

Researchers discover the first-ever link between intelligence and curiosity

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(PhysOrg.com) -- Scientists from University of Toronto and the Samuel Lunenfeld Research Institute of Mount Sinai Hospital have discovered a molecular link between intelligence and curiosity, which may lead to the development of drugs to improve learning.

In a paper published Sept. 10 in the highly-respected journal *Neuron*, Professor John Roder of U of T's Department of [Molecular Genetics](#), a senior investigator at the Lunenfeld, and Bechara Saab, PhD candidate at the Lunenfeld, studied the interaction of two proteins in a small region of the brain called the dentate gyrus (one of three parts of the hippocampus, which plays an important role in long-term memory and spatial navigation).

"Dr. Roder and Bechara Saab have made a discovery in a region of the brain that has been under-explored in the past," said Dr. Jim Woodgett, director of the Lunenfeld. "This molecular link holds promise for future cognitive therapies."

For the study, the neuronal calcium sensor-1 (NCS-1), a protein which is known to affect the memory of worms and is linked to bipolar and schizophrenia in people, was increased by one-and-a-half fold specifically in the dentate gyrus of mouse models. This modest overexpression increased the ability of [brain cells](#) to change how they communicate with each other and gave the mice superior memory in complex tasks and a significant increase in exploratory behaviour (curiosity).

Because the exploratory behaviour was only altered in safe environments, Roder and Saab believe they have discovered a region of the brain that generates curiosity and a model for how brain activity leads to curiosity.

The researchers also discovered that both curiosity and spatial memory were impaired when a benign drug (developed at Mount Sinai) blocked the NCS-1 protein from binding to the dopamine type-2 receptors (a major target of anti-psychotics) in the dentate gyrus.

"Now that we know that some of the molecules and [brain](#) regions that control learning and [memory](#) also control curiosity, we can go back to the lab and design drugs that may improve cognition in humans - that's the potential benefit for the future," explained Saab. "Immediately, however, we can put into use the knowledge that fostering curiosity should also foster intelligence and vice versa."

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