

Dam Early Free Access to Hypertonic NaCl Solution Induces a Long-Term Effect on Offspring Basal Chronic Brain Cell Activity

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Introduction: Exposure to an altered osmotic environment during a pre/postnatal period can differentially program the fluid intake and excretion pattern profile in a way that persists until adulthood. Our recent results indicate that maternal voluntary ingestion of hypertonic NaCl solution during pregnancy and lactation until one week post-weaning alters the offspring's central osmoregulatory mechanisms. Offspring water and sodium intake induced by different osmotic manipulations (sodium depletion or sodium overload) is changed during adulthood. However, the analysis of the programming effects on basal pattern of neuronal activity along brain nuclei involved in the control of hydroelectrolyte balance is limited.

Objective: To evaluate the impact of maternal voluntary ingestion of hypertonic NaCl solution (as previously detailed) in the basal brain chronic neuronal activity of adult's offspring.

Material and Methods: Animal handling and experimental procedures were approved by the Animal Care and Use Committee of our institute, and the National Institutes of Health (NIH) Guidelines were followed. We analyzed the immunohistochemical detection of brain Fra like protein (Fra-LI), alone or combined with vasopressin (AVP) in control (M-Ctrol group) and imprinted (M-Na group) rats, at 70 postnatal day.

Results: The M-Na group showed increased Fra-Li immunoreactivity (ir) along the organum vasculosum of the lamina terminalis (OLVT) (M-Ctrol= 105.75± 21.77 vs M-Na= 308.5 ±59.01; p=0.018; t=-3.22). However, double Fra-AVP ir neurons or Fra-Li ir along the subfornical organ, hypothalamic paraventricular nucleus (PVN, lateral mangelocellular and medial parvocellular subnuclei) and supraoptic nucleus (anterior and medial sections) did not show any significant differences between the maternal treatments.

Conclusions: Taking into account our previous evidence and the present results indicate that the availability of a rich source of sodium during the pre/postnatal period induces a long-term effect on drinking and the basal neural activity along the OVLT implicated in the control of hydroelectrolyte balance.

Keywords: hypertonic environment, pre/post natal, basal chronic brain cell activity, long-term effect.

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