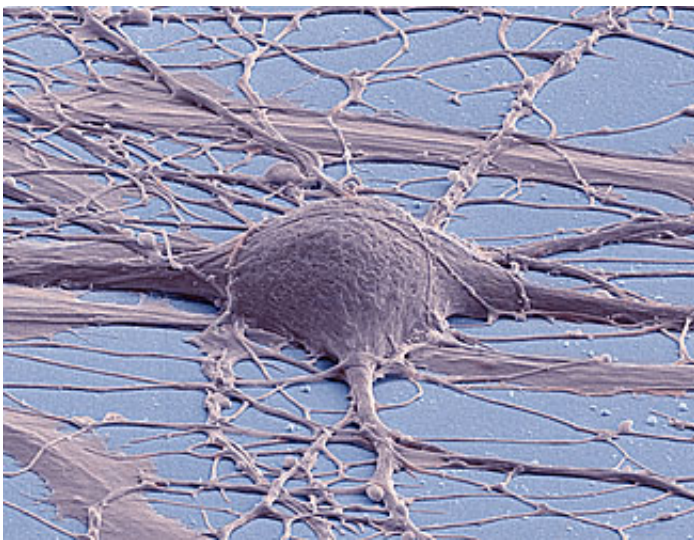


Having a hard time focusing? Research identifies complex of neurons crucial to controlling attention

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This is a scanning electron micrograph (false color) of a human induced pluripotent stem cell-derived neuron. Credit: Thomas Deerinck, UC San Diego

Our ability to pay attention to certain things while ignoring distractions determines how good we are at a given task, whether it is driving a car or doing brain surgery. A research team at McGill University has for the first time convincingly identified a network of neurons in a particular area of the brain, the lateral prefrontal cortex, that interact with one another to promptly filter visual information while at the same time ignoring distractions. It's a discovery with potentially far reaching

implications for people who suffer from diseases such as autism, ADHD and schizophrenia.

The researchers recorded brain activity in macaques as they moved their eyes to look at objects being displayed on a [computer screen](#) while ignoring visual [distractions](#). These recorded signals were then input into a decoder running on a [personal computer](#) which mimicked the kinds of computations performed by the brain as it focuses. With some startling results.

"The decoder was able to predict very consistently and within a few milliseconds where the macaques were covertly focusing attention even before they looked in that direction," says Julio Martinez-Trujillo, of McGill's Department of Physiology and the lead author of the paper. "We were also able to predict whether the monkey would be distracted by some intrusive stimulus even before the onset of that distraction."

But what was even more interesting was that the researchers were able to manipulate the computer's ability to "focus" by subtly manipulating the neuronal activity that had been recorded and input into the machine. In effect, by manipulating the interactions of the neurons, the researchers were able to induce "focused" and "distracted" states in the computer.

"This suggests that we are tapping into the mechanisms responsible for the quality of the attentional focus, and might shed light into the reasons why this process fails in certain neurological diseases such as ADHD, autism and [schizophrenia](#)," says Sébastien Tremblay, a doctoral student at McGill University and the first author of the paper which was published in the current edition of *Neuron*. "Being able to extract and read the neuronal code from higher-level areas of the brain could also lead to important breakthroughs in the emerging field of neural prosthetics, where people who are paralysed use their thoughts to control objects in their environment."

Provided by McGill University

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