Written by Josh Till
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Researchers with the University of Alabama at Birmingham (UAB) Comprehensive Cancer Center and UAB Department of Chemistry have won an $805,000 grant from the U.S. Department of Defense Breast Cancer Research Program to study whether dead cancer cells left over after treatment encourage cancer's spread to other parts of the body.

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The research centers on examining inactivated or altered genetic material (DNA) left in the body after breast-cancer cells are exposed to chemotherapy. UAB researchers say the resulting altered DNA may be the factor that activates the spread of living cancer cells to distant locations in the body – a deadly process called metastasis – through a specific molecular pathway.

Learning more about this metastasis pathway could lead to major improvements in prevention, treatment and follow-up care for millions of cancer patients, says Katri Selander, M.D., Ph.D., an assistant professor in the UAB Division of Hematology and Oncology and co-principal researcher on the grant.

"What if by killing cancer cells with chemotherapy we inadvertently induce DNA structures that make surviving cancers cells more invasive? The idea is tough to stomach," Selander says. "Fundamentally this question must be answered to advance the knowledge base and to know all the risks and benefits of cancer treatment.

“This research has the potential to reach across numerous scientific disciplines, and may one day improve the lives of patients worldwide.”

Metastasis is the No. 1 cause of cancer recurrence and treatment failure.

The new grant expands on a research partnership between Selander and her team of researchers and those working in the laboratory of David Graves, Ph.D., chair of the UAB Department of Chemistry. Graves and his team are characterizing the DNA structures and other factors that induce metastasis in surviving cancer cells.

The pathway activated by the dead cancer cells is mediated in the body as a protein called toll-like receptor 9, or TLR9. This protein is present in the immune system and in many types of cancer. If TLR9 boosts metastasis, then researchers will work on finding targeted therapies that block or regulate this molecular pathway, Selander says.

UAB’s grant from the Department of Defense Breast Cancer Research Program is designed to reward innovative research projects that could lead to major scientific and health advances.

The Department of Chemistry is housed in the UAB College of Arts and Sciences , home to academic disciplines that include the arts, humanities, sciences ands the School of Education. The college's unique structure advances research and learning in both K-12 and higher education, and its courses are taught by a world-class faculty. Committed to the UAB spirit of independence and innovation, the college enables students to design their own majors, participate in undergraduate research or complete graduate degrees on a five-year fast track. Through productive partnerships, flexible curricula and a bold, interdisciplinary approach to learning and teaching, the college is preparing students for success in the ever-changing global marketplace of commerce and ideas.

The UAB Comprehensive Cancer Center is among the 40 cancer centers in the nation to meet the stringent criteria for the National Cancer Institute's comprehensive designation. The center is a leader in groundbreaking research, reducing cancer disparities and leading-edge patient care.

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