SEX-SPECIFIC METABOLIC AND MITOCHONDRIAL EFFECTS OF CHRONIC DIETARY BISPHENOL A EXPOSURE IN ADULT ZEBRAFISH (*DANIO RERIO*)

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INTRODUCTION: Bisphenol A (BPA) is a chemical compound used in plastic manufacturing, and products such as food containers can release small amounts of this substance into food and beverages, representing a major route of exposure for humans and animals. Even at low concentrations, BPA acts as an endocrine disruptor, affecting metabolic and neurological functions. **OBJECTIVE:** To investigate the effects of chronic BPA exposure via diet on metabolic parameters and brain mitochondrial functionality in adult zebrafish, with emphasis on differences between males and females. **MATERIALS AND METHODS:** Adult wild-type zebrafish (3–4 months old, 50:50 sex ratio) were maintained at 27 °C with a 14h light/10h dark photoperiod and fed twice daily at 3% of body weight. Animals were fed for 60 days with one of three diets: control (BPA-free), BPA 4 µg/kg, or BPA 50 µg/kg body weight. Fish were weighed every 15 days to adjust food quantity and maintain dose accuracy. After exposure, animals were sexed, euthanized, and blood samples were collected for glucose, total cholesterol, and triglycerides measurements using commercial kits (LABTEST). Brain mitochondrial functionality was assessed by high-resolution respirometry (Oroboros O2k) using the substrate-uncoupler-inhibitor titration (SUIT) protocol. **RESULTS AND CONCLUSION:** BPA 50 µg/kg significantly increased glucose, triglyceride, and total cholesterol levels, effects observed only in males. The male glucose levels were also increased by BPA 4 µg/kg. Mitochondrial respiration was altered only in males fed on BPA 50 µg/kg. There was an increase in the oxidative phosphorylation (OXPHOS) and electron transport system (ETS) in complex II. This increase may reflect an mitochondrial adaptive response to the elevated energy demand caused by increased glucose and triglyceride levels. Our findings indicate that BPA may induce alterations in energy metabolism and brain bioenergetics in a sex-specific manner.

KEYWORDS: Endocrine disruptors; respirometry; energy metabolism

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