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# Understanding addiction through molecular imaging

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## Abstract

Improvements in the development of brain imaging methods have advanced the ability to study the neurochemistry of the living brain in psychiatric disorders, including addiction. Particularly positron emission tomography (PET) has been used to determine neurochemical substrates of addiction. Imaging studies investigate vulnerability to addiction through dopamine, serotonin, opiate, and more recently glutamate-receptor and transporter binding, as well as exploring dopamine transmission via pharmacologic challenge and depletion studies. Hypotheses regarding neurotransmitter function in addiction derived from preclinical and clinical observations have been able to be evaluated through a growingavailability of radiotracers to explore neurotransmitter synthesis, transportersand receptors. For example, both dopamine receptors and dopamine release in areas of the striatum are reducedin cocaine, methamphetamine, heroin, and alcohol dependence, possibly related toclinical outcome. This talk will provide an overview of key findings illustrating how molecular imaging has extended our knowledge of the neurobiological bases of drug abuse and addiction, how they address potential clinical and therapeutic applications, and will integrate the findings from imaging studies to propose a model of drug addiction.

## Biography

Dr. Nina Urban is a psychiatrist and research scientist and Assistant Professor of Clinical Psychiatry in the Division of Substance Abuse at Columbia University, New York. Dr. Urban's research focuses on the exploration of alterations in the dopaminergic, serotonergic and glutamatergic systems in drug abuse ('club drugs', cannabis, alcohol and cocaine), employing neuroimaging methods such as positron emission tomography (PET), and functional imaging methods (fMRI/MRS), as well as studying deep transcranial magnetic stimulation (rTMS) as an experimental treatment for cocaine- and cannabis dependence. In addition to translational clinical research, Dr. Urban treats patients with comorbid substance abuse and psychiatric problems including mood, anxiety and psychotic disorders, with a special focus on posttraumatic stress disorder in both in- and outpatient settings.