NEURO-INFLAMMATION AND ALCOHOL ADDICTION: CORRELATION WITH MEMORY AND MOTOR IMPAIREMENT

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Chronic ethanol use and abstinence is well known to cause cognitive and motor impairment in alcohol dependent individuals, however the neurobiological mechanism underlining those behavioural changes is still not clear. There is emerging evidence implicating microglia activation (i.e. neuro-inflammation) in the neurobiology of several mental health disorders. In this talk, we will present novel data illustrating the effect of chronic ethanol use and of acute, medium and long term abstinence on a cerebral neuroinflammation marker. 18kDa translocator protein (TSPO) is sparsely expressed in the brain parenchyma, and resting glia, but richly expressed in activated glial cells. TSPO PET has been used to detect neuroinflammation *in vivo* in humans in inflammatory conditions.  We also assessed the effect of chronic ethanol use and of acute, medium and long term abstinence on mGluR5 glutamate receptors which is also known to be associated with neuroinflammation and alcohol addiction.

We treated C57Bl/6J) mice with an ethanol-containing diet or isocaloric diet up to 10 days, with an escalating paradigm. Different mice cohorts were then let to spontaneously withdraw for one, four or seven days and underwent behavioural assessments of cognition and coordination, (novel object recognition (NOR) and Rota-Rod respectively), prior to termination at treatment.

Chronic ethanol treatment had a negative impact on motor coordination which persisted for one day post-withdrawal from ethanol but recovered after 4 days withdrawal. Ethanol treatment did not have a significant effect on memory as evaluated by NOR; however, ethanol-withdrawal resulted in a reduction of memory with a lack of object recognition on withdrawal days 1 and 7.

Chronic ethanol treatment and one day post-ethanol withdrawal lead to a transient significant increase in TSPO binding in several brain regions. Moreover, an overall-group increase in mgluR5 binding was observed in several key brain regions of alcohol treated mice compared to controls. Significant negative correlations were identified between binding levels and memory scores in several brain regions in ethanol treated and abstinent mice.

The results of this study indicate neuroinflammation as possible mechanism driving cognitive and behavioural changes observed in alcohol dependent individuals undergoing abstinence.