

MICROPLASTIC-INDUCED DAMAGE IN *Drosophila melanogaster*?

INTERGENERATIONAL EFFECTS

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INTRODUCTION: Over the years, microplastics have been increasingly used to produce various materials, such as cosmetics, clothing, and others. However, recent studies have shown that microplastics can harm living organisms, including different generations. **OBJECTIVE:** Therefore, this study aimed to evaluate the damage caused by microplastics in the *Drosophila melanogaster* and also assessing whether this harm his filial generation (F1). **MATERIALS AND METHODS:** The flies were exposed during the developmental period to 0.1 µm yellow-green fluorescence marked microplastics in the following concentrations 0, 0.1, 1, 10 and 25 ppm (F0), after kept on a regular diet during the adult phase (up to 7 days). Afterward, the F1 was collected and kept on a regular diet for the same period (up to 7 days). F0 and F1 were analyzed for UV light emission compatible with the presence of labeled yellow-green microplastics. In addition, western blot analysis of mitochondrial function proteins, drICE, Dcp-1, Mfn-2, and ATP5A1 were carried out. **RESULTS AND CONCLUSION:** In F0, an increase in UV light emission in the head was detected from a concentration starting at 0.1 ppm, accompanied by an increase in apoptotic markers drICE and Dcp-1 starting at a concentration of 1 ppm, and a decrease in energy efficiency markers Mfn-2 and ATP5A1, beginning at the same concentration of 1 ppm. In F1, the persistence of microplastic particles was not detected at any concentration through UV light emission; however, the persistence of the indirect effect was observed in Dcp-1 at concentrations of 1 ppm and 25 ppm, in Mfn-2 at 1 ppm and 10 ppm, and only at a concentration of 10 ppm in ATP5A1. These results show that, in addition to bioaccumulating in the heads of the flies (F0), microplastics can affect important proteins of mitochondrial, demonstrating their harmful effects. Notably, despite the absence of persistent microplastic particles in the heads of F1, indirect effects still a concern due to changes in markers of mitochondrial function in the head, highlighting the need for further research on continuous microplastic exposure and its intergenerational and transgenerational impacts in different experimental models.

Keywords: Microplastics, Apoptosis, *Drosophila melanogaster*