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ABSTRACT BOOK

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CELL STRESS

EFFECT OF AQUEOUS EXTRACTS FROM *Posidonia oceanica* SEAGRASS ON MOUSE MACROPHAGES AND HUMAN BLOOD BRAIN BARRIER

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Bioactive compounds from aquatic species exert several beneficial effects in human health, including anti-inflammatory and antioxidant. In particular, extracts derived from green leaves (GLE) and rhizomes (RE) of *Posidonia oceanica* have been shown to exert antitumoral activity *in vitro* against liver cancer cells[1]. Since these extracts have a prominent content of polyphenols, the aim of this study was to assess their potential anti-inflammatory effect on LPS-treated mouse RAW 264.7 macrophages and TNF-α-treated human endothelial cells belonging to an *in vitro* model of blood brain barrier (BBB)[2]. No cytotoxic effect and a reduction of nitrite production by inflammed macrophages were found after 24 h-treatment with increasing concentrations of both extracts. In addition, a modulation of mRNA expression of inflammatory markers was shown by Real Time PCR. Subsequently, on the basis of these data referring to the peripheral level, an *in vitro* model of the human blood-brain barrier (BBB) has been used to investigate the potential anti-inflammatory effect at the central level. We used a co-culture model with the presence of human endothelial cells and pericytes and we added the extracts, at the same concentrations used in the previous experiments with RAW cells, to the luminal compartment and induced inflammation with TNF-α[3]. Results obtained by Real Time PCR on inflammatory markers of BBB cells showed that both extracts were ineffective in reducing inflammation. Interestingly, studies performed on BBB permeability have shown that both extracts do not alter its integrity, reduce the TNF-α-induced permeability alteration and counteract the release of nitrites. Of note, only RE induces an increase in mRNA and protein expression of molecular markers of tight and adherens junctions, leading to a recovery of protein delocalisation after exposure to TNF-α, as shown by immunofluorescence. These promising results prompt further investigation to evaluate more in detail the potential immunomodulatory role of GLE and RE and to unveil the molecular cascade underlying the observed recovery of the integrity of the BBB.

REFERENCES

1. Abruscato *et al. In Vitro* Cytotoxic Effect of Aqueous Extracts from Leaves and Rhizomes of the Seagrass *Posidonia oceanica* (L.) Delile on HepG2 Liver Cancer Cells: Focus on Autophagy and Apoptosis. Biology (Basel). 2023 Apr 18 ;12(4):616. doi: 10.3390/biology12040616.
2. Cecchelli *et al.* A stable and reproducible human blood-brain barrier model derived from hematopoietic stem cells. PLoS One. 2014 Jun 17 ;9(6): e99733. doi: 10.1371/journal.pone.0099733.
3. Versele *et al.* TNF-α and IL-1β Modulate Blood-Brain Barrier Permeability and Decrease Amyloid-β Peptide Efflux in a Human Blood-Brain Barrier Model. Int J Mol Sci. 2022 Sep 6;23(18):10235. doi: 10.3390/ijms231810235.

EFFECT OF MELATONIN ON HEPATIC ALTERATIONS IN A BTBR T + Itpr3tf/J MOUSE MODEL OF AUTISM

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Autism spectrum disorder (ASD) is defined as a heterogeneous set of neurodevelopmental disorder compromising social communication and social interactions and inducing restricted and repetitive behavior. Although the etiology of autism is not well understood, previous findings suggested that the mechanism underlying ASD involves genetics, environmental and biological factors. Among others, oxidative stress, neuroinflammation and apoptotic mechanisms seem to be associated with the pathogenesis of autism. ASD is also described to be associated with various physiological abnormalities in different organs, such as liver. Melatonin (N-acetyl-5-methoxytryptamine) is considered a strong antioxidant due to its ability to scavenge free oxygen radicals. It also has a potential therapeutic action, based on beneficial effects shown on liver injuries and diseases. The aims of the study were to investigate morphological and functional alterations in liver of an autistic mouse model BTBR T+Itpr3tf/J (BTBR) mice and to identify therapeutic strategies for alleviating hepatic damages using melatonin administration. BTBR mice and C57BL6/J (CTR) as healthy control mice have been divided in 4 groups, then treated and not treated respectively with melatonin. We studied hepatic cytoarchitecture, oxidative stress, inflammation and ferroptosis. The results showed more elevated oxidative stress and inflammation in BTBR mice than CTR mice. We also demonstrated the expression of ferroptosis markers in BTBR mice liver. Moreover, we assessed the beneficial potential of melatonin on hepatic alterations of BTBR mice. The results suggested positive effects on cytoarchitecture and metabolic functions due to melatonin treatment.

CELLULAR AND MOLECULAR MECHANISMS RELATED TO AAPH EFFECTS IN HUMAN ERYTHROCYTES: BENEFICIAL ROLE OF ANTHOCYANIN EXTRACTED FROM *Callistemon citrinus*

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