

# BOOK OF ABSTRACTS



Organização

**U. PORTO**

Apoio



**TÍTULO | TITLE**

Livro de Resumos do 18º Encontro de Investigação Jovem da U.Porto | *Book of Abstracts  
Young Researchers Meeting of U.Porto*

**UNIVERSIDADE DO PORTO**

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**ISBN**

978-989-746-418-8

**DESIGN**

Serviço de Comunicação e Imagem da U.Porto

## 23024 | Untangling sex differences in glia-to-neuron communication in chronic alcohol exposure

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**Background & Aim:** Excessive alcohol consumption is global health challenge with profound neurobiological consequences. Our laboratory has shown that alcohol exposure induces reactive astrocytic changes, affecting gene expression, activity, and proliferation, while also altering microglial morphology and immune responses [1]. This study aims to characterise sex-specific effects of chronic alcohol consumption on the prefrontal cortex (PFC), focusing on glial cell morphology, synaptic density, and behaviour. **Methods:** Adult mice underwent a voluntary drinking model using an intermittent ‘every-other-day’ (EOD) paradigm with 15% (v/v) ethanol for three weeks. Behavioural tests for anxiety, depression, and memory were conducted before sacrifice. Brains were processed for glial cell analysis using immunohistochemistry and confocal microscopy. Synaptosomes were isolated for proteomics and analysis used STRING and Panther. **Results:** Preliminary data reveal sex-dependent glial and synaptic adaptations. Males showed increased astrocyte volume in the ventromedial PFC (vmPFC) and hyper-ramification in the ventrolateral PFC (vlPFC), while females showed reductions in astrocyte size and complexity. Microglia also displayed sex-specific changes: males had decreased microglial volume in the vlPFC, while females exhibited increased microglial size. Inhibitory synapse density was elevated in males, while females showed an increase in excitatory synapses. These changes correlated with behavioural differences—males displayed heightened anxiety, whereas females exhibited reduced anxiety. Proteomic analysis further supports sex-dependent molecular adaptations: male-enriched proteins were linked to myelination and glial development, while female-specific proteins were associated with mRNA processing, RNA transport, and axonogenesis. **Conclusions:** Chronic alcohol exposure induces sex-specific neuroimmune and synaptic alterations, potentially contributing to differential susceptibility to alcohol use disorders (AUD).

**Keywords:** Neuroimmune response, Glial activation, Alcohol-related neuroplasticity, PFC Dysfunction, Sex differences.

**Acknowledgments:**

This work was funded by National Funds through FCT—Fundação para a Ciência e a Tecnologia, I.P., under the project PTDC/SAU-TOX/0067/2021.

**References:**

[1] Socodato, R., Henriques, J. F., Portugal, C. C., Almeida, T. O., Tedim-Moreira, J., Alves, R. L., Canedo, T., Silva, C., Magalhaes, A., Summavielle, T., & Relvas, J. B. (2020). Daily alcohol intake triggers aberrant synaptic pruning leading to synapse loss and anxiety-like behaviour. *Sci Signal*, 13(650), eaba5754. <https://doi.org/https://doi.org/10.1126/scisignal.aba5754>