LONG-TERM EFFECT OF DEVELOPMENTAL EXPOSURE TO HYPOCHLORITE AND VASOPRESSOR AGENTS ON HYPOTHALAMIC FUNCTION AND PITUITARY ACTIVITY IN MICE

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ABSTRACT

Exposure to endocrine disruptors can permanently influence the fetal programming of the body systems through the alteration of signaling networks. The hypothalamic-hypophyseal-pituitary (HHP) axis is a complex system which influences the nervous system, endocrine functions and immune cell function, as well as the hypothalamic genes which code for neurotransmitters. The study aims to evaluate the effect of prenatal exposure to CP and HHP function via Interleukin-6 (IL-6) and Cortisol levels in female mice, and negative changes in the gonadotropic function in the hypothalamic-pituitary-gonadal axis that cause a significant decrease in the levels of luteinizing hormone (LH) and follicle-stimulating hormone (FSH) in female mice.

RESULTS

Evaluation of IL-6 levels shows a significant increase in cytokine production in female mice. The results of these experiments indicate that prenatal exposure to CP may alter the expression of key signaling proteins in the HHP axis in the newborn, and that such effects are evident at adulthood. The consequences of such altered endocrine programming deserve further investigation, as well as to report the changes in maternal and social behavior of mice exposed to CP-

INTRODUCTION

Long-term exposure to endocrine disruptors (EDCs) is one of the major public health concerns, as these compounds can alter gene expression, affect cellular pathways, and disrupt the normal development of the nervous system and the immune system. The hypothalamic-pituitary axis (HPA) is a complex system that regulates the body's response to stress and plays a crucial role in the regulation of metabolism, growth, and reproduction. The HPA axis is composed of the hypothalamus, which secretes corticotrophin-releasing hormone (CRH), the pituitary gland, which secretes adrenocorticotropic hormone (ACTH), and the adrenal gland, which secretes cortisol. The HPA axis is also involved in the regulation of the immune system, with cortisol playing a crucial role in modulating the immune response.

The hypothalamic-pituitary-gonadal (HPG) axis is another important endocrine system that regulates the development and function of the gonads, with the pituitary gland secreting luteinizing hormone (LH) and follicle-stimulating hormone (FSH) to regulate the menstrual cycle and reproductive function. exposure to EDCs can alter the function of the HPG axis and affect the development of the reproductive system.

MATERIALS & METHODS

Animals and Treatments

Pregnant C57BL/6J (10/group) were treated with sterile water (1 vehicle control), CP (3 mg/kg/d) in gestational day (G15-18). Before, during, and at the end of treatment, male body weight and food consumption were recorded. After delivery, litter sizes were recorded for each sex. Three subgroups of neonates were treated subcutaneously on postnatal days 1 (PND 1), 7 (PND 7), and 14 (PND 14) with 30 mg/kg dexamethasone (Dex) for 5 fl male and female groups.

Samples preparation

Hypothalamic and pituitary tissues were collected from 100 male and 100 female mice at the age of 12 weeks. The tissues were immediately frozen in liquid nitrogen and stored at -80°C. The tissues were then homogenized and used for the analysis of the levels of interleukin-6 (IL-6), corticosterone, and luteinizing hormone (LH) and follicle-stimulating hormone (FSH).

DISCUSSION

Pre-natal and/or post-natal exposure to CP and/or other EDCs may specifically affect the HPA axis, which is involved in the regulation of the immune system, the reproductive system, and the stress response. The results of this study suggest that prenatal exposure to CP may alter the function of the HPA axis and affect the development of the reproductive system.

REFERENCES