A single intravenous injection of Kisspeptin evokes an increase in luteinising hormone in 15- and 18-week-old gilts

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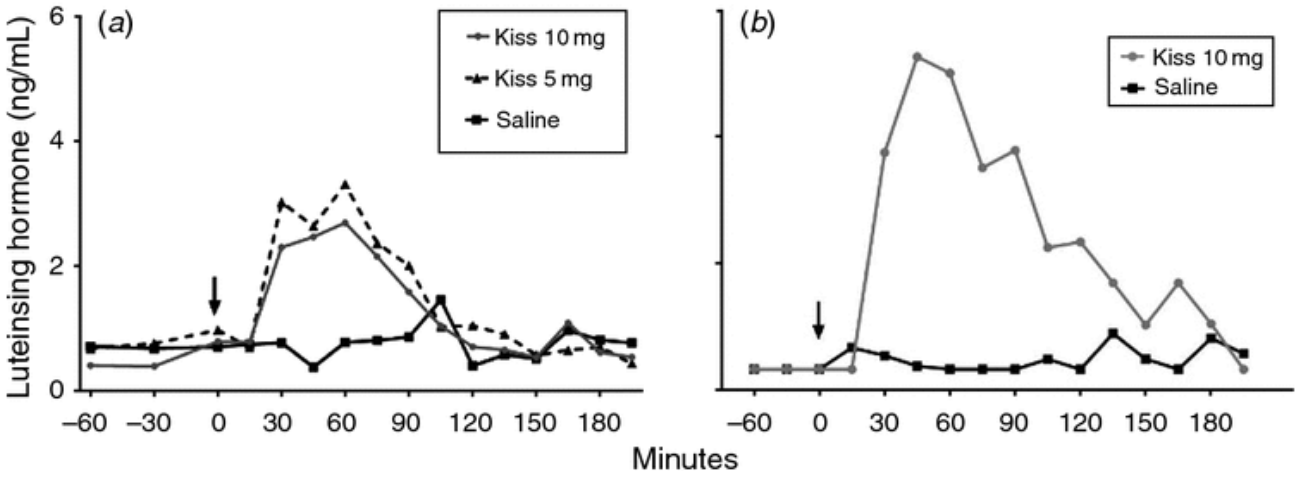
Kisspeptin is a neuropeptide essential to the regulation of the gonadotrophin releasing hormone (GnRH) neuroendocrine system (Lehman *et al.* 2010). Sheep, rodents and humans deficient in the gene that codes for kisspeptin, KISS1, never reach sexual maturity and kisspeptin is a key regulator of seasonality in sheep (Goodman *et al.* 2007). Expression of KISS1 mRNA is attenuated in the non-breeding season of sheep and injection of kisspeptin during the nonbreeding season can stimulate oestrus in ewes (Smith 2012). While the role of kisspeptin in the neuroendocrine control of reproduction in humans, sheep and rodents is well established, little is understood about its role in pigs. We hypothesised that a single intravenous injection of kisspeptin would evoke an increase in plasma concentrations of luteinising hormone (LH) in 15- and 18-week-old gilts and that this increase would be of similar magnitude in each age group.

We conducted the experiment over two replicates at the Roseworthy Piggery, Roseworthy, SA. Gilts were identified and tagged at birth. One week before commencement of the experiment, gilts were transferred to individual pens to acclimatise to the experimental environment. Gilts were then fitted with indwelling ear-vein catheters. In Replicate 1, 18-week-old gilts were allocated to three treatments ($n = 6$ per treatment). They were injected with either saline, 5 mg of Kisspeptin 10 (Pheonix Pharmaceuticals Inc., Burlingame, CA, USA) or 10 mg Kisspeptin 10. In Replicate 2, 15-week-old gilts were allocated to two treatments ($n = 6$ per treatment). They were injected with either saline or 10 mg of Kisspeptin 10. On the day of the experiment blood was collected every 15 min for 1 h before injection and then every 15 min for 6 h after injection. Data were analysed using a repeated