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Hormonal activation of oxytocin and vasopressin neurons by peripheral kisspeptin. V Scott, C Brown. Centre for Neuroendocrinology and the Department of Physiology, Otago School of Medical Sciences, University of Otago, Dunedin.

Kisspeptins are a group of peptides (54-, 14-, 13- and 10-amino acid), derived from translation of the *Kiss-1* gene. In 2003 they were found to be critical for fertility via direct activation of gonadotropin-releasing hormone (GnRH) neurons by kisspeptin neurons. In addition to this role in fertility, intravenous (IV) administration of kisspeptin-10 increases oxytocin levels, and intracerebroventricular (ICV) kisspeptin-10 increases vasopressin levels in rats. Oxytocin is important in parturition and is essential for milk ejection, while vasopressin promotes antidiuresis and vasoconstriction. Hence, kisspeptin might play a role in reproductive function and body fluid regulation via stimulation of oxytocin and vasopressin secretion.

Because posterior pituitary hormone secretion is dependent on action potential (spike) discharge, we used *in vivo* extracellular single unit recording to determine the effects of kisspeptin-10 on supraoptic nucleus (SON) neuron activity in urethane-anaesthetised virgin female rats. Intravenous kisspeptin-10 (100 µg) increased the firing rate of oxytocin neurons (n=12) from 3.7 ± 0.8 spikes s^{-1} to 4.7 ± 0.8 spikes s^{-1} (P = 0.0004, Student's t test) and evoked a short (<3 s) high frequency (>15 spikes s^{-1}) burst of firing in ~25% of vasopressin neurons. By contrast, ICV kisspeptin-10 (2 and 40 µg) did not alter oxytocin (n=15) or vasopressin (n=5) neuron firing rate.

To investigate the pathway involved in mediating the activation of oxytocin neurons by peripheral kisspeptin-10, we used intraperitoneal capsaicin to desensitise vagal afferents, and this prevented the IV kisspeptin-10 induced increase of oxytocin neuron firing rate in all seven neurons tested.

These are the first results to show peripheral, but not central, kisspeptin-10 increases the activity of oxytocin neurons and a proportion of vasopressin neurons. Endogenous kisspeptin regulation of SON neurons is likely indirect via vagal afferent input, with kisspeptin acting as a hormone rather than as a neuropeptide in this system.

Maternal immune activation reduces inhibitory drive in CA1 of the dorsal hippocampus: a potential characteristic of increased risk for schizophrenia development. **K Overeem[1,2], A Wolff[2], D Bilkey[2], J Williams[1], W Abraham[2]. [1]Department of Anatomy, Otago School of Medical Sciences, [2]Department of Psychology, University of Otago, Dunedin.**

Epidemiological research has identified a link between maternal illness and increased likelihood of schizophrenia. Using the maternal immune activation (MIA) model in rodents we have observed impaired prepulse inhibition; a behavioural perturbation observed in schizophrenia, along with behavioural and electrophysiological impairments indicative of impaired hippocampal processing. Our aim was to investigate whether MIA, induced by administrating the immunostimulant poly-IC mid gestation, is associated with reduced inhibition in the hippocampus.

Dorsal hippocampal CA1 sections were dissected or fixed and sectioned for western blot (MIA, n = 7 Control n = 7) or immunohistochemical (MIA n = 8, Control n = 8) analysis respectively. We analysed the density of GAD67; an enzyme necessary for synthesis of the inhibitory neurotransmitter GABA. Furthermore, our immunohistochemistry analysis was focused within a subpopulation of cells that contain the protein parvalbumin (PV). Finally, GAD67 levels were correlated with PPI scores.

The western blot analysis demonstrated a significant reduction in GAD67 expression in MIA animals (0.88 ± 0.10 (mean ± sd)) compared to Controls (1.00 ± 0.11) t (12) = -2.05, P = 0.03. The correlation between GAD67 expression and PPI was significant for MIA animals (r = 0.78, P = 0.02) but not Controls (r = -0.28, P = 0.54). Analysis of GAD67 density in PV positive cells revealed no difference between the groups (MIA: 0.92 ± 0.13; Control: 1.00 ± 0.05,) t (8.7) = -1.49, P = 0.09, and no correlations (MIA: r = 0.12, P = 0.78, Controls: r = -0.06, P = 0.90).

The results indicate that MIA decreases GAD67 in CA1 and the degree of reduction corresponds with behavioural abnormalities. However, reduced GAD67 was not found within PV positive cell types. Nonetheless, the results suggest that reduced inhibition in the hippocampus may be a feature that contributes to increased risk for schizophrenia development.