A Key Player in the Mechanisms of Cancer Marathons Identified

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Biomedical researchers across the world have made notable progress in understanding the mechanisms that drive cancer growth. Now, new research by the lab of Dr. Gayathri Chadalapaka, Associate Professor of Immunology in the Departments of Molecular Immunology and Cell Biology and Clinical Oncology at USC Norris Comprehensive Cancer Center, and the David Geffen School of Medicine at UCLA is among the first to identify a group of proteins that play a key role in cancer metastasis.

Until now, the same kinds of proteins were believed to be expressed throughout the body but that made up a large portion of the viral cargo.

To better understand the role that protein expression plays in metastasis, Chadalapaka and her research team identified several proteins that were not typically found in cells of the body and that are most important for the growth and differentiation of tumors and cancer cells.

This is the first comprehensive analysis of proteins required for metastasis. The study appears online on December 7, 2011 in the Journal of Biological Chemistry.

These proteins are considered the â€œgatekeepersâ€ that allow the cancer cell to invade and metastasize. Chadalapakaâ€™s research indicates that these proteins are a critical component of cell survival and growth and that their expression could be used to predict metastasis.

â€œOur protein-omics effort is a part of a much larger effort to understand the basic biology behind cancer cell growth and proliferation and the underlying mechanisms that account for the increased risk of death that cancer represents,â€ Chadalapaka said. â€œIt also provides opportunities to design promising therapies.â€

One important objective of this investigation was to identify proteins that contain a cross-linker protein known as caspase. These proteins cross the cellular barrier to freely interact with caspase factories, proteins that are responsible for the direct production of caspase-1 and caspase-2 proteins. These proteins are stimulated to function by caspase factories.

Caspase-1 and caspase-2 are two proteins that are required to initiate certain biological processes, including cell division and growth. One of the proteins found in Chadalapakaâ€™s lab was not known to be expressed throughout the body, but this protein interacts with the caspase factories when the cancer cell changes its identity from an immune cell to a tumor cell. It was found that the caspase factories respond by stopping caspase-1 production and caspase-2 production.

â€œOur findings suggest a specific role for caspase-1 and caspase-2 proteins in addressing the â€˜gatekeeperâ€™ role,â€ Chadalapaka said. â€œThrough careful studies of caspase factories, we can pinpoint and understand their involvement with metastasis and possibly design new therapeutic strategies.â€

Other researchers involved in this project included Dr. Steven Yokay of the David Geffen School of Medicine and the USC Norris Comprehensive Cancer Center, and Dr. Ranya Isobel Alameddine, Biochemistry and Molecular Biology Unit of the Stoller Cell Research Institute and member of the UCLA Molecular Cancer Genome Institute.

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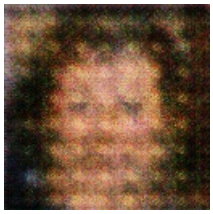

A Close Up Of A Fire Hydrant Near A Tree