MedicalXpress

Researchers identify mechanism that regulates acoustic habituation

April 11 2017

Most people will startle when they hear an unexpected loud sound. The second time they hear the noise, they'll startle significantly less; by the third time, they'll barely startle at all. This ability is called acoustic habituation, and new Western-led research has identified the underlying molecular mechanism that controls this capability. The research opens the door to treatments, especially for people who have autism spectrum disorder or schizophrenia and who experience disruptions in this ability.

Susanne Schmid, PhD, associate professor at Western's Schulich School of Medicine & Dentistry, and principal investigator on the study explains that acoustic habituation is a common form of sensory filtering, which refers to the brain's ability to block out extraneous sounds, feelings or visual information so that we are able to focus on what's most important in our surroundings. Disruption in sensory processing was added as a diagnostic marker for autism spectrum disorders only in the most recent version of the Diagnostic and Statistical Manual of Mental Disorders (DSM5).

Using electrophysiology and pharmacological tools, the research has shown that a potassium channel, specifically the BK channel, in the central nervous system can be regulated with drugs to increase or decrease these disruptions in animal models.

"By doing this we are better able to understand what's going wrong in people that do not habituate," said Schmid. "It also means we might be able to improve habituation by targeting this mechanism and thereby

improve their sensory filtering."

Schmid says enhancing habituation and sensory filtering in autism spectrum disorder and schizophrenia might have beneficial effects not only on hyper- and hyposensitivity, but also on cognitive function.

The research was published in *The Journal of Neuroscience* and was funded by an operating grant from the Canadian Institutes of Health Research and the Ontario Mental Health Foundation.

More information: Tariq Zaman et al, BK Channels Mediate Synaptic Plasticity Underlying Habituation in Rats, *The Journal of Neuroscience* (2017). DOI: 10.1523/JNEUROSCI.3699-16.2017

Provided by University of Western Ontario