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MEETING ABSTRACT

A3.20

Neural networks underlying cocaine addiction and social interaction

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Background: The Insular cortex is a brain area involved in the representation of interoceptive information. Naqvi and colleagues showed in their study that patients with insular lesions quitted smoking and did not present any craving for cigarettes [1]. A growing body of evidence indicates that experimenter-controlled or administered social interaction either outside or inside the testing cage can decrease drug reward and reinstatement or relapse [2]. Rats that chose socializing over drugs had decreased activation of the insular cortex [3]. In fact, social interaction changes the activity of specific neuronal circuits that control drug preference, craving and relapse.
Methods: Pharmacological inhibition of anterior and posterior insular during cocaine place preference and sociability and social novelty.
Results: We show that pharmacological inhibition of posterior insular cortex facilitates immediate and long-term (12 days) cocaine conditioned place preference expression. And it also slightly increases social novelty. While pharmacological inhibition of anterior insular cortex has no significant effect on cocaine-conditioned place preference or social preference and social novelty.
Discussion: Recent work on the role of insular cortex on rodents demonstrates that reversible inactivation of posterior insular cortex, as well as its electrical stimulation decreased both nicotine self-administration and reinstatement in rats. In contrary, Pelloux and colleagues showed that lesions of anterior part of insular cortex potentiate cocaine-seeking behaviours where rats underwent forced abstinence. Insular cortex was also recognized as a hub which integrates interoceptive signals associated with experience of drug. Moreover, it has been shown that cocaine properties include both hedonic and aversive effects. Recent findings on the role of posterior insular cortex indicate that the posterior insular cortex conveys aversive information to the amygdala which is crucial for context-dependent learning. Our data suggest that inhibition of posterior insular cortex reduces the aversive component of cocaine which eventually facilitates the rewarding value of cocaine in the conditioned place preference paradigm.

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Keywords: neural networks – cocaine addiction – social interaction – insular cortex

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