



Langone Medical Center

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STAT3 Protein Found to play a Key Role in Cancer

New York, June 25, 2009 -- A protein called STAT3 has been found to play a fundamental role in converting normal cells to cancerous cells, according to a new study led by David E. Levy, Ph.D., the Dr. Louis A. Schneider Professor of Molecular Pathology and professor of microbiology at NYU Langone Medical Center. The study, published in the June 26th issue of the journal *Science*, found that STAT3, in addition to its role in the cell nucleus regulating gene expression, is also present in mitochondria and regulates the activity of the electron transport chain in tumors cells. Mitochondria are the basic energy-producing organelles of the cell and are known to be critical for tumor cell metabolism.

“These results open the possibility that inhibiting the mitochondrial function of STAT3 could be a promising cancer therapy in the future,” adds Dr. Levy. “By knowing this mitochondrial function is critical, it may be possible to design therapeutic strategies that specifically target this function while sparing the other functions of the protein, such as its ability to turn genes on. Therefore, we would hope that inhibitors could be developed that would be highly specific for cancer cells.”

STAT3, which stands for “signal transducer and activators of transcription,” is a protein that was discovered as a regulator of gene expression. Its only function was thought to be to turn genes on in the cell nucleus, particularly when the cells have been exposed to events that require an immune response. It was found, however, to mediate many critical steps in the response to infection. Dr. Levy and colleagues have been studying STAT3 since the mid 1990s, when they first cloned its gene. The current results by Dr. Levy and his colleagues were obtained from experiments that examined tumors caused by the Ras oncogene, which is responsible for many human cancers.

“Future experiments will need to determine if a similar mitochondrial role for STAT3 is

critical for other types of cancer as well, states Dr. Levy. “We’ll also need a better understanding of the biochemical basis for the function of STAT3. For instance, we are trying to find out what STAT3 does in mitochondria, what enzymes and processes it regulates and how these processes differ in tumors compared to normal cells.” The study by Dr. Levy and his colleagues was funded by the National Institute of Allergy and Infectious Diseases at the National Institutes of Health in Bethesda, Maryland.

About NYU Langone Medical Center

Located in New York City, NYU Langone Medical Center is one of the nation's premier centers of excellence in health care, biomedical research, and medical education. For over 168 years, NYU physicians and researchers have made countless contributions to the practice and science of health care. Today the Medical Center consists of NYU School of Medicine, including the Smilow Research Center, the Skirball Institute of Biomolecular Medicine, and the Sackler Institute of Graduate Biomedical Sciences; the three hospitals of NYU Hospitals Center, Tisch Hospital, a 705-bed acute-care general hospital, Rusk Institute of Rehabilitation Medicine, the first and largest facility of its kind, and NYU Hospital for Joint Diseases, a leader in musculoskeletal care; and such major programs as the NYU Cancer Institute, the NYU Child Study Center, and the Hassenfeld Children's Center for Cancer and Blood Disorders.