Alcohol dependence damages the brain through a multiplicity of factors including thiamine deficiency, liver disease, head injury, and repeated episodes of withdrawal. Alcohol withdrawal is a potential opportunity for reducing damage as it is the main point of contact between doctors and patients. Pre-clinical models of alcohol dependence demonstrate activation of microglia, brain-resident macrophages, and expression of cytokines both in the brain and peripheral blood during alcohol withdrawal. These changes were associated with neuronal death, and learning deficits. Similar processes may occur in man as increased microglial numbers and chemokine expression, and raised circulating pro-inflammatory cytokines have been reported in alcohol dependence. We undertook two studies to investigate neuroinflammation and alcoholism in man.

In study 1, both pro- and anti-inflammatory cytokines and chemokines decreased significantly in 51 alcohol-dependent patients during detoxification demonstrated that whilst T cell cytokines increased. IL-6 was positively associated with withdrawal severity and depressive symptoms during withdrawal. The chemokine CCL-2 was positively associated with performance on cognitive tasks. In study 2, neuroinflammation was assessed with Positron Emission Tomography (PET) using $^{11}$C]PBR28 that binds to the Translocator Protein 18 kDa (TSPO) richly expressed in microglia. In recently abstinent male alcohol-dependent patients $^{11}$C]PBR28 PET revealed lower TSPO binding in the hippocampi than healthy controls. TSPO binding in the hippocampus was also positively correlated with performance on tests of verbal memory. This suggests that hippocampal microglial loss or dysfunction may be related to memory problems in alcoholism. In summary, there are changes in both peripheral and brain inflammatory processes in early abstinence from alcohol dependence that are related to clinical symptoms. Characterisation of inflammation in alcoholism is important due to its likely impact on clinical course and provides novel approaches for treatment to reduce brain damage due to alcoholism.