REWARD SYSTEM DYSFUNCTION AS A PREDICTOR OF PSYCHOSIS AND ADDICTIVE DISORDERS

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In drug and alcohol dependence, detoxification is characterized by a significant reduction in drug-induced dopamine production and release, which has been shown to impair reward anticipation elicited by non-drug-associated stimuli. Drug-associated cues, on the other hand, appear to elicit increased functional activation in the medial prefrontal cortex (MPFC), which has been shown to be associated with impaired dopamine neurotransmission in the ventral striatum (VS). These findings suggest that dopamine dysfunction in alcohol dependence is associated with an attentional and motivational bias towards drug-associated at the expense of non-drug-associated stimuli. In schizophrenia, on the other hand, unmedicated patients show an increase in dopamine synthesis capacity and release in the associative striatum, which may extend into parts of the VS. Here, chaotic or stress-induced dopamine firing appears to interfere with the encoding of salient reward prediction errors, which may result in the attribution of salience towards otherwise irrelevant, neutral cues. In accordance with this hypothesis, functional impairments in the encoding of reward-associated cues were associated with motivational deficits in the VS, while a bias towards processing of negative feedback in the MPFC correlates with the severity of delusions. Computational approaches show that particularly in disorders as schizophrenia, where patients often fail to understand the underlying task structure, it is necessary to model a behavior in order to match patients and controls for the applied strategy - functional activation differences observed when subjects are matched for task strategy then point to a true neurobiological difference, i.e. VS-encoding of prediction errors in schizophrenia.