

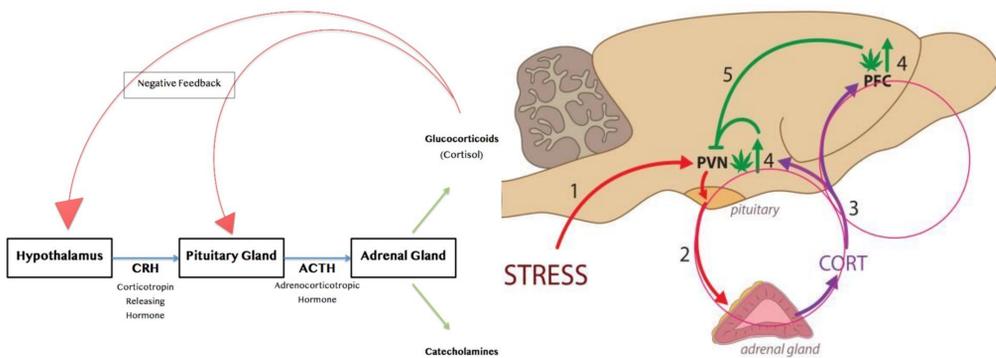
Abstract

Objective: The research goal was to determine whether children who were exposed to cannabis prenatally produced less cortisol postnatally than children not prenatally exposed to cannabis.

Method: Hair samples were collected from children participating in a longitudinal birth cohort study (SIP Study, PI: Nomura) at annual assessments at 2 years, 3 years, 4, years, 5 years, and 6 years postpartum. The hair samples were analyzed for cortisol levels. Prenatal cannabis exposure status was determined via self-report questionnaires completed by the children's mothers also participating in the longitudinal birth cohort study.

Results: There was a significant difference in child cortisol production between children that were exposed to cannabis prenatally and children that were not exposed to cannabis prenatally. Exposed children produced significantly less cortisol (M = 336.65 pg/mg) than children not exposed (M = 10,144.90 pg/mg, p = .019).

Conclusion: While preliminary, the present study aligns with previous proposals that endocannabinoids play a role in the suppression of the hypothalamic-pituitary-adrenal (HPA) axis, resulting in decreased cortisol production. The results of the experiment indicate that prenatal exposure to cannabis can result in neuroendocrine changes in offspring after birth.

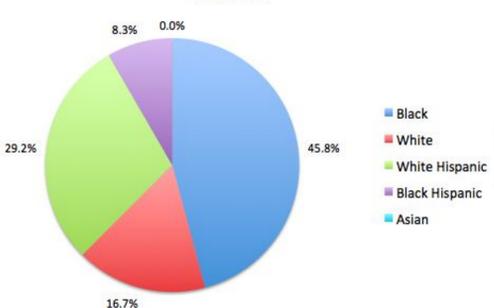


Background

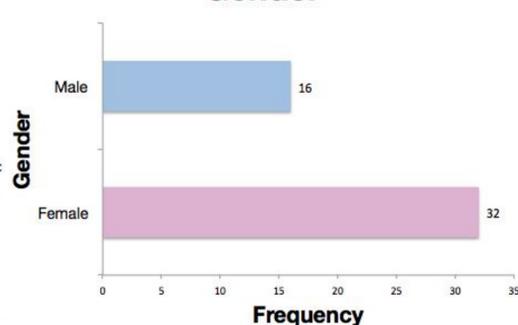
Background: Cannabis is the most highly abused drug among pregnant women. Little research, however, has been done to assess the potential outcomes of prenatal exposure in offspring. Prior research suggests that children exposed to cannabis prenatally experience significant negative cognitive effects at age 3⁽²⁾ and behavioral problems at age 10⁽³⁾. The endocannabinoid system (ECS), in addition to being implicated with cannabis use, modulates several neuroendocrine axes, one of which is the HPA axis. This feedback system consists of the hypothalamus, pituitary gland, and adrenal glands, and is responsible for the production of cortisol, the stress hormone. Although the ECS was originally believed to stimulate the HPA axis, more recent research proposes that endocannabinoids inhibit the release of adrenocorticotropic hormone and glucocorticoids^(1, 4).

