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Does drinking alcohol give you brain damage?

The mechanism by which neurotoxicants, such as alcohol, damage neurons is not fully understood. To investigate the neuropathology arising from cumulative excessive alcohol consumption we examined prefrontal cortex brain tissue from human alcoholics and age, gender, and post-mortem delay matched control subjects. H&E staining and light microscopy of prefrontal cortex tissue revealed a reduction in the levels of cytoskeleton surrounding the nuclei of cortical and subcortical neurons, and a disruption of subcortical neuron patterning in alcoholic subjects. One dimensional polyacrylamide gel electrophoresis proteomics of cytosolic proteins identified dramatic reductions in the protein levels of spectrin β II, and α- and β-tubulins in alcoholics, and these were validated and quantitated by Western blotting. In alcoholics, significant loss of cytosolic α- and β-tubulins was also seen in the other brain regions examined: caudate nucleus, hippocampus, and cerebellum. We have also extended our studies to assess brain damage in rats administered alcohol for a 4-week period. Results of this short-term (acute) alcohol exposure will also be discussed.

Biography

Wayne Grant Carter received his Honours degree and PhD in Biochemistry from the University of Southampton, studying protein post-translational modification and molecular signalling cascades. He is currently a Group Leader in the School of Medicine, University of Nottingham, with research focused upon protein post-translational modification and molecular mechanisms of hepato- and neuro-toxicity. His recent publication detailing "alcohol-related brain damage in humans" (PLoS ONE 9(4): e93586) received considerable national and international media coverage

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