

Common food supplement fights degenerative brain disorders

May 21 2013

Widely available in pharmacies and health stores, phosphatidylserine is a natural food supplement produced from beef, oysters, and soy. Proven to improve cognition and slow memory loss, it's a popular treatment for older people experiencing memory impairment. Now a team headed by Prof. Gil Ast and Dr. Ron Bochner of Tel Aviv University's Department of *Human Molecular Genetics* have discovered that the same supplement improves the functioning of genes involved in degenerative brain disorders, including Parkinson's disease and Familial Dysautonomia (FD).

In FD, a [rare genetic disorder](#) that impacts the nervous system and appears almost exclusively in the Ashkenazi Jewish population, a genetic mutation prevents the brain from manufacturing healthy IKAP proteins – which likely have a hand in [cell migration](#) and aiding connections between nerves – leading to the early degeneration of neurons. When the supplement was applied to cells taken from FD patients, the gene function improved and an elevation in the level of IKAP protein was observed, reports Prof. Ast. These results were replicated in a second experiment which involved administering the supplement orally to [mouse populations](#) with FD.

The findings, which have been published in the journal *Human Molecular Genetics*, are very encouraging, says Prof. Ast. "That we see such an effect on the brain—the most important organ in relation to this disease—shows that the supplement can pass through the blood-brain barrier even when administered orally, and accumulate in sufficient

amounts in the brain."

Slowing the death of nerve cells

Already approved for use as a supplement by the FDA, phosphatidylserine contains a molecule essential for transmitting signals between nerve cells in the brain. Prof. Ast and his fellow researchers decided to test whether the same chemical, which is naturally synthesized in the body and known to boost memory capability, could impact the genetic mutation which leads to FD.

Researchers applied a supplement derived from oysters, provided by the Israeli company Enzymotec, to cells collected from FD patients. Noticing a robust effect on the gene, including a jump in the production of healthy IKAP proteins, they then tested the same supplement on mouse models of FD, engineered with the same genetic mutation that causes the disease in humans.

The mice received the supplement orally, every two days for a period of three months. Researchers then conducted extensive genetic testing to assess the results of the treatment. "We found a significant increase of the protein in all the tissues of the body," reports Prof. Ast, including an eight-fold increase in the liver and 1.5-fold increase in the brain. "While the [food supplement](#) does not manufacture new [nerve cells](#), it probably delays the death of existing ones," he adds.

Therapeutic potential for Parkinson's

That the supplement is able to improve conditions in the brain, even when given orally, is a significant finding, notes Prof. Ast. Most medications enter the body through the blood stream, but are incapable of breaking through the barrier between the blood and the brain.

In addition, the researchers say the supplement's positive effects extend beyond the production of IKAP. Not only did phosphatidylserine impact the gene associated with FD, but it also altered the level of a total of 2400 other genes—hundreds of which have been connected to Parkinson's disease in previous studies.

The researchers believe that the supplement may have a beneficial impact on a number of degenerative diseases of the brain, concludes Prof. Ast, including a major potential for the development of new medications which would help tens of millions of people worldwide suffering from these devastating diseases.

Provided by Tel Aviv University

Citation: Common food supplement fights degenerative brain disorders (2013, May 21) retrieved 4 June 2024 from <https://medicalxpress.com/news/2013-05-common-food-supplement-degenerative-brain.html>

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