Disinfectant Exposure Decreases Reproductive Hormones

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BACKGROUND

FSH and LH are decreased in mice exposed to ADBAC+DDAC

Early life exposure to ADBAC+DDAC reduced FSH and LH production.

Three treatment groups of CD-1 mice
- Unexposed controls
- Ambient exposure through normal use of disinfectant in the mouse room
- Dosed exposure (60 mg/kg/day in the feed + ambient)

Ambient mice are not experimentally dosed, but receive exposure from normal use of disinfectant in the mouse room.

RESULTS

Early life exposure to ADBAC+DDAC reduced FSH and LH production.

Both hormones were reduced indicating direct action on GnRH production or blockade of the estrogen receptor.

ADSBAC (alkyl diglyceratebenzyl ammonium chloride) and DDAC (dimethyl ammonium chloride) are two quaternary ammonium compounds. ADBAC and DDAC are common in household cleaners, personal care products, inks, paints, and makeup. Recent studies by our lab found that chronic exposure decreases reproduction in male and female mice. Others have found that exposure inhibits mitochondrial function, cholesterol synthesis and causes blockade of the estrogen receptor. Reproductive function is directed by follicle stimulating hormone (FSH) and luteinizing hormone (LH). Both are regulated by estrogen via the hypothalamic-pituitary-gonadal axis.

MATERIALS and METHODS

We hypothesized that ADBAC+DDAC exposure would alter FSH and LH production in both ambiently exposed and dosed mice.

Ambient mice are not experimentally dosed, but receive exposure from normal use of disinfectant in the mouse room.

FSH and LH are decreased in mice exposed to ADBAC+DDAC.

Different letters above bars denotes significant differences between groups by ANOVA p ≤ 0.05.

N = 8 per treatment group, dosed mice received 60 mg/kg.

Acknowledgements - Citations


One Health Concerns

- Exposure to quaternary ammonium compounds is extensive
- Most HPGA endocrine disruptors also disrupt growth hormone, thyroid hormones, and ACTH
- Human infertility has increased over the last 20 years in part from environmental factors. ADBAC+DDAC exposure may be contributing to this increase in infertility.

Supported by the VCOM-VMCVM One Health Program.