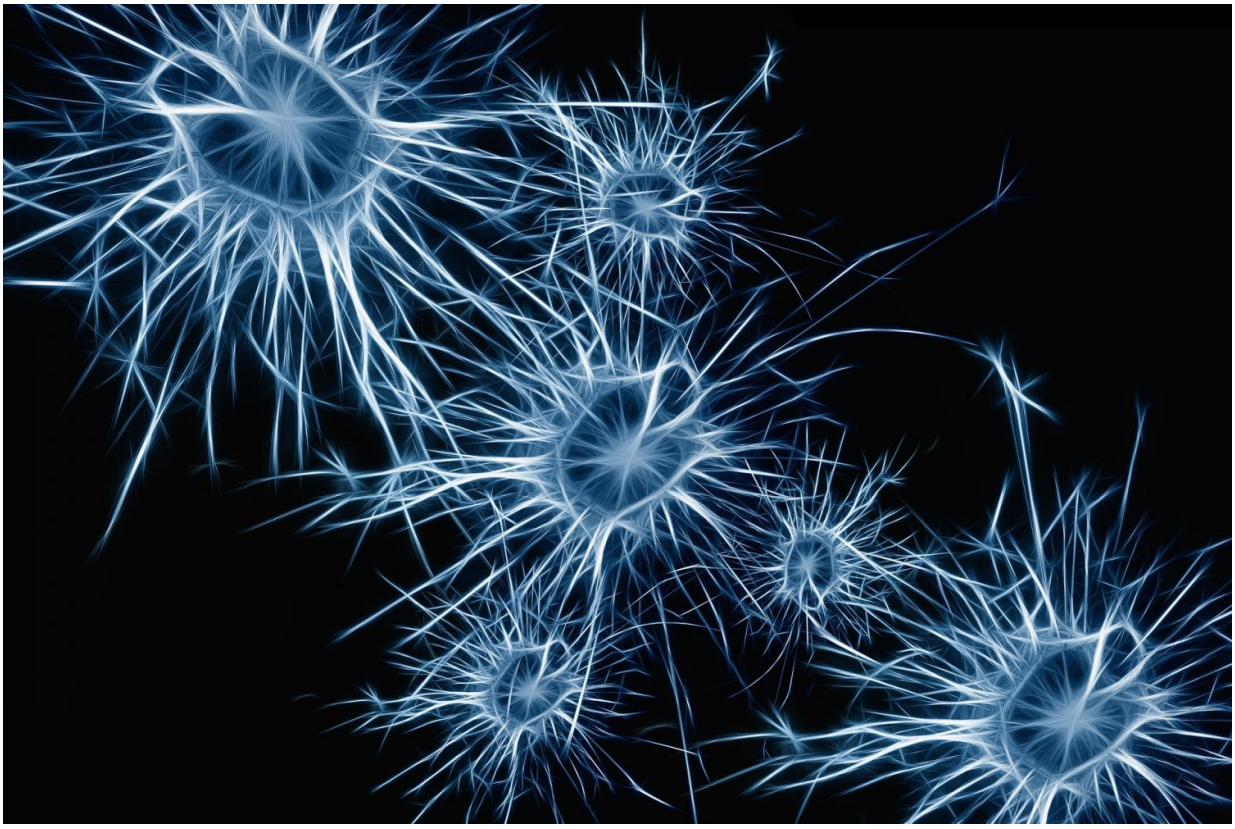
MedicalXpress

Team reports connections that will fuel future brain trauma research

November 7 2017



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A team led by University of Idaho scientists has found a way to stimulate formation of new neural connections in the adult brain in a study that could eventually help humans fend off memory loss, brain trauma and

other ailments in the central nervous system.

Peter G. Fuerst, an associate professor in the College of Science's Department of Biological Sciences and WWAMI Medical Education Program, and a team that included lead author doctoral student Aaron Simmons, were able to stimulate growth of new neural connections in mice that are needed to connect the cells into neural circuits. Their study, which included scientists from the University of Louisville and University of Puerto Rico-Humacao, is titled "DSCAM-Mediated Control of Dendritic and Axonal Arbor Outgrowth Enforces Tiling and Inhibits Synaptic Plasticity." It was published today in the Journal *Proceedings of the National Academy of Sciences*.

"The paper is a study into factors that prevent adult neurons from making new connections," Fuerst said. "Regulation of this process is important to prevent several disorders, such as autism, but is also related to the inability of the adult nervous system to readily recover from damage."

Researchers studied a cell population that has the unusual ability to make new connections into adulthood, but under normal conditions does not grow the needed axons or dendrites. The team was able to genetically manipulate the cell population in the mice to induce axon and dendrite outgrowth. They found this induced the formation of stable, functional connections with new cells.

"The idea is that one could stimulate the nervous system to make new connections if there was some kind of trauma," Fuerst said. "Maybe this is the way to reactivate the cell to build those new connections that we can take advantage of clinically."

Their efforts included research through the regional WWAMI Medical Education Program at the University of Washington and could have wide

ramifications for other adult neurological conditions that prevent human brains from making those needed connections as an adult.

"In children in early development it's very easy to make new connections, but adults lose that ability, and we want to see why that is," he said.

The genetic manipulation used in mice as part of the study wouldn't work in humans. Instead, Fuerst and his team would next like to test small-molecule drugs that regulate these central nervous system processes - currently used to combat cancer in humans - to see if they can help the nervous system make new connections in mice.

"These contributions by Peter and his team right here at the University of Idaho are helping advance global neurological research," said Janet Nelson, vice president for research and economic development. "I'm excited by the potential impact of this research on the understanding of the brain and in advancing human health."

More information: Aaron B. Simmons et al, DSCAM-mediated control of dendritic and axonal arbor outgrowth enforces tiling and inhibits synaptic plasticity, *Proceedings of the National Academy of Sciences* (2017). DOI: 10.1073/pnas.1713548114

Provided by University of Idaho