prolactin hormone and growth hormone, so there is a similarity in biological functions, as prolactin stimulates physical growth and weight gain in birds, reptiles and mammals due to its similarity with growth hormone as the injection of prolactin causes a significant increase in body weight.

Neuroendocrinology and Pituitary
NEUROENDOCRINOLOGY AND PITUITARY BASIC RESEARCH ADVANCES

The Role of Microglia in the Polycystic Ovary Syndrome (PCOS)-Like Brain

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Polycystic ovary syndrome (PCOS) is the most common cause of anovulatory infertility, affecting roughly 1 in 8 women of reproductive age. Accumulating evidence from animal models suggests that the brain plays a key role in the development and maintenance of PCOS. In a well-characterised prenatally androgenised (PNA) mouse model of PCOS, aberrant neuronal wiring associated with PCOS deficits in adulthood are detected as early as postnatal day (P) 25, prior to disease onset. However, the mechanisms by which prenatal androgen exposure alters brain wiring remains unknown. Microglia, the immune cells of the brain, are active sculptors of neuronal wiring across development, mediating both the formation and removal of neuronal inputs. Therefore, microglia may play an important role in driving the abnormal neuronal wiring that leads to PCOS-like features in the PNA brain. Here, to assess whether microglia are altered in the brain of PNA mice, microglia number and morphology-associated activation states were quantified in two hypothalamic regions implicated in fertility regulation. Microglia were identified by immunolabelling for the microglia-specific marker, Iba-1, across developmental timepoints, including embryonic day 17.5, P0, P25, P40 and P60 (n = 7–14/group). At P0, PNA mice had significantly fewer "activated" amoeboid microglia compared to controls ($P < 0.05$). Later in development at P25, PNA mice exhibited significantly fewer "sculpting" microglia ($P < 0.001$), whereas at P60, PNA mice possessed a greater number of "activated" amoeboid microglia relative to controls ($P < 0.01$). This study demonstrates time-specific changes in the number and morphology of microglia in a mouse model of PCOS and suggests a role for microglia in driving the brain wiring abnormalities associated with PCOS. These findings support the need for future functional experiments to determine the relative importance of microglia function in shaping the PCOS-like brain and associated reproductive dysfunction.

Neuroendocrinology and Pituitary
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The Transcription Factor Ventral Anterior Homeobox 1 Modulates Circadian Time-Keeping and Fertility Through Direct Regulation of Vasoactive Intestinal Polypeptide Expression in the Suprachiasmatic Nucleus

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Light provides the primary timing signal that enables fine-tuned behavioral and hormonal entrainment of circadian rhythms to the environment. Light is transmitted from the eye to the brain through the retinohypothalamic tract, where one target is the hypothalamic suprachiasmatic nucleus (SCN), which generates self-sustained circadian rhythms. The vasoactive intestinal polypeptide (VIP) expressing neurons of the SCN relay light information to peripheral cells and tissues through control of hormonal and nervous signals, allowing synchronization of molecular clocks located in individual cells throughout the body. Non-natural light cycles, ie shiftwork, and weakened SCN function through genetic manipulation, disrupt the body's circadian rhythms, causing deregulated hormone release, metabolic disorders, and negative effects on reproductive systems such as irregular menstrual cycles and decreased sperm count. To further our understanding of how the SCN translates light information into neuroendocrine control of fertility, we conditionally deleted the SCN enriched transcription factor Ventral anterior homeobox 1 (Vax1) in post-developmental VIP neurons, generating Vax1-flox/flox:Vip-Cre+ (cKO) mice. To determine if the SCN timekeeping function was impacted in cKO mice, we single housed males and females with running wheels to examine activity during both 12-hour light/dark cycles and in constant darkness. Wheel-running behavior in constant darkness revealed a shortening of the endogenous free-running period (Tau) of the SCN. Aside from Tau, wheel running behaviors were comparable to controls. Weakened SCN output can negatively impact fertility. While on 12-hour light/dark cycles, we found a modest, but significant change in follicle stimulating hormone and estrogen in cKO females and a reduced sensitivity of GnRH neurons to kisspeptin in males. The changes in hormone release were associated with a slightly lengthened estrous cycle in cKO females and reduced sperm quality in cKO males. To identify the molecular origin of the shortened SCN period, we used immunohistochemistry and RNAscope to examine expression of Vip. We found that diestrus cKO females had a significant reduction in Vip expression at ZT16 and preliminary data suggest a reduction in the circadian clock gene Bmal1. Together, these studies identify a novel role of VAX1 in VIP neurons where VAX1 is required for VIP expression and circadian timekeeping. Loss of VAX1 in VIP neurons weakens SCN output, deregulating reproductive hormone release and modestly reducing reproductive function in both males and females.