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UNMC research team determines nitric oxide linked to neurodegenerative disorders

In an article published this month in The Journal of Neuroscience, a research team from the University of Nebraska Medical Center College of Dentistry has determined that nitric oxide plays a damaging role nitric in the development of Alzheimer's, Parkinson's, multiple sclerosis and other neurodegenerative disorders.

The research team, headed by Kalipada Pahan, Ph.D., an associate professor of biochemistry, oral biology and pharmacology at the UNMC College of Dentistry, found that excessive amounts of nitric oxide are instrumental in inducing astroglia (a major cell type in the brain) to produce a certain type of acid proteins (glial fibrillary acid proteins), which in turn damage neurons in the brain.
The excessive production of the acid proteins by the astroglia is a pathological hallmark of several neurodegenerative diseases, Dr. Pahan said.
"Astroglia play important roles in brain function," he said. "However, in response to various neurodegenerative insults, astrocytes react rapidly and produce excessive amounts of the acid protein causing the brain to lose neurons."

Dr. Pahan said that his research team found that when the nitric oxide was removed using drugs, different neurotoxic compounds of various neurodegenerative disorders were unable to increase the production of the acid proteins.

"Our next step is to find out how to control the excessive production of nitric oxide in activated astroglial cells. We are already working in this field and screening several drugs for their ability to penetrate the blood-brain barrier and reduce the production of nitric oxide in the brain. Once we find a suitable nitric oxide reducer with minimal adverse side effects, the supplementation of such a compound in aged people and in patients with neurodegenerative disorders could be beneficial," he said.