Puberty dependence of (AVP) expression in the BNST and MeA (Social Behavior Circuit)

Nishita Raghu Rao

INTRODUCTION

Social development is critical for an individual’s overall health and wellbeing. Apart from reproductive competence, adolescents undergo social, emotional, cognitive and physical development (Winner, 2003). One such neuromodulator that governs social behavior is Vasopressin (Arginine Vasopressin or AVP).

For it, it was indicated that pubertal factors underlie social behavior development. This study investigates the development of the social behavior circuit from onset of Vasopressinergic projections in the Bed Nucleus Stria Terminalis (BNST) and the Medial Amygdala (MeA). It questions the gonadal steroid influence on the pathway projections extending toward the paraventricular nucleus of the hypothalamus (PVN), lateral habenula (LH), VTA, dorsal vagal complex (dvc), and paraventricular regions of the hypothalamus (SON and PVN), project toward the MA, dorsal vagal complex (dvc), and project toward the lateral habenula (LH), VTA, and SON. Sexual dimorphism of AVP expression in the brain is evident by the presence of sex differences.

STUDY DESIGN

Male and female juvenile Brattleboro rats, lack AVP throughout development due to a mutation in the AVP precursor gene (AVPR1a) (Cheng et al., 1984). Social behavior circuitry consists of social, emotional, cognitive, and physical development (Winner, 2003). AVP in the brain can be assessed by documenting functional and structural differences of both sexes. For example, a 2-hour exposure to light implies a Long Day (LD) and a 1-hour exposure to light implies a Short Day (SD). Puberty was successfully obtained in male and female hamsters, wherein GnRH elevation initiates AVP fiber development in the BNST and dvc. Gonadal steroid hormones during puberty, they cannot determine the pathway by which AVP acts to affect.

RESULTS


GONADAL-SEROTONIN INTERACTIONS ON AVP EXPRESSION

Sexual dimorphism was also observed in the Bed Nucleus Stria Terminalis (BNST) and the Medial Amygdala (MeA) when comparing the number of cells expressing Vasopressin (directly of AVP) development cells were higher in males than in females (De Vries et al., 2017). Fig 4. Upon gonadal steroid influence however, the number of AVP-expressing cells varied in the presence of Estradiol (E2) and a combination of Estradiol and Dihydrotestosterone (E2 + DHT) with no observable change recorded in the presence of just DHT. Furthermore, in males, there was a higher spike in expression of AVP-labeled cells in the presence of E2 (De Vries et al., 2018).

Thus, one can concur that the gonadal steroid hormonal levels during puberty, impacts AVP development, in the BNST and MeA (Social behavior pathway).

DISCUSSION

Although AVP expression showed dependence on gonadal-steroid manipulations, it does not explain the onset of AVP fiber development. In fact, the social behavior circuit: AVP fiber development in the LS and LH has already been documented by F121 mice, which is indicative of juvenile stages, not adolescence (de Vries, Bulb, & Swadlow, 1981, Fig 5). Thus, one can also speculate that the vasopressinergic pathway development peaks just prior to puberty.

REFERENCES

Cheng, S. F., Tawakoli-Lohi, K., & Delville, Y. (2008). Neuroblast development of the brain's lateral habenula, projecting towards the LC, LH, LS and VSA, are involved in depicting social behavior. The sexually dimorphic parvocellular VP projections from the BNST and the Medial Amygdala (MeA), 1981). Play behavior can be assessed by documenting functional and structural differences of both sexes. For example, a 2-hour exposure to light implies a Long Day (LD) and a 1-hour exposure to light implies a Short Day (SD).

CONTACT

Nishita Raghu Rao
State University of New York, Buffalo
rishrao9@gmail.com