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Promising clinical trial results of tucatinib with T-DM1 against HER2+ breast cancer

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Virginia Borges, M.D., MMSc, and colleagues report promising phase 1b results for tucatinib and T-DM1 against HER2+ breast cancer. Credit: University of Colorado Cancer Center

Phase 1b clinical trial results published in *JAMA Oncology* show promise

for the combination of tucatinib (formerly ONT-380) with T-DM1 against heavily pretreated HER2-positive breast cancer. Of 57 patients treated, 48 percent responded to the combination, with cancer control of median 8.2 months. Importantly, tucatinib acted against brain metastases stemming from HER2+ breast cancer, a major cause of mortality from the disease.

"At University of Colorado Cancer Center, we've worked with this drug since it was discovered by ARRAY BioPharma in Boulder. First it was ARRAY-380, then ONT-380 and now it's called tucatinib. Since then, our institution has taken a lead effort in bringing it into trials and now into places where we are seeing it provide real benefit for women," says Virginia Borges, MD, MMSc, director of the Breast Cancer Research Program and Young Women's Breast Cancer Translational Program at CU Cancer Center.

About 20 percent of breast cancers are considered HER2-positive, meaning that these cancer cells overexpress "receptors" that bind human epidermal growth factor 2 (HER2). When HER2 receptors on cancer cells trap HER2, it signals the uncontrolled reproduction of these cells. However, the reverse is also true: When HER2+ breast cancer cells are unable to bind HER2, they die.

Tucatinib is a small molecule inhibitor of the HER2 growth factor receptor. The drug works by targeting the HER2 "tyrosine kinase—a link in the chain of communication that allows HER2 receptors to signal the growth of the cell. Importantly, the fact that it is a small molecule means the drug is able to pass through the blood-brain barrier to act against brain metastases of the disease. HER2+ breast cancer is more likely to affect younger women and also more likely than other breast cancers to metastasize specifically to the brain.

"One of the best things about this drug is that it combines well with

nearly everything. It is so well tolerated that when you test tucatinib in combination with other drugs, it feels like you're just giving the other drug. It's a pill. It works. And it hardly causes side effects. It's really a doctor's dream," Borges says.

Accordingly, tucatinib is being evaluated in a number of other trials and with additional partners, for example another trial offered at CU Cancer Center and elsewhere exploring the use of the drug as a component of a combination against so called triple-positive breast cancer (those cancers expressing estrogen, progesterone and HER2 receptors). Borges hopes that the effectiveness of tucatinib in patients with metastatic disease who have tried previous treatments may lead to trials of the drug used earlier in the course of treatment.

In the current trial, tucatinib was combined with Ado-Trastuzumab Emtansine (T-DM1), which is one in a class of drugs known as antibody-drug conjugates. In this case, an antibody called trastuzumab that binds to HER2 is combined with a drug called emtansine that kills cells. Together, T-DM1 delivers the cell-killing drug directly to cancer cells marked by HER2.

"It's a no-chemo regimen. Once the drug is approved, we hope to see this regimen come forward in the course of treatment. Ultimately, we hope it will prevent recurrences and also diminish the number of brain metastatic recurrences," Borges says.

Updated results will be presented at the San Antonio Breast Cancer Symposium in December, 2018.

More information: Virginia F. Borges et al, Tucatinib Combined With Ado-Trastuzumab Emtansine in Advanced ERBB2/HER2-Positive Metastatic Breast Cancer, *JAMA Oncology* (2018). DOI: 10.1001/jamaoncol.2018.1812