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ALCOHOLISM:

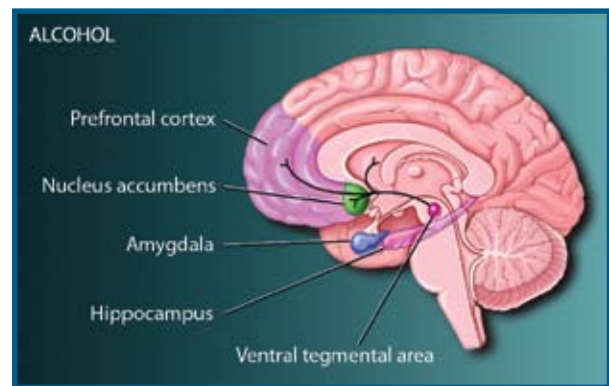
“Habits and Cues in Alcohol Drinking: Dynamic Striatal Activity”

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GRANT DESCRIPTION

People with alcohol use disorders drink for many reasons, one of which may be the activation of habit circuitry in the brain. This grant uses an animal model of alcohol drinking to investigate what changes in the brain mediate the transition from goal-directed drinking to habitual drinking. The study investigates real-time neurodynamics of the dorsal striatum in rats during alcohol drinking and relapse-like behavior, and specifically looks to determine how behavioral habits promote alcohol seeking and consumption by comparing brain activity in rats trained on reinforcement schedules that model habitual versus goal-directed operant behavior. Individual dopamine release events, called dopamine transients, are measured in the dorsal striatum at lever presses to obtain alcohol, at the presentation of alcohol-associated cues, and during drinking. In another group of rats, cell firing activity in the dorsal striatum is measured during these same events. The data resulting from these innovative studies will provide important information about how the dorsal striatum differentially encodes habitual versus goal-directed alcohol drinking. Two ARRA supplements were provided for this grant. The first provides funds for undergraduate students to assist with projects over the summer and the second provides funds to investigate how potentially therapeutic drugs affect alcohol drinking differently in rats trained on goal-directed versus habitual schedules of operant alcohol self-administration.



Brain Reward Drug Systems. Scientists are not certain about all the structures involved in the human brain reward system. However, studies of rat and monkey brains, and brain imaging studies in humans, have provided many clues. These illustrations show what areas are most likely part of the reward systems in the human brain.



IN THE LAB: Recovery Act Stories



ALCOHOLISM:

“Habits and Cues in Alcohol Drinking: Dynamic Striatal Activity”

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SCIENCE AND HEALTH IMPLICATIONS

The disconnection of alcohol drinking behavior from its consequences is a major factor that makes alcoholism so difficult to treat — alcoholics continue to drink despite negative consequences and devaluation of alcohol by tolerance. This research will show how different brain processes (goal-directed versus habitual behavior) contribute to a complex behavior such as alcohol drinking, and how variable contributions of these brain processes can affect the persistence of alcohol drinking even when the alcohol is no longer rewarding. Ultimately this research will provide a window into how the brain encodes alcohol-related habit formation and help to understand the behavioral and physiological underpinnings of habitual drinking, which could hold the key to curbing the development of alcohol dependence and to preventing relapse. In addition, by testing therapeutic drugs on habitual and goal-directed alcohol drinking, the experiments may lead to improved preclinical animal models of alcohol drinking and relapse-like behavior.

The Society for Neuroscience (SfN) is the world's largest organization of scientists and physicians devoted to advancing understanding of the brain and nervous system. Since its inception in 1969, the Society has grown from 500 members to more than 40,000.