

Breast cancer effectively treated with chemical found in celery

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Apigenin, a natural substance found in grocery store produce aisles, shows promise as a non-toxic treatment for an aggressive form of human breast cancer, following a new study at the University of Missouri. MU researchers found apigenin shrank a type of breast cancer tumor that is stimulated by progestin, a synthetic hormone given to women to ease symptoms related to menopause.

"This is the first study to show that apigenin, which can be extracted from celery, parsley and many other natural sources, is effective against human breast cancer cells that had been influenced by a certain chemical used in [hormone replacement therapy](#)," said co-author Salman Hyder, the Zalk Endowed Professor in [Tumor Angiogenesis](#) and professor of biomedical sciences in the College of Veterinary Medicine and the Dalton Cardiovascular Research Center.

In the study, Hyder and his colleagues implanted cells of a deadly, fast-growing human [breast cancer](#), known as BT-474, into a specialized breed of mouse. Some of the mice were then treated with medroxyprogesterone acetate (MPA), a type of progestin commonly given to post-menopausal women. A control group did not receive MPA.

Later one group of MPA-treated mice was treated with apigenin. [Cancerous tumors](#) grew rapidly in the mice which did not receive apigenin. In the apigenin-treated mice, breast [cancer cell growth](#) dropped to that of the control group, and the tumors shrank.

"We don't know exactly how apigenin does this on a chemical level," Hyder said. "We do know that apigenin slowed the progression of human [breast cancer cells](#) in three ways: by inducing cell death, by inhibiting [cell proliferation](#), and by reducing expression of a gene associated with [cancer growth](#). Blood vessels responsible for feeding cancer cells also had smaller diameters in apigenin-treated mice compared to untreated mice. Smaller vessels mean restricted nutrient flow to the tumors and may have served to starve the cancer as well as limiting its ability to spread."

The mice in Hyder's study were injected with apigenin. In the future, apigenin injections could be a safe alternative or supplement to the highly toxic chemotherapy drugs now in use.

"Chemotherapy drugs cause hair-loss, extreme fatigue and other side effects," Hyder said. "Apigenin has shown no toxic side-effects even at high dosages. People have eaten it since pre-history in fruits and vegetables."

Finding funding for clinical testing of apigenin in humans may be difficult, according to Hyder.

"Clinical trials of apigenin with humans could start tomorrow, but we have to wait for medical doctors to carry out that next step," Hyder said. "One problem is, because apigenin doesn't have a known specific target in the cancer cell, funding agencies have been reticent to support the research. Also, since apigenin is easily extracted from plants, pharmaceutical companies don't stand to profit from the treatment; hence the industry won't put money into studying something you can grow in your garden."

The research team included Benford Mafuvadze, doctoral student in biomedical sciences; Yanyun Liang, research scientist Dalton

Cardiovascular Research Center; Cynthia Besch-Williford, associate professor of veterinary pathobiology; and Xu Zhang, visiting researcher at the Dalton Cardiovascular Research Center.

The research was recently published online in the journal *Hormones and Cancer*.

Provided by University of Missouri-Columbia

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