

Brain Changes in Addiction to Gambling and Cocaine

VISN 1 MIRECC researchers have used brain imaging studies to show that urges to gamble and urges to use cocaine involve activation of similar brain regions. This finding supports the idea that addictions are not limited to behaviors that involve taking drugs or alcohol. Three groups of participants, cocaine abusers, pathological gamblers and non-addicted controls were shown films designed to evoke cocaine craving, gambling craving, neutral responses and other emotional responses while their brain function was monitored using Functional Magnetic Resonance Imaging (fMRI). This method produces moment-to-moment sequential pictures of blood flow through the brain and enables scientists to determine the brain regions that are activated or suppressed during different kinds of mental activity. Subjects in the three groups had very different subjective responses to the stimulating films. Those who abuse cocaine experience an intense desire to use cocaine when shown the cocaine film but no desire to gamble when shown the gambling film. Likewise, gamblers reported strong urges to gamble when shown the gambling film but no emotional reaction to the cocaine film. Non-addicted control subjects reported a neutral reaction or one of disgust when shown either of the cocaine or gambling film. Changes in brain activation mirrored these differences in craving response to the different films. Compared with non-addicted subjects, the cocaine abusers and gamblers showed changes in activity in two brain areas: (a) the region associated with appetite and drives for pleasurable experiences and (b) the pre-frontal cortex which associated with judgement and decision making. The brain changes suggest that craving in addicted patients involves both greater emotional arousal and reduced ability to use executive function to curb impulsive behavior. The lead investigator, MIRECC researcher Marc Potenza, interprets these results as supporting his theory that pathological gambling is like drug addiction with out the drugs. Other researchers include MIRECC investigators Thomas Kosten and Bruce Rounsaville and a team of Yale investigators including P.Christopher Gottschalk, Pawel Skudlarski, Robert Fulbright, Cheryl Lacadie, Mary Wilber, Marvin Steinberg, Todd Constable, John Gore and Bruce Wexler.