MedicalXpress

Researchers link Alzheimer's to lack of specific protein

August 16 2011

A new clue to understanding one of the causes of Alzheimer's disease was unveiled in an article published Sunday (Aug. 14) in *Nature Neuroscience* online. Kara Pratt, a new faculty member in the University of Wyoming Neuroscience Center , is the study's lead investigator.

Neurons, the cells of the brain and the nervous system, are amazingly flexible and adaptable, says Pratt, who led the project as a post-doctoral researcher at the University of Washington School of Medicine.

When proteins receive a lot of information from other neurons, they compensate by turning down their synaptic strengths ("input gain"). Conversely, Pratt says, when stimulated at lower than normal frequencies, they turn up their synaptic strengths. This is a form of neural plasticity referred to as homeostasis, which allows neurons to function stably in the midst of extreme changes in activity levels.

She says in people with Alzheimer's disease, it has been hypothesized that brain neurons may lose their flexibility. The most common way in which familial (inherited) Alzheimer' disease is inherited is by a mutation in a protein called presenilin.

The researchers found that neurons that do not have presenilin are not adaptable -- are unable to change their gain -- when activity levels are altered for long periods of time. Pratt says the researchers also tested the compensatory response in neurons from transgenic mice engineered to express a mutated form of presenilin. These neurons also failed to adapt

to changing amounts of stimulation.

"Our experiments indicate that presenilin is essential for neurons to remain adaptable," Pratt says. "Lack of this type of adaptability could contribute to brain dysfunction underlying Alzheimer's disease."

Pratt is setting up a laboratory in the UW Department of Zoology and Physiology to study forms of neuron adaptability and other forms of neural plasticity in the developing visual system of the African clawed frog tadpole.

Provided by University of Wyoming

Citation: Researchers link Alzheimer's to lack of specific protein (2011, August 16) retrieved 18 April 2024 from https://medicalxpress.com/news/2011-08-link-alzheimer-lack-specific-protein.html

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