UNL biochemist probes protein for disease clues

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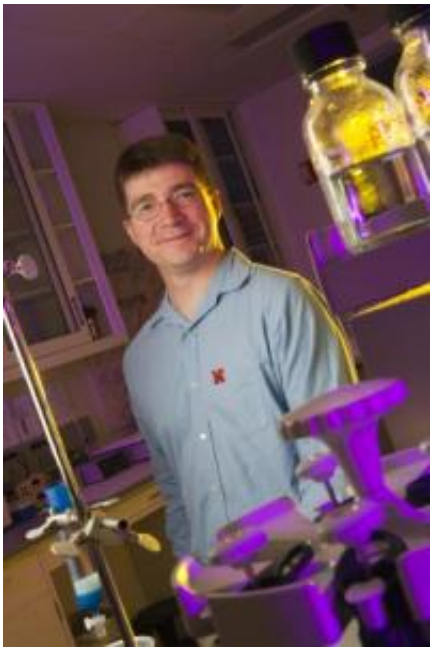

Mark Wilson

(PhysOrg.com) -- Scientists believe they have discovered a common link between such disparate diseases as Parkinson's disease and some types of cancer. Studying these links could lead to advances in combating these and other human diseases.

University of Nebraska-Lincoln biochemist Mark Wilson studies a protein believed to play a critical role in causing mitochondrial abnormalities leading to Parkinson's and some cancers. He's expanding

his research with a recent $1.35 million grant from the National Institutes of Health's National Institute of General Medical Sciences.

Scientists now know that inheritable forms of Parkinson's disease develop from mutations in genes found in the mitochondria, the "cellular power plants" that perform a variety of functions within an organism's cells. For example, a genetic mutation that alters the DJ-1 protein disrupts the mitochondria's response to oxidative stress, an imbalance in molecular reactions that can damage cells and lead to diseases such as Parkinson's, Alzheimer's and ALS.

Scientists know that DJ-1 is an essential protein for maintaining the balance between helping cells survive oxidative stress and initiating cell death when cancer would otherwise form. But many questions remain about how it works and the effect of mutations.

Wilson uses X-ray crystallography to determine DJ-1's three-dimensional structure in its normal and mutated forms to better understand how the protein contributes to neurodegenerative diseases.

"The hope is that it will give us the ability to biochemically characterize the pathways that go amiss in these rare forms of Parkinson's," Wilson said. "Cancer and Parkinson's disease don't obviously have a lot in common, but they do have this protein in common. Our hope is that this protein connects a variety of serious human diseases to a common biochemical pathway."

Greater understanding of that pathway and its molecular components may one day lead to treatments against cancer and neurodegenerative diseases, he said.

Provided by University of Nebraska-Lincoln