Addiction as a disorder of decision-making

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New research shows that craving drugs such as nicotine can be visualized in specific regions of the brain that are implicated in determining the value of actions, in planning actions and in motivation. Dr. Alain Dagher, from McGill University, suggests abnormal interactions between these decision-making brain regions could underlie addiction. These results were presented at the 2013 Canadian Neuroscience Meeting, the annual meeting of the Canadian Association for Neuroscience - Association Canadienne des Neurosciences (CAN-ACN).

Neuroeconomics is a field of research which seeks to explain decision making in humans based on calculating costs and likely rewards or benefits of choices individuals make. Previous studies have suggested addicted individuals place greater value on immediate rewards (cigarette smoking) over delayed rewards (health benefits). Research done by Dr. Dagher and colleagues show how the value of the drug, which is indicated by the degree of craving, varies based on drug availability, decision to quit and other factors. He also shows that this perceived value of the drug at a given time can be visualized in the brains of addicted individuals by functional Magnetic Resonance Imaging (fMRI), and that imaging results can be used to predict subsequent consumption.

Dr. Dagher showed that a specific brain region called the dorsolateral prefrontal cortex (abbreviated DLPFC) regulates cigarette craving in response to drug cues - seeing people smoke, or smelling cigarettes - and that these induced cravings could be altered by inactivating the DLPFC by Transcranial Magnetic Stimulation (TMS). He suggests addiction may result from abberrant connections between the DLFPC and other brain

region in susceptible individuals. These results could provide a rational basis for novel interventions to reduce cravings in addicted individuals, such as cognitive behavioral therapy or transcranial stimulation of the DLFPC.

Concluding quote from Dr. Dagher: "Policy debates have often centred on whether addictive behaviour is a choice or a brain disease. This research allows us to view addiction as a pathology of choice. Dysfunction in brain regions that assign value to possible options may lead to choosing harmful behaviours."

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