ANALYSIS OF THE BEHAVIORAL EFFECTS OF FREE AND NANOEMULSIFIED QUERCETIN IN AN EXPERIMENTAL MODEL OF PARKINSON'S DISEASE

Vitória Pereira Mackmillan; Camila de Oliveira Vian; Carolina Miranda Alves; Marcelo Augusto Germani Marinho; Rafael Felipe Aguiar; Cristiana Lima Dora; Mariana Appel Hort; Ana Paula Horn.

Universidade Federal do Rio Grande - FURG, Rio Grande, RS.

INTRODUCTION: Parkinson's disease (PD) is a neurodegenerative disorder characterized by the degeneration of dopaminergic neurons. Animal models using neurotoxins, such as 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP), have been employed to replicate this condition. Natural compounds, such as quercetin (QU), an antioxidant flavonoid, have been investigated as potential therapeutic alternatives for PD. However, QU exhibits low solubility and bioavailability. To overcome these limitations, its incorporation into lipid-based nanostructures, such as quercetin-loaded nanoemulsions (NEQU), has been proposed to enhance solubility, stability, and absorption. **OBJECTIVES:** This study aimed to evaluate the effects in locomotion of the pretreatment with NEQU and free QU on MPTP-induced Parkinson's disease model in zebrafish larvae. **MATERIALS AND METHODS:** Embryos were collected one hour after fertilization, and viable specimens were selected. At 4 days post-fertilization (dpf), larvae were pretreated with QU and NEQU at concentrations of 1 µM and 2.5 µM, and with their respective dilution vehicles. At 5 dpf, MPTP was administered, and at 7 dpf, the larvae underwent motor behavior analysis. An adapted setup was used for the analyses, with a camera connected to a data acquisition system (DanioVision, Noldus) to record movement. Video analysis was performed using EthoVision XT software (Noldus).Experimental protocols were approved by CEUA/FURG, license P015/2022. **RESULTS AND CONCLUSION:** The results showed that exposure to MPTP significantly reduced larval mobility. Treatment with QU did not protect from the neurotoxin-induced effects. The groups treated with DMSO exhibited mobility similar to the control group, indicating that the solvent did not interfere with the outcomes. Notably, the groups treated with NEQU demonstrated a considerable improvement in locomotion compared to the MPTP group. These findings suggest that MPTP effectively simulates the motor symptoms of Parkinson's disease in zebrafish and that NEQU exhibits neuroprotective potential, representing a promising alternative for future studies.

Keywords: Neurodegeneration; MPTP; quercetin.