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Molecules identified that help propel cancer metastasis

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For many types of cancer, the original tumor itself is usually not deadly. Instead, it's the spread of a tiny subpopulation of cells from the primary tumor to other parts of the body -- the process known as metastasis—that all too often kills the patient. Now, researchers at Albert Einstein College of Medicine of Yeshiva University have identified two molecules that enable cancer to spread inside the body. These findings could eventually lead to therapies that prevent metastasis by inactivating the molecules.

The regulatory molecules are involved in forming invadopodia, the protrusions that enable tumor cells to turn metastatic – by becoming motile, degrading extracellular material, penetrating blood vessels and, ultimately, seeding themselves in other parts of the body.

The research appears in the April 7 online issue of *Current Biology*. The study's senior author is John Condeelis, Ph.D., co-chair and professor of anatomy and structural biology, co-director of the Gruss Lipper Biophotonics Center and holder of the Judith and Burton P. Resnick Chair in Translational Research at Einstein.

Dr. Condeelis and his team identified two molecules (p190RhoGEF and p190RhoGAP) that regulate the activity of RhoC, an enzyme that plays a crucial role during tumor metastasis and that has been identified as a biomarker for invasive breast cancer.

"In vitro as well as in vivo studies have shown that RhoC's activity is

positively correlated with increased invasion and motility of tumor cells ," said corresponding author Jose Javier Bravo-Cordero, Ph.D., a postdoctoral fellow in the labs of Dr. Condeelis and assistant professor Louis Hodgson, Ph.D., in the Gruss Lipper Biophotonics Center and the department of anatomy and structural biology. "The new players we've identified as regulating RhoC could serve as therapeutic drug targets in efforts to block tumor metastasis."

The other researchers in the Einstein study, all in the department of anatomy and structural biology, were M.D./Ph.D. student Matthew Oser, research technician Xiaoming Chen, Robert Eddy, Ph.D., and Dr. Hodgson. This study is the first to employ a new generation of G-protein biosensors that Dr. Hodgson developed. The title of the paper is "A novel spatiotemporal RhoC activation pathway locally regulates cofilin activity at invadopodia."

Provided by Albert Einstein College of Medicine