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STAT3 protein found to play a key role in cancer

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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., professor of pathology and 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 mitrochondrial 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. It's 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."

Source: New York University School of Medicine (news : web)