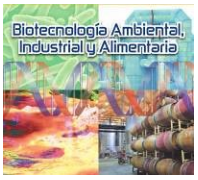
Poster



Neuroprotective strategies against neonatal hypoxia-ischemia

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ABSTRACT

Motivation: Neonatal hypoxia ischemia (HI) is a brain damage caused by oxygen deprivation in newborns. Nowadays, it continues to be a major cause of neonatal mortality and lifelong neurodevelopmental disabilities worldwide.

Neonatal HI physiopathology includes oxidative stress, inflammation, and apoptosis. Some studies have shown that nutraceuticals that have antioxidant, anti-inflammatory or anti-apoptotic properties can prevent neonatal HI by reducing brain damage. Thus, the aim of this work is to evaluate the neuroprotective potential of a plant-derived phenolic compound (PDPC) administered as a pre-treatment before the HI event, with focus on myelination and astroglia activation.

Methods: Our group used the Rice-Vannucci mouse model of neonatal HI by ligating the left common carotid artery and then subjecting 7-day-old pups to hypoxia for 90 min. Pups were administered PDPC (at 20 or 100 mg/kg) or saline intraperitoneally 20 min before the intervention. Two days later, the brains were dissected, homogenized and stored at -80ºC for future experiments to evaluate the antioxidant potential of the PDPC. In a parallel study, seven days later, the brains were dissected to study myelination and astroglia activation by immunohistochemistry using MBP (myelin basic protein) and GFAP (glial fibrillary acidic protein) to assess the neuroprotective potential of PDPC.

Results: Preliminary results indicate a loss of myelination in the ipsilateral hemispheres (where the carotid artery was ligated) of mice subjected to HI, but this loss seemed to be significantly reduced in a dose dependent manner in those mice pretreated with the PDPC. In the case of astroglia staining, experiments are still ongoing but these suggest an overexpression of astroglia in certain areas of the affected hemisphere of the brain in HI mice, such as the cortex or thalamus. We are currently stablishing an image analysis protocol to evaluate the overexpression of GFAP+ cells and observe if it lowers in the treated versus the non-treated group.

Conclusions: To conclude, we can highlight that ongoing experiments suggest that pretreatment with PDPC, specially at 100 mg/kg, preserves myelination and may reduce astroglial activation. Future experiments will also evaluate the antioxidant potential of PDPC pretreatment by measuring the ROS production and the activity of antioxidant enzymes in brain homogenates.

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