

Study finds brain abnormalities linked to impaired self-awareness in cocaine addiction

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New research from the Icahn School of Medicine at Mount Sinai reveals long-term cocaine abuse may be associated with deficits in parts of the brain involved in monitoring and overseeing one's own behavior. The findings call into question the long-held clinical assumption that addicted individuals continue their compulsive drug use because of oppositional denial or lying, or because of careless minimization of their problems. The findings are published online Nov. 20 in the journal *JAMA Psychiatry*.

Using functional and structural MR imaging procedures, investigators were able to visualize abnormalities in error responding and gray matter integrity in the part of the brain known as the anterior cingulate cortex, which controls many cognitive functions, including recognizing and responding to mistakes. Researchers sorted the addicted individuals by [self-awareness](#), based on whether they were able to provide accurate reports of their own choice behavior and through a written questionnaire that assessed emotional functioning. Results were compared against healthy controls and cocaine-addicted individuals who did not have these self-awareness deficits.

"Quantifiable functional and structural abnormalities in the brain were easy to see in the MRIs of cocaine-addicted individuals with impaired self-awareness," said Rita Z. Goldstein, PhD, the study's senior author and Professor of Psychiatry and Neuroscience at the Icahn School of Medicine at Mount Sinai. "These deficits were prominent even when we compared this subgroup of individuals with other cocaine-addicted

individuals whose self-awareness was intact." More precisely, the [anterior cingulate cortex](#) was morphologically smaller and responded abnormally to errors in the cocaine-addicted individuals with impaired self-awareness.

Scott J. Moeller, PhD, the lead author of the study, and Assistant Professor in the Department of Psychiatry at the Icahn School of Medicine at Mount Sinai, pointed out that the findings could have important clinical implications. "Clearly, one-size-fits-all treatment options for drug addiction are not working effectively," he said. "The good news is that our findings suggest treatment options that might be especially useful for individuals with impaired self-awareness. For example, pre-therapy motivational interviews may help increase motivation to seek treatment in the first place. Once at the clinic, additional intervention for these individuals could include mindfulness therapies to cultivate self-awareness of substance use triggers and consequences." The goal of these therapies would be to help counteract the anterior cingulate abnormalities, improve self-awareness and self-control, and ultimately decrease problematic drug abuse.

Based on these findings, the researchers plan to develop new MRI paradigms to investigate different facets of self-awareness that they were unable to target in this study. They also plan to launch longitudinal and clinical studies to test how self-awareness relates to drug treatment outcomes. In the longer-term, the authors foresee expanding the idea to other psychiatric disorders, such as gambling and eating disorders, which like drug addiction have not been traditionally linked with self-awareness limitations.

Provided by The Mount Sinai Hospital

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