

Researchers identify new function of protein in cellular respiration

January 28 2009

(PhysOrg.com) -- Virginia Commonwealth University researchers have found that the protein Stat3 plays a key role in regulating mitochondria, the energy-producing machines of cells. This discovery could one day lead to the development of new treatments for heart disease to boost energy in failing heart muscle or to master the abnormal metabolism of cancer.

In the study, published online Jan. 8 in *Science Express*, researchers reported that Stat3, a protein previously known to control the activity of genes by acting in the cell nucleus, also plays a key role in cellular energy production.

The team examined oxygen consumption in cultured cells and hearts of mice. They discovered that when Stat 3 protein was missing, cells consumed less oxygen and produced less ATP, the key molecular form of cellular energy. The findings revealed that Stat3 is necessary for the function of the mitochondrial electron transport chain that generates ATP. Changes in energy production and expenditure are essential to maintain cellular homeostasis.

"We found evidence that Stat3 is present in the mitochondria and that it serves to control the production of ATP," said principal investigator Andrew C. Larner, M.D., Ph.D., professor of biochemistry and molecular biology in the VCU School of Medicine, and co-leader of the Immune Mechanisms research program at the VCU Massey Cancer Center.



"We have described a new pathway by which generation of ATP is regulated. This pathway could suggest new ways for Stat3 to be therapeutically manipulated to treat a variety of diseases where there are imbalances between energy generation and energy demands such as occurs in cancer and heart disease," he said.

Next, the team will conduct studies to determine the downstream targets of Stat3 in the mitochondria and identify the physiological role of Stat3 that is localized to the mitochondria in heart disease and cancer.

Source: Virginia Commonwealth University

Citation: Researchers identify new function of protein in cellular respiration (2009, January 28) retrieved 6 May 2024 from <u>https://phys.org/news/2009-01-function-protein-cellular-respiration.html</u>

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