchers used a tool that precisely measures the amount of a protein expressed in a cancer sample. According to Dr. Perez, this study was the first to meticulously measure protein levels, including HER2, HER3, HER4, EGFR (epidermal growth factor receptor), ER (estrogen receptor), and PTEN (a tumor suppressor gene) in almost 1,400 tumor biopsies.

Many researchers thought that analysis of the HER3 protein might be a good predictive marker because HER2 and HER3 interact together to promote cancer growth, Dr. Perez says.

"A biopsy could have 80 percent HER3 protein, and it wouldn't be any different in terms of a patient's outcome from Herceptin use than a tumor that had 5 percent HER3 protein," she says.

The next step to finding predictive biomarkers showing a benefit to Herceptin use will be to look at multi-gene profiles, not single biomarkers, Dr. Perez says.

Provided by Mayo Clinic