PRESS RELEASE

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# The Biology of Addiction Risk Looks Like Addiction

*Reports new study in Biological Psychiatry*

**Philadelphia, PA, July 1, 2014** – Research suggests that people at increased risk for developing addiction share many of the same neurobiological signatures of people who have already developed addiction. This similarity is to be expected, as individuals with family members who have struggled with addiction are over-represented in the population of addicted people.

However, a generation of animal research supports the hypothesis that the addiction process changes the brain in ways that converge with the distinctive neurobiology of the heritable risk for addiction. In other words, the more one uses addictive substances, the more one's brain acquires the profile of someone who has inherited a risk for addiction.

One such change is a reduction in striatal dopamine release. Dopamine is a key brain chemical messenger involved in reward-related behaviors. Disturbances in dopamine signaling appear to contribute to reward processing that biases people to seek drug-like rewards and to develop drug-taking habits.

In the current issue of *Biological Psychiatry,* researchers at McGill University report that individuals at high risk for addiction show the same reduced dopamine response often observed in addicted individuals, identifying a new link between addiction risk and addiction in humans.

Dr. Marco Leyton and his colleagues recruited young adults, aged 18 to 25, who were classified into three groups: 1) a high-risk group of occasional stimulant users with an extensive family history of substance abuse; 2) a comparison group of occasional stimulant users with no family history; and 3) a second comparison group of individuals with no history of stimulant use and no known risk factors for addiction. Volunteers underwent a positron emission tomography (PET) scan involving the administration of amphetamine, which enabled the researchers to measure their dopamine response.

The authors found that the high-risk group of non-dependent young adults with extensive family histories of addiction displayed markedly reduced dopamine responses in comparison with both stimulant-naïve subjects and non-dependent users with no family history.

"This interesting new parallel between addiction risk and addiction may help to focus our attention on reward-related processes that contribute to the development of addiction, perhaps informing prevention strategies," said Dr. John Krystal, Editor of *Biological Psychiatry*.

Leyton, a Professor at McGill University, said, "Young adults at risk of addictions have a strikingly disturbed brain dopamine reward system response when they are administered amphetamine. Past drug use seemed to aggravate the dopamine response also but this was not a sufficient explanation. Instead, the disturbance may be a heritable biological marker that could identify those at highest risk."

This finding suggests that there are common brain mechanisms that promote the use of addictive substances in vulnerable people and in people who have long-standing habitual substance use.

Better understanding this biology may help to advance our understanding of how people develop addiction problems, as well as providing hints related to biological mechanisms that might be targeted for prevention and treatment.

The article is "Reduced Dopamine Response to Amphetamine in Subjects at Ultra-High Risk for Addiction" by Kevin F. Casey, Chawki Benkelfat, Mariya V. Cherkasova, Glen B. Baker, Alain Dagher, and Marco Leyton (doi: 10.1016/j.biopsych.2013.08.033). The article appears in *Biological Psychiatry*, Volume 76, Issue 1 (July 1, 2014), published by Elsevier.

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**Notes for editors**
Full text of the article is available to credentialed journalists upon request; contact Rhiannon Bugno at +1 214 648 0880 or Biol.Psych@utsouthwestern.edu. Journalists wishing to interview the authors may contact Dr. Marco Leyton at +1 514 398 5804 or marco.leyton@mcgill.ca.

The authors' affiliations, and disclosures of financial and conflicts of interests are available in the article.

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The journal publishes novel results of original research which represent an important new lead or significant impact on the field, particularly those addressing genetic and environmental risk factors, neural circuitry and neurochemistry, and important new therapeutic approaches. Reviews and commentaries that focus on topics of current research and interest are also encouraged.

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