

## **NEUROADAPTATION TO ALCOHOL DEPENDENCE: CONSEQUENCES AND OPPORTUNITY FOR RECOVERY**

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Alcohol dependence is one of the most highly prevalent, universal neuropsychiatric disorders and is marked by a characteristic profile of neuropsychological deficits. The damaging effect of chronic alcoholism on brain structure and function are heterogeneous in the location and extent of insult yet selective with respect to cognitive and motor processes and neural pathways potentially disrupted. For most, impairments are mild to moderate and involve executive functions, working memory, visuospatial abilities, and postural stability. Neural circuitry targeted by alcoholism involves gray matter nodes and white matter tracts of frontocerebellar and limbic brain systems. With prolonged abstinence from alcohol, both functional and brain structural recovery can ensue. Tracking alcoholism's dynamic course of sobriety and relapse reveals the potential for accommodation to and recovery from neural and neuropsychological insult. This dynamism reveals longitudinal investigation of alcoholism as a compelling model of human neuroadaptation and neural plasticity. Further, functional imaging studies provide evidence for compensation by invoking non-normal sites and circuits to achieve normal performance on tasks typically impaired. Such evidence provides hope for directed rehabilitation efforts that encourage intact neural systems to take over functions impaired because of their reliance on degraded circuitry. The learning objectives for this course are: 1) to recognize that alcohol dependence disrupts selective brain macrostructure, microstructure, and function; 2) to appreciate that alcoholism-related functional brain changes are a form of neuroadaptation that may underlie dysfunction, making alcoholism a self-perpetuating disorder; 3) to learn that sustained sobriety can result in improvement in brain structure and function, indicative of either damage reversal or compensatory mechanisms that can be identified with formal neuropsychological testing and quantitative structural and functional brain imaging.