

Peptide delivers 1-2 punch to breast cancer in pre-clinical study

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Researchers at Wake Forest University Baptist Medical Center (WFUBMC) have discovered what may become a new weapon in the fight against breast cancer. For the first time, a peptide found in blood and tissue has been shown to inhibit the growth of human breast tumors in mice, according to a study recently published in the journal *Cancer Research*.

Patricia E. Gallagher, Ph.D., and E. Ann Tallant, Ph.D., scientists in the Hypertension and Vascular Research Center at WFUBMC, demonstrated that the peptide angiotensin-(1-7) attacked [breast cancer](#) in two ways: by inhibiting the growth of the breast cancer cells themselves and by inhibiting the growth of cancer-associated fibroblasts (CAFs), cells found in the tumor microenvironment -- the tissue surrounding the tumor. CAFs play a vital role in tumor initiation, growth and metastases by providing structural support for the [tumor cells](#) and by producing growth factors that help the tumor cells grow.

In this study, mice were injected with human [breast cancer cells](#) to form the two most common types of breast tumors -- estrogen-receptor and HER2 sensitive. In women with breast cancer, an estimated 50 to 60 percent have estrogen-receptor sensitive tumors and 20 to 30 percent have HER2 sensitive tumors.

Once the tumors grew, the mice were injected with either angiotensin-(1-7) or saline for 18 days. In the mice treated with angiotensin-(1-7), there was a 40 percent reduction in tumor size as

compared to the saline-injected mice, whose tumors grew three times their size at the initiation of treatment. Breast tumor fibrosis also was reduced by 64 to 75 percent in the mice treated with the peptide as compared to the saline-injected mice. Fibrosis is the thickening of the breast tissue around and within the tumor that acts as a scaffold to support the spread of cancer cells.

"This is the first study to show that angiotensin-(1-7) not only inhibits the growth of tumors, but also inhibits [breast tumor](#) fibrosis," Gallagher said. "Think of it as a seed and the soil around it – the seed being the tumor and the soil being the fibrosis. You can attack the seed, or you can attack the soil, or do both, and our drug does both."

The tumor microenvironment is especially important when the cancer has metastasized, Tallant said, because drugs that are effective for treating the primary tumor often are not effective in treating a tumor growing in a different part of the body. "Our findings also suggest that angiotensin-(1-7) may enhance the effect of chemotherapeutic agents when administered in combination with other drugs by altering the microenvironment in which the tumor grows," she said.

"Because the safety of angiotensin-(1-7) was established here at Wake Forest Baptist in a recently completed trial in patients with different types of solid tumors, we hope to go to clinical trials for breast cancer relatively soon," Gallagher said.

Gallagher's and Tallant's initial research conducted at the Comprehensive Cancer Center at Wake Forest Baptist showed that angiotensin-(1-7) inhibited the growth of vascular smooth muscle cells, the cells that surround blood vessels and regulate blood pressure. Previous studies showed that patients treated with drugs to reduce blood pressure and increase angiotensin-(1-7), also had a smaller chance of developing cancer. Based on this information, Gallagher and Tallant

studied the effect of the peptide on lung cancer and discovered that angiotensin-(1-7) inhibited the growth of lung tumors in mice, as well as reduced the supply of blood vessels to the growing tumor. Their latest study, as reported in [Cancer Research](#), now shows additional effects of angiotensin-(1-7).

Both scientists and Wake Forest University Baptist Medical Center hold a patent on the use of angiotensin-(1-7) for the treatment of cancer.

Provided by Wake Forest University Baptist Medical Center

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