Electrophysiological correlates of abused drugs: relation to natural rewards.

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ABSTRACT
The addictive consequences of abused substances depend upon activation of neurons in reward centers of the brain. Investigations aimed at determining the underlying basis for substance abuse have resulted in breakthroughs related to drug actions on normal neural processes; for example, the singular role of dopamine as the basis for drug addiction has been revised to include effects that, with other transmitter systems, produce changes in target neuronal firing that are different from those previously assumed, including "reward value" at the neuronal and systems levels and changes in the significance of pursued stimuli as a function of motivational state, context, effort, salience, and cognitive demand. Studies comparing these factors directly show differences between the actions of abused substances and less potent food-related rewards. Characterization of the change in reward-encoding processes for drug and natural rewards has provided insight into how abused substances gain control over behavior. This report explores how abused drugs alter neuron firing in reward-sensitive brain regions and how those alterations effect drug-seeking activity in animals and humans.