MedicalXpress

Fighting cancer: Natural and synthetic progestin therapies in post-menopausal women help breast cancer grow and spread

July 12 2017

Hormone replacement therapies, or medications containing female hormones that substitute those no longer produced by the body, often are prescribed to reduce the effects of menopausal symptoms in women. Research has indicated that women who take hormone replacement therapies have a higher incidence of breast cancer. Now, researchers at the University of Missouri have linked natural and synthetic progestins to the body's production of specialized cancer cells that act like stem cells in humans. Findings could help scientists target these rare cells that proliferate in breast cancers and metastasize elsewhere, and may help clinicians identify immunotherapies to combat the spread of the disease.

"In previous studies, we have shown that both natural and synthetic progestins accelerate the development of breast cancer and increase their metastasis to lymph nodes," said 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. "Our laboratory is committed to identifying the cell mechanisms that bring about increased breast cancer risks. Recently, our research focused on special cells—which are called 'cancer stem cell-like cells'—that induce aggressive tumor growth, metastasis and cancer recurrence."

In a series of tests, the team used hormone-responsive human breast cancer cells to examine the effects of progestin on the cell markers

typically found in breast cancers. Both natural and synthetic progestins significantly increased protein expression of CD44, a molecule involved in cell proliferation, cell communication and migration. Additionally, the presence of progestins caused these components to behave like cancer stem cell-like cells.

These rare cells are a small population of cells that—acting like normal stem cells—are self-renewing, create identical copies of themselves and proliferate exponentially. Further testing showed that the rare subset of cancer cells actually were enriched by progestin.

"The findings show that exposure to natural and synthetic progestins leads to the development of these cancer stem-cell like cells," Hyder said. "These cells greatly increase the likelihood of resistance to therapies and the risk for metastasis. Our findings also suggest that clinicians may be able to combat the progestin-dependent tumor growth through immunotherapy."

The study, "Natural and synthetic progestins enrich cancer stem cell-like cells in hormone-responsive human breast cancer cell populations in vitro", recently was published in *Breast Cancer – Targets and Therapy*.

Provided by University of Missouri-Columbia