MULTIGENERACIONAL AND NEONATAL EFFECT OF ALUMINIUM: A COMPREHENSIVE BEHAVIORAL EVALUATION IN *Caenorhabditis elegans*

Caroline Falabreti[1]; Gabriela Mota Tibola[1]; Wagner Antonio Tamagno[2]; Aline Pompermaier[3]; Carla Alves[1].

1- Federal Institute of Education, Science and Technology of Rio Grande do Sul, Sertão, RS, Brazil
2 - School of Health Sciences, Purdue University, West Lafayette, IN, United States.
3 - Laboratory of Ecology and Conservation, Federal University of Fronteira Sul, Erechim, RS, Brazil

INTRODUCTION:The intensification of industrial processes has increased waste production, making heavy metals, such as aluminum (Al), an environmental and public health concern due to their association with neurodegenerative disorders and behavioral changes. OBJECTIVE: This study investigated the effects of neonatal and transgenerational exposure to Al using *C. elegans* (strain N2). MATERIALS AND METHODS: In the neonatal exposure, after synchronization, eggs were exposed to Al concentrations (5.5 , 8 , and 10.5 $mg.L^{-1}$) for 24h (until all eggs have hatched), while in the transgenerational approach, L1 larvae were exposed for 20h then Al was removed, individuals were allowed to grow up to adults with eggs, they were synchronized and their offspring (F1) was evaluated. The behavioral markers analyzed included pharyngeal pumping, body bends, defecation cycle, and swimming activity. RESULTS: Neonatal results showed a significant reduction in pharyngeal pumping at all concentrations, a decrease in body bends at 5.5 $mg.L^{-1}$, and an increase at 10.5 $mg.L^{-1}$, as well as decrease in the defecation cycle (8 and 10.5 $mg.L^{-1}$). Transgenerational exposure decreased the pharyngeal pumping at 5.5 and 10.5 $mg.L^{-1}$ and also decreased the defecation cycle at 5.5 and 10.5 $mg.L^{-1}$, an increase in body bends at 5.5 $mg.L^{-1}$ and a reduction in swimming at all concentrations were observed. CONCLUSION: These findings indicate that Al significantly affects the embryonic and adult development of *C. elegans*, altering critical behaviors with distinct patterns observed between neonatal and multigenerational exposure. Preliminary results suggest that even moderate concentrations of Al can induce neurotoxic effects, highlighting the need to further investigate the mechanisms behind these changes. Overall, this study contributes to the assessment of environmental and health risks, particularly concerning early-in-life and cumulative exposures.

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