

Study offers clues as to why teens are more susceptible to addiction and mental illness

January 17 2012, by Bob Yirka

(Medical Xpress) -- Researchers at the University of Pittsburgh's Moghaddam Laboratory, led by biochemist Bitá Moghaddam [have found](#) after studying rat brains that minor differences in activity levels in certain brain parts, between adults and teens might help explain why teens tend to be more susceptible to both addiction and mental illnesses such as depression and schizophrenia. As the team explains in their upcoming paper in the *Proceedings of the National Academy of Sciences*, differences in the way the dorsal striatum responds to rewards may offer an explanation as to why teens have such problems.

To find out why teens might be more prone to such maladies, the team started with the nucleus accumbens, a part of the [brain](#) that produces so-called happy chemicals in response to rewards such as food or sex. As many are aware, various chemicals (such as recreational drugs) can cause the same effect. In this study, the researchers taught a group of rats to respond to a tone by dipping their nose in a certain hole. Doing so resulted in a tasty treat. In the brain, the tone resulted in the production of happy chemicals which served as a reward, causing the rats to learn to do as they were bid. Both teens and adults made the same amount of the happy chemicals, but, when the researchers compared the reaction of another brain part, the dorsal striatum, to such chemicals in teen rats versus adults they found that this particular brain region responded with more activity in the teen rats.

The dorsal striatum is a part of the basal ganglia, a part of the brain responsible for forming what are normally considered good habits, such

as panning eye movements when entering a new environment; it's also a part of the brain involved in forming emotional responses to external stimuli. Thus, anything that causes extra activity in this part of the brain is worth noting when trying to nail down differences between groups or subclasses of animals.

The team points out that [addiction](#), [mental illness](#) and impulsive behavior are not restricted to teenage humans, as rats and many other animals have been found to have the same differences. Thus, increased activity in certain brain parts in rats will likely mean the same thing is occurring in humans, which could possibly explain at least some of the differences seen in teens, versus adults.

And while the researchers don't know why different brain parts react differently to the same stimuli in teens versus adults, they do believe such differences likely explain the oft noted behavioral differences between [teens](#) and adults. But that's not the whole story of course, just last month Moghaddam and her team published a study that shows that teen brains tend to over-process rewards as well.

More information: The striatum processes reward differently in adolescents versus adults, *PNAS* (2012).

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