Maternal Consumption of High Fat Diet Activates Proteins Related to Endoplasmic Reticulum Stress in the Offspring Mice

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INTRODUCTION: Obesity is associated to increase in the unfolded protein response (UPR), an indicator of endoplasmic reticulum stress and responsible by impairment in insulin signaling. High fat diet (HFD) consumption during pregnancy and lactation has been linked to metabolic damage in the offspring. However, the contribution of UPR to metabolic disorders in offspring from HFD dams remains unknown. OBJECTIVES: To evaluate the activation UPR in the offspring of dams fed with HFD during pregnancy and lactation. MATERIAL AND METHODS: The analyses were performed in offspring on the 28th day of life the dams fed with either standard chow (SC) or high-fat diet (HFD) during gestation and lactation. We evaluated the body weight, glucose tolerance test (GTT) and phosphorylation and expression of the proteins related to UPR in the hypothalamus were analyzed through Western Blot technique. RESULTS AND DISCUSSION: There was no difference in body weight between the groups on day (d) 2 after birth, but from 7\(^{th}\) to 28\(^{th}\) day the HFD-offspring (HFD-O) group showed a significant increase in body weight compared to SC-offspring (SC-O) group. Besides, HFD-O mice presented glucose intolerance. The level of p-PERK, p-eIF2α, p-JNK and NFκB in HFD-O were increased (1.07 fold, 2.4 fold, 1.8 fold and 1.8 fold, respectively) compared to SC-O. Also, the gene expression of pro-inflammatory cytokines, IL1β and TNFα were increased (3.6 fold and 2.0 fold, respectively) in the HFD-O compared to SC-O. These alterations might be related to impairment in the insulin signaling, as evidenced by reduced (35%) AKT phosphorylation compared to SC-O group after insulin challenge. CONCLUSION: We concluded that offspring from high fat diet dam present activation of proteins related to UPR in hypothalamus, suggesting that this tissue is under metabolic stress condition leading to damage to the glucose homeostasis and the development of obesity in adulthood.

Key-words: endoplasmic reticulum stress, hypothalamus, obesity, offspring

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