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Research Interests

My research focuses on the nature of long-term neuroplastic adaptations produced by repeated exposure to drugs of abuse and stress, and the role these neuroadaptations play in the development of psychopathology, especially addiction. Much of this research has focused on the phenomenon of psychomotor sensitization associated with the repeated intermittent administration of amphetamine and cocaine, either by an experimenter or by self-administration. For example, repeated treatment with amphetamine, cocaine or morphine produces very long-lasting changes in subsequent drug-induced behavior, as well as associated enduring alterations in a number of neurobiological systems, especially mesotelencephalic dopamine systems. These neuroadaptations include structural changes in the morphology of dendrites on cells in brain reward systems. These latter findings suggest that exposure to psychomotor stimulants may alter patterns of synaptic connectivity in neural systems involved in mediating basic motivational processes, thereby altering a number of reward-related processes. Another focus concerns the ability of environmental (nonpharmacological) factors to modulate the development and expression of sensitization and the neurobiological mechanisms by which environmental context gates drug responsiveness, including the ability to modulate gene expression. In this latter line of research we hope to better understand how environmental and psychological factors interact with the neurobiological actions of drugs and stress to promote the brain changes that result in psychopathology.



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