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Biochemical and behavioral consequences of ethanol intake in a mouse model of metabolic syndrome

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Background: Alcohol abuse is common in people with sedentary lifestyles, unbalanced diets and metabolic syndrome (MS). Both, alcohol abuse and MS have negative effects on the CNS inducing cognitive impairment and impaired brain oxidative status. Considering that a few studies have focused on the combined effects of both conditions in the brain, the aim of this work is to elucidate the effects of alcohol intake in a mouse model of MS, at the behavioral and biochemical level.

Methodology: Control (B6.V-Lep ob/+ JRj) and MS (B6.V-Lep ob/obJRj) male mice aging 4 weeks were used in the study, divided in four groups: control (C), ethanol (E), obese (Ob), obese-ethanol (Ob-E). 10% ethanol consumption model was used for 6 weeks. Basal glycemia, insulinemia and a glucose overload test were evaluated at the end of the study. An object recognition test was used to assess short- and long-term memory. The antioxidant enzyme glutathione peroxidase (GPX) activity and the lipid peroxidation product, malondialdehyde (MDA) were analyzed in mice cortex samples.

Results: No significant differences were found among groups in long- and short-term memory. No significant differences between C and E group were found in the basal glycemia and the glucose overload test. However, the Ob group presented a significant increase in both parameters when compared to the C and E groups. These values were significantly decreased in the Ob-E group when compared to Ob group. Insulinemia was increase in both, Ob and Ob-E when compared to C and E groups. The activity of GPX was burst in the E, Ob and Ob-E groups when compared to C animals. No significant differences were observed in MDA concentration.

Conclusion: Four weeks of ethanol administration do not induce significant behavioral or biochemical brain impairments in Ob mice, although it was able to modulate glucose metabolism.

Biography

Pablo Balino received his Bachelor's degree in Biology from the University of Valencia, Master's in basic and applied Neurosciences by the University of Valencia, and PhD in Biology from Jaume I University. During the doctorate, his main line of research has focused on the study of the neuroenzymatic mechanisms of brain metabolism of ethanol, as well as its behavioral repercussion. During this period, and supported by a predoctoral fellowship from the Ministry of Science, Innovation and Technology. He completed a 1-year stay at the Center for Alcohol Studies (Rutgers University, New Jersey). After the doctorate, he is awarded with a postdoctoral fellowship belonging to the prestigious European Marie Curie program, becoming a research member of the NEUROACT consortium "A collaborative training program to develop multi-electrode array (MEA) platforms to understand synaptic function and treat diseases of the nervous system ". He is currently a research fellow in the group of neural systems within the area of physiology at the University Jaume I.

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