

Study shows drug effective in treating, preventing breast cancer

1 November 2007

A new study of an estrogen-derived drug shows promise as a treatment for breast cancer and breast cancer metastases to bone.

The study, which was done in mice, appears on the cover of the November issue of *Cancer Research*.

Urszula Iwaniec, an assistant professor in the Department of Nutrition and Exercise Sciences at OSU, is the one of the authors of the study, along with OSU professor Russell Turner and researchers from the Mayo Clinic. Iwaniec and Turner are both researchers at OSU's Skeletal Biology Laboratory.

In breast cancer, the cancer commonly lodges in the bone, destroying it in a debilitating painful process called osteolysis. Osteolysis can lead to bone fractures and causes patients to feel tired, or even to lose consciousness.

Iwaniec and Turner studied the effect of 2-methoxyestradiol (meth-oxy-es-tra-di-ol), or 2ME2, on the bone. 2ME2 is derived from estrogen and works by suppressing tumor growth and blocking the formation of new blood vessels that feed tumors.

"We were expecting the drug to have an effect, but we were not expecting to have as big of an effect as it did," Iwaniec said.

In studies of other cancers, 2ME2 has been shown to induce cancer cells to self-destruct. Otherwise, tumor cells evade this process allowing them to continually divide and spread throughout the body.

Clinical trials of 2ME2 for breast cancer patients are in progress. These trials are based on an oral version of 2ME2 to treat primary tumors, but this method has limitations as the oral version of 2ME2 is poorly suited to getting into the blood system and reaching tumors. Researchers resolved this

problem by delivering 2ME2 by injection and found it was much more effective.

Researchers described 2ME2 as an "attractive candidate for controlling tumor growth, metastasis to bone and bone disorders," such as osteolysis caused by the spread of breast cancer.

"This is potentially of very substantial importance because this agent has few of the unpleasant side effects of most chemotherapy drugs and targets both bone resorption and the cancerous tumor cells," Turner said. "It really is the first agent that has been clearly demonstrated to do that."

Turner said current drugs that are used to prevent bone fractures and bone pain in cancer patients are not effective in targeting the tumor cells. Turner has spent the past decade studying 2ME2 as a treatment for osteoporosis and a rare bone cancer called osteosarcoma, and is excited about its prospects as a cancer treatment.

"Often, treatments that are good for cancer are bad for the bones," he said. "2ME2 appears to be capable of treating both. If you had a treatment that both reduced the risk of bone cancer and osteoporosis, it would be extremely significant."

In summary, the researchers found that 2ME2 could:

- Effectively target breast cancer cells;
- Prevent the spread of breast cancer cells to bone;
- Protect bone from osteolysis, which is a type of bone metastasis in which the bone is eaten away by cancer cells.

The next step for the Mayo Clinic and OSU researchers is to replicate and test the finding in clinical trials.

Source: Oregon State University

APA citation: Study shows drug effective in treating, preventing breast cancer (2007, November 1)
retrieved 5 May 2021 from <https://medicalxpress.com/news/2007-11-drug-effective-breast-cancer.html>

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