Sarah Hackman, Biology

Year in School: Junior
Hometown: Wentzville, MO
Faculty Mentor: Dr. M. Cathleen Kovarik, Veterinary Biomedical Sciences
Funding Source: Life Sciences Undergraduate Research Opportunity Program

The effect of steroids on GPR54 and GnRH neurons in the postpubertal male mouse

Sarah Hackman, Mona Garro, & M. Cathleen Kovarik

A novel neuropeptide, kisspeptin, binds to the receptor GPR54, to influence the initiation and regulation of puberty in mammals. It appears that the activation of GPR54 stimulates the release of gonadotropin releasing hormone (GnRH) from specialized neurons, resulting in the activation of the reproductive system. To further understand the role of the kisspeptin system in GnRH secretion, levels of GPR54 and GnRH mRNA were compared in hypothalamic tissue before, during, and after puberty in male mice. In addition, the expression of GPR54 and GnRH mRNA was examined after castration with or without steroid replacement in postpubertal males. Transgenic male mice that express green fluorescent protein (GFP) were used at 20, 30, and 60 days postnatal (PND). Some postnatal mice were gonadectomized (GDX), and half received testosterone (T) replacement. RNA was isolated from the septum and the basal hypothalamus (areas known to contain GnRH neurons), reverse transcribed, and subjected to real-time, quantitative PCR. Levels of mRNA were compared between GDX and GDX+T, as well as at each of the three ages. Relative amounts of mRNA from GPR54 and GnRH were compared with a housekeeping gene, RPII, using standard curves. Preliminary data suggests that the amount of GPR54 mRNA in hypothalamic tissue is unchanged at the ages studied ($p<0.892$), although we need to increase the number of mice studied at each age. However, the levels of GnRH mRNA in hypothalamic tissue do increase, although not significantly, with age and the pubertal transition ($p<0.112$). In postpubertal mice, the relative amount of GnRH mRNA is greater than GPR54 mRNA. Thus, data indicate that there is a decrease in GPR54 mRNA when compared to GnRH mRNA ($p<0.05$) during the pubertal transition. Studies that examine the effect of steroids on GPR54 and GnRH mRNA expression are currently in progress.