

Betting and the brain: Clinical implications of neuroscience research in problem gambling.

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Evidence from neuroscience indicates that several neurobiological mechanisms are related to differential outcomes in addiction. For instance, higher levels of impulsivity have been related to earlier relapse, and brain activity patterns like higher responsivity to addiction related cues as measured in fMRI research, have predictive value for earlier treatment drop-out or relapse. The overall number of neuroimaging studies in pathological gamblers is still modest, but is increasing sharply in the last few years. Despite the relatively small number of studies, neurobiological processes have been shown to play a key role in the development of problem gambling, its continuation, and relapses in gambling problems after treatment. Functional MRI studies consistently show a diminished response of the reward-related mesolimbic-prefrontal brain circuit in problem gamblers and pathological gamblers when responding to rewards or losses that they encounter outside of a gambling situation. However, neuroimaging studies that focus on the neural responses of problem gamblers and pathological gamblers in gambling situations, show that increased activation in this reward-related brain circuit is present, for instance in response to high-risk gambles, or when winning when the probability of winning is low. Similarly, studies of gambling cue-reactivity implicate an increased response in motivational and attentional brain circuitry, consistent with studies in substance use disorders. Recent fMRI studies on gambling specific aspects such as expectations of wins, near-wins, and risky gambles indicate that these aspects are associated with neural mechanisms relevant in determining behavior of problem gamblers compared to non-addicted gamblers. In this presentation, an overview is given focusing on the newest insights in the neurobiology of problem gambling and on clinical implications of these findings.