

NANOPLASTICS ARE ACCUMULATED IN THE GUT AND BLOOD OF RAINBOW TROUT AND INDUCE A DECREASE IN PLASMA CORTISOL LEVELS

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Nanoplastics (NPs) are plastic particles of less than 1 µm in size formed in the environment by the degradation of larger plastic waste. These particles can cross biological barriers, such as the gastrointestinal and brain blood barriers, which could make them the most dangerous among plastic debris. The main objective of the present work was to evaluate if polystyrene-NPs (PS-NPs) are recognized as a stressor by the hypothalamus-pituitary-interrenal (HPI) axis of rainbow trout (*Oncorhynchus mykiss*) by measuring plasma cortisol levels. For this purpose, adult rainbow trout (50.2 g mean weight) were orally intubated with PS-NPs (44 nm, 100 µg/L, 1 mL per fish). After 96 h fish were sacrificed, and blood, liver and gut were sampled. Cortisol, and lipid metabolism (glucose, cholesterol, and triglycerides) biomarkers were determined in plasma after PS-NPs exposure. Quantification of PS-NPs levels was carried out in blood, gut and liver of fish. Histology was done in the gut to assess damage. The results showed that PS-NPs were detected and quantified in both blood and gut of exposed fish, but not in liver. Plasma cortisol levels showed a significant decrease in PS-NPs exposed fish when compared to control group. In fish, cortisol is involved in the stress response as well as in many aspects of the endocrine-mediated immune response and therefore the observed decrease could suggest an impairment of the HPI axis. Triglycerides levels in plasma were increased in the exposed individuals, which could point to altered lipid metabolism, potentially affecting the energetic status of rainbow trout. No histological alterations were found.