

# Mental illness and drug addiction may co-occur due to disturbance in part of the brain

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Why do mental illness and drug addiction so often go together? New research reveals that this type of dual diagnosis may stem from a common cause: developmental changes in the amygdala, a walnut-shaped part of the brain linked to fear, anxiety and other emotions. A full report on why these “comorbid” disorders may develop appears in the December *Behavioral Neuroscience*, published by the American Psychological Association (APA).

Dual diagnosis is common yet difficult to treat. Addiction of all types – to nicotine, alcohol and drugs – is often found in people with a wide variety of mental illnesses, including anxiety disorders, unipolar and bipolar depression, schizophrenia, and borderline and other personality disorders. Lead author Andrew Chambers, MD, cites clinical reports that at least half the people who seek help with addiction or mental-health treatment have co-occurring disorders. Epidemiological data says that from two to five of every 10 anxious or depressed people, and from four to eight of every 10 people with schizophrenia, bipolar disorder, or antisocial personality, also have some type of addiction.

To find the scientific basis for this complex, seemingly intractable pairing, which has in the past been attributed to “self-medication,” Chambers’ team at the Indiana University medical school compared the adult mood- and drug-related behavior of two groups of adult rats: those whose amygdalas were surgically damaged in infancy and those whose amygdalas were left intact but who underwent a sham surgery, to equalize their treatment.

Rats with damaged (lesioned) amygdalas grew up abnormally under-responsive to ambiguous or potentially threatening stimuli. Not showing the normal caution, they moved significantly more in response to novelty, showed significantly less fear in an elevated maze, and kept socializing even when exposed to the scent of a predator.

Crucially, these same rats also were significantly more sensitive to cocaine after just one exposure. And rats given repeated cocaine injections later showed even stronger expressions of the enduring changes in behavior – suggesting an overall hypersensitivity to the addictive process.

Given that the experimental and control rats were raised in the same tightly controlled conditions, the only difference being their brain status, researchers concluded that the integrity of the amygdala was the root cause of both impaired fear behavior and heightened drug response.

“Brain conditions may alter addiction vulnerability independently of drug history,” says Chambers. He and his colleagues concluded that someone’s greater vulnerability to addiction, rather than a given drug’s ability to alter the symptoms of mental illness for better or worse (usually worse), more fully explains the high rates of dual diagnosis.

For these reasons, and given the lab evidence and the fact that dual diagnosis patients do less well on psychiatric medication than other patients, Chambers wondered whether the underlying problems in the brain – what he calls “neural inflexibility” -- make it harder for these people to respond.

To improve the effectiveness of treatments for dual diagnosis, Chambers would like to see educators, counselors, physicians, and scientific researchers integrate insights into both mental health and addiction. Funding the simultaneous treatment of both disorders would also help,

he observes, given that “dual-diagnosis cases are the mainstream among these patients, probably because addiction and mental illness are strongly linked by neurobiology.”

What may harm the amygdala early in human development" Dr. Chambers cites the relatively rare cases of temporal lobe epilepsy, tumors or early brain injury. Far more common, he speculates, are complex interactions among subtle genetic and environmental factors that change the way the amygdala functions or is connected to the rest of the brain during childhood and adolescence. For example, he says, “Early emotional trauma, paired with a certain genetic background, may alter the early development of neural networks intrinsic to the amygdala, resulting in a cascade of brain effects and functional changes that present in adulthood as a dual-diagnosis disorder.”

Source: American Psychological Association

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