Deleterious Effect of Prenatal High-Salt Diet on Brain Redox Homeostasis

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Introduction: High-salt intake is associated with important metabolic changes, including in redox state. Environmental features, as physical activity, stress, drugs and maternal diet seem to influence the critical period of fetal development, and may cause short- and long-term effects. Mitochondrial dysfunction and oxidative stress are involved in the pathophysiology of many diseases, but little is known about the effect of excessive salt intake during pregnancy. **Objectives:** Evaluate the effect of high-salt diet supplemented during pregnancy and lactation on mitochondrial function and redox state of offspring's brain. **Material and Methods:** Wistar rats were divided into two groups: control diet (0.675% NaCl) and high-salt diet (7.2% NaCl). Female rats were fed during 5 weeks, including pregnancy and lactation. Offspring was euthanized at post-natal day 7 when brain structures were dissected and used for biochemical parameters measure. This study was approved by a local ethics commission. **Results and Discussion:** High-salt diet during pregnancy and lactation promoted an increment in reactive species and decreased nitric oxide levels in offspring's cerebellum. Cerebellum also presented lower values of mitochondrial mass and membrane potential in high-salt diet group. Hypothalamus and prefrontal cortex showed an increment in nitric oxide levels. Offspring's prefrontal cortex also showed increased levels of mitochondrial superoxide. In hippocampus, the concentration of reactive species was decreased whereas levels of mitochondrial superoxide were increased. Besides, activity of the antioxidant enzymes superoxide dismutase and glutathione peroxidase was increased in cerebellum and parietal cortex, respectively. In addition, high-salt diet caused an impairment in catalase activity in prefrontal cortex of offspring. No significantly difference was observed in glyoxalase-1 activity in the evaluated structures. **Conclusions:** Results suggests that maternal diet during pregnancy and lactation influences metabolic programming, and a high-salt diet can cause modulations in mitochondrial activity and redox state of the offspring's brain.

Key words: high-salt diet, metabolic programming, redox homeostasis.
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