Sample Population: Hair samples were collected and analyzed from a subsample of children (n = 48) participating in a longitudinal study of pregnancy (SIP Study, PI Yoko Nomura). Half of the children in the sample were exposed to cannabis prenatally, and the other half were not exposed. Each exposed child was matched to an unexposed child based on age at assessment, gender, and race. Participants were recruited at the OB/GYN clinics of New York Presbyterian Queens and Mount Sinai Hospital in New York City.

Race



Gender



Measures & Data Analysis

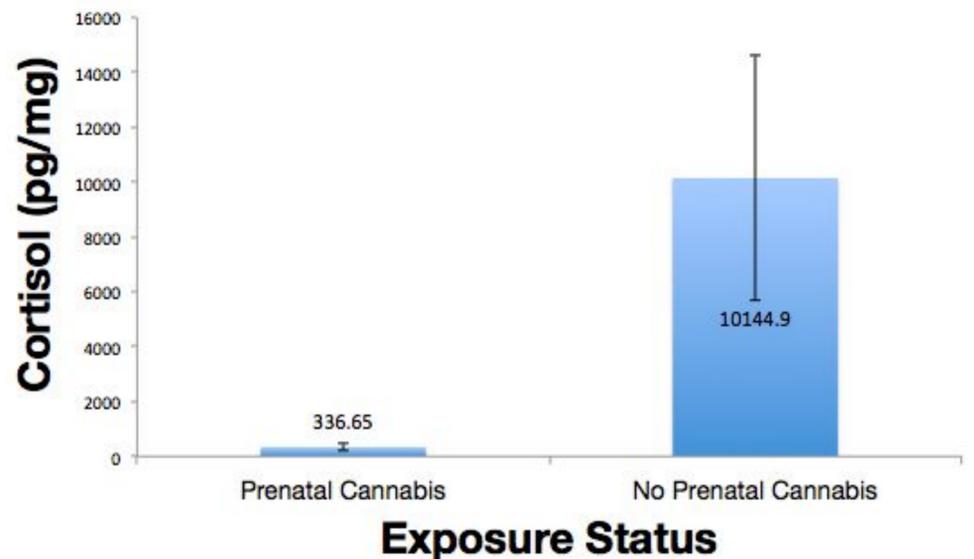
Measures: Prenatal cannabis exposure status was determined via self-report questionnaires completed by the children's mothers. Hair cortisol level analysis was carried out using the ELISA method (Alpco Diagnostics, Windham, NH)⁽⁵⁾ at Technische Universität Dresden in Germany.

Data Analysis: Using a one-tailed paired t-test where participants were matched according to age at the time of assessment, gender, and race, we analyzed whether prenatal cortisol levels resulted in lower cortisol production in offspring postnatally.

Results

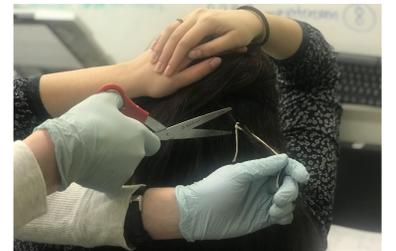
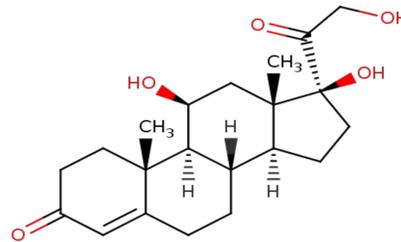
Results: Children who were exposed to cannabis prenatally produced significantly less cortisol (M = 336.65 pg/mg) than children who were not exposed prenatally (M = 10,144.90 pg/mg, t(23) = -2.200, p = .019).

Mean Cortisol Levels



Discussion

- Children who experienced prenatal exposure to cannabis produced significantly less cortisol in postnatal analysis than children who were not exposed prenatally.
- This supports the initial hypothesis and aligns with prior research that endocannabinoids inhibit the production of cortisol by the HPA axis.
- This suggests that prenatal exposure to cannabis may result in some kind of fundamental change in the brain concerning the ECS and HPA axis.
- Cortisol plays a role in many systems, including the immune, circulatory, skeletal and nervous systems, and helps regulate the stress response.
- Thus, with increasing cannabis use among pregnant women, it is important to understand potentially detrimental results of prenatal exposure on the offspring stress response system.



References

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