

Vitamin D Analog Found To Boost Radiation

HANOVER, NH – A form of vitamin D has been found to greatly enhance radiation treatment for tumors associated with breast cancer, according to a new collaborative Dartmouth Medical School study. The findings support the potential benefits of combining a vitamin D analog with radiation to wipe out radiation-resistant cancer cells.

While radiation therapy is a common course of treatment after a malignant tumor is surgically removed, there are often cells that are resistant to radiation that may cause a recurrence of cancer in the patient's future. When combined with radiation, the vitamin D analog EB 1089 is capable of wiping out radio-resistant cells that may be present following the surgical removal of a tumor in a clinical situation.

The study, published in the June issue of the *Journal of Clinical Cancer Research*, compares tumor growth in mice treated with radiation alone and mice exposed to radiation and EB 1089, a derivative of vitamin D. Final tumor volume in animals irradiated with EB 1089 was approximately 50 percent lower than in the group that received radiation alone.

"The results of our latest study with EB 1089 are very encouraging," said lead author, Dr. Sujatha Sundaram, assistant research professor at Dartmouth Medical School. "The vitamin D analog has proven effective in enhancing radiation treatments in our prior studies with cell cultures and now in live mice. We are eager to push ahead to clinical trials with breast cancer treatments in humans."

Each year approximately 200,000 women in the United States are diagnosed with breast cancer. Of that number, about 40,000 die from the disease, making breast cancer the leading cause of cancer deaths among women between the ages of 20 and 59, according to the American Cancer Society. Radiotherapy is commonly used to treat breast cancer, both before surgery to reduce tumor size and after surgery to reduce tumor recurrence.

There has been increasing evidence that vitamin D – naturally manufactured by the body after exposure to sunlight – helps to prevent and treat several forms of cancer. But too much vitamin D has been found to induce excessive calcium that can affect bone metabolism and structure. The vitamin D analog EB 1089 has a modified chemical structure which has significantly fewer calcium-related side-effects. "It is relatively nontoxic, especially when compared to chemo-therapy treatments that cause hair loss, loss of appetite and several other side-effects," said Sundaram.

This is the first study to combine the vitamin D compounds with radiation, and “demonstrates a clear advantage in combining EB 1089 with irradiation in the control of breast tumor growth,” state the researchers.

"We're always trying to find drugs that will prevent cancer from recurring, yet be less toxic to the patient than the current chemotherapy regimens," said study co-author David A. Gewirtz, PhD, Virginia Commonwealth University Medical Center in Richmond, VA. "We're seeing very encouraging results in cell culture and animal studies when we add vitamin D analogs to radiation therapy."

The authors are optimistic that these findings could offer a significant benefit to patients suffering from radiation-resistant brain tumors and prostate cancer, not just breast cancer. They acknowledge that there are limitations in studies that use animal models to grow human tumors and say additional trials are needed. The analog EB 1089 is currently in clinical patient trials in Europe for the treatment of cancer, although it is not being used with radiation therapy.