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20571 | Deciphering the astrocytic and synaptic changes under chronic alcohol exposure using a self-administration paradigm

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Abstract

Drug abuse is characterized by a compulsive and persistent drug-seeking behaviour, despite the harmful emotional, physical and social consequences [1]. Our laboratory has previously found that the neuronal-glia crosstalk is critical in relaying the changes caused by acute exposure to psychoactive drugs through neuroimmune mechanisms [2]. We have also reported that microglia can engulf postsynaptic components in the prefrontal cortex (PFC) of mice after repeated alcohol exposure and this led to increased anxiety in mice [3]. The adverse effects of alcohol on the central nervous system (CNS) are well described, with astrocytes becoming reactive and displaying changes in gene expression, activity and proliferation [4]. However, the mechanisms involved are not yet fully understood. We are currently characterizing the astrocytic response under chronic alcohol consumption, taking into account the crucial interaction between neuronal and glial cells in the development and maintenance of addiction. Using a well-established voluntary alcohol drinking paradigm [5], we are evaluating alcohol-associated changes in PFC astrocytes, synapses and their behavioural correlates. Our preliminary results indicate similar alcohol consumption patterns between males and females, however, males, but not females, present altered weight gain and experience a significant increase in inhibitory synapse density after chronic exposure to ethanol when compared to the control group. Our work is contributing to a better understanding of the impact of chronic alcohol intake and may lead to the development of new strategies for pharmacological intervention in drug addiction, based on the targets identified as critical for the neuronal-glia crosstalk.

Keywords: alcohol; astrocytes; neurons; synapses; CNS; addiction.

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