HYPOTHALAMIC MASH1 IS MODULATED BY HIGH-FAT DIET CONSUMPTION DURING PREGNANCY AND LACTATION IN MICE

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Introduction: Studies show that inflammation triggered by high-fat diet-induced (HFD) obesity seems to impair hypothalamic neurogenesis Mash1-mediated. In addition, maternal consumption of HFD during the pregnancy cause metabolic disturbs in adult offspring. Objective: To evaluate the effects of the maternal HFD consumption on Mash1 in the hypothalamus of mice offspring.

Methods: Females mice (Swiss) were randomly divided into two groups: one was fed with HFD and other, with standard chow (SC), during pregnancy and lactation. After delivery the litter size (SC offspring, SC-O; HFD offspring, HFD-O) was reduced to 8 animals per dams. Pups (28 days old-P28) were euthanized and the hypothalamus was collected to evaluate gene expression of MASH1 (Ascl1) and Hes5 by qPCR. The hypothalamic arcuate nucleus of P28 mice was collected by punch to evaluate the same genes. Data are expressed as means ± SEM, the groups were compared with the Student’s t-test. Statistical significance for all analysis was set at p<0.05. Results: The body weight gain, serum cytokines, and milk consumption were higher in HFD-O than SC-O mice. Hes5 gene expression (HFD-O=226.21±57.61, n=7 vs. SC-O=100±34.63%, n=6; p<0.001) was higher in HFD-O compared to SC-O and Ascl1 gene expression (HFD-O=71.44±10.59, n=7 vs. SC-O=100±22.22%, n=6; p<0.05) was lower in HFD-O than SC-O P28 mice. In the arcuate nucleus, Hes5 gene expression was higher in HFD-O than SC-O mice (HFD-O=136.60±66.93, n=4 vs. SC-O=100±6.26%, n=4; p<0.05) and Ascl1 gene expression was lower in HFD-O compared to SC-O mice (HFD-O=70.61±3.62, n=5 vs. SC-O=100±9.29%, n=5; p<0.05). Conclusion: This study suggests that maternal HFD consumption modulates Mash1 and can lead to alterations on cellular differentiation and maintenance of neural progenitors. These events can be related to metabolic disorders that are associated to obesity development in adulthood.

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Key words: MASH1; hypothalamus; mice.