Ritalin Boosts Learning in Addition to Focus

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The psychostimulant drug Ritalin (methylfenidate) does more than increase a person's ability to focus—it also boosts learning Now researchers have revealed—in a study published March 7 in *Nature Neuroscience*—what might cause the boost in learning.

Ritalin is prescribed to millions of children and adults with a condition known as attention deficit hyperactivity disorder (ADHD) or attention deficit disorder (ADD). People with either condition tend to be easily distracted, and thus have a harder time completing tasks. Ritalin was approved to treat ADHD and ADD because of its known ability to help a person stay focused on a specific task.

Antonello Bonci, MD and Patricia Janak, PhD, from the University of California in San Francisco, suspected that Ritalin's ability to aid in learning might have something to do with the dopaminse system—the neurochemical reward system. To determine whether this was the case, Bonci, Janak and their UCSF colleagues studied the effect of Ritalin both in animals and in tissue culture. They found that Ritalin did increase learning, in addition to improving focus, but by different mechanisms of action. Both effects were explained by Ritalin's ability to activate dopamine receptors. Specifically, activating dopamine receptor 1 (D1) was associated with enhanced learning, while activating dopamine receptor 2 (D2) was associated with increased focus.

"Although Ritalin is so frequently prescribed, it induces many brain changes, making it difficult to identify which of those changes improve learning," said Kay Tye, the study's lead author and an undergraduate student in Bonci's lab. "By identifying the brain mechanisms underlying Ritalin's behavioral enhancements, we can better understand the action of Ritalin as well as the properties governing brain plasticity."

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