

5-23-2012

Research Finds Cadmium Link to Breast Cancer

Sarah Gardner

Dominican University of California, sarah.gardner@dominican.edu

Dave Albee

Dominican University of California, david.albee@dominican.edu

Survey: Let us know how this paper benefits you.

Recommended Citation

Gardner, Sarah and Albee, Dave, "Research Finds Cadmium Link to Breast Cancer" (2012).
Press Releases. 483.

<https://scholar.dominican.edu/news-releases/483>

This News Release is brought to you for free and open access by the Communications and Media Relations at Dominican Scholar. It has been accepted for inclusion in Press Releases by an authorized administrator of Dominican Scholar. For more information, please contact michael.pujals@dominican.edu.

Research Finds Cadmium Link to Breast Cancer

The study by researchers in the lab of Dr. Maggie Louie, associate professor of biochemistry in [Dominican's Department of Natural Sciences and Mathematics](#), shows exposure to cadmium for prolonged periods of time can cause the progression of breast cancer to become more aggressive.

The American Society for Biochemistry and Molecular Biology (ASBMB) selected an abstract of this research to be presented at the ASBMB annual meeting at the Experimental Biology 2012 conference in San Diego on April 23.

Breast cancer results from the abnormal growth of the cells in the mammary gland. The normal growth of mammary gland epithelial cells is modulated by the circulating levels of estrogen, a hormone produced by the ovaries. The activity of estrogen is stimulated by the estrogen receptor (ER). Heavy metals such as cadmium can act as endocrine disruptors and mimic estrogen, thereby disrupting the hormone dependent pathways.

While other studies have shown links between acute cadmium exposure and activation of the ER, Louie's study is one of few to focus on chronic cadmium exposure and breast cancer.

"The relationship between cancer and chronic exposures at low levels is important to understand because most people are not exposed to high levels of heavy metals, unless they work in manufacturing plants that deal with such metals," Louie said.

"Unfortunately, cadmium is all around us. Cadmium is in our food, our water, our makeup, and our air. Understanding the role that cadmium plays in the progression of breast cancer is extremely important in order to find better ways to prevent the disease from advancing."

Louie has received two National Institutes of Health (NIH) grants to study cadmium's relationship with breast cancer. Research supported by the first grant demonstrated that acute cadmium exposure stimulates breast cancer cell growth and activates estrogen receptor regulated gene expression. These findings were published in 2010 in the peer-reviewed journal, *Molecular Endocrinology*.

The work presented at Experimental Biology 2012 is a follow up study looking at the effects of chronic cadmium exposure on breast cancer progression in a cell culture model that Louie developed in the lab. The study indicates that chronic exposure to cadmium can contribute to the development of more malignant characteristics in breast cancer cells.

"Many of us are exposed to very low levels of cadmium from the environment on a daily basis, and our research shows that even small concentrations of this metal at prolonged exposures can cause breast cancer cell growth."

Cadmium is produced mainly as a byproduct from mining, smelting, and refining sulfidic ores of zinc, lead, and copper. Rocks mined to produce phosphate fertilizers also contain varying amounts of cadmium. Cadmium also is found in rechargeable batteries and cigarette smoke. Cadmium enters the body through consumption of contaminated food or water, or inhalation of cigarette smoke.

The research was conducted by Louie, along with her graduate student Esmeralda Ponce and undergraduate student Natalie Aquino in Louie's lab at Dominican University of California.

Louie's research is supported by a grant from the National Cancer Institute at the National Institutes of Health. Ponce also is the recipient of an NIH grant under the institute's Research Supplements to Promote Diversity in Health-Related Research program. Ponce's grant covers her graduate studies at Dominican.

Louie's preliminary data show an increase in the ability of breast cancer cells to migrate and invade through the extracellular matrix with prolonged cadmium exposure. The extracellular matrix is the outer barrier of an organ or tissue. Increased invasive and migration abilities are characteristic of cancer cells' ability to spread. Louie discovered that MCF-7 cells chronically exposed to cadmium express higher levels of SDF-1, a protein associated with tumor invasion and metastasis.

How specific proteins, including SDF-1, contribute to the aggressive characteristics of the cadmium exposed cells requires further research, and understanding their role in cadmium-induced carcinogenesis will provide further insights to how heavy metals contribute to breast cancer progression.

Experimental Biology is an annual gathering of six scientific societies that this year is expected to draw 14,000-plus independent scientists and exhibitors.

Media Contact: Sarah Gardner, 415-485-3239, Sarah.Gardner@Dominican.edu.

May 23, 2012