Conference Abstract

Behavioral Plasticity and Gene Regulation in the Brain During a Long-Term Intermittent Ethanol Exposure in an Adult Zebrafish Population

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Ethanol consumption is correlated with different neurobiological and behavioral impairments. Acute and chronic exposure to this drug is associated with alterations in the regulation of the mesolimbic dopaminergic system as well as with transcriptional modulation of other receptors in the central nervous system and can unleash seeking behavior or behavioral adaptations and phenotypes such as loss of control, dependence and tolerance. In the present work, we characterized the chronological effects of acute and chronic intermittent exposure to ethanol (1% v/v) in an adult zebrafish population (Danio rerio). During sixteen days of ethanol exposure, we associated the neuromodulation of target genes (drd1, drd2, gabra2a, gabbr1a, gabbr1b) in the central nervous system with behavioral parameters, assessed by social preference, antipredatory capacity and anxiety-like analysis. Transcriptional and behavioral data were collected in days 0, 1, 4, 8, 12 and 16, after ethanol exposure. In days 1 and 4, ethanol exposure increased exploratory behaviour regardless of the risk involved (less time spent close to conspecifics and lower avoidance reaction to predator). Along with the reduction of drd2, grin1a and gabra2a transcription seen in the same days, these results suggest an anxiolytic effect of acute ethanol exposure. Interestingly, in days 8, 12 and 16, an attenuation of the behavioral effects was observed. The social preference, antipredatory behaviour, perception and exploration parameters were reconstituted. This behavioral re-establishment, accompanied by the increase in drd1, drd2 and gabbr1a transcription in the 8th day could be an indicative of an adaptation to chronic exposure to ethanol. The modulation of drd2 gene combined with the behavioral characterization observed in the study suggests this signalling pathway as a key participant in the phenotypic outcomes of a long-term chronic exposure to ethanol. Lastly, our results reaffirm the ethanol deleterious impacts in perception, ability to respond to adverse stimuli and in anxiety-like behaviour.

Abstracts

Keywords: Alcohol; Acute; Anxiolytic; Motivation; Chronic; adaptation; CNS receptors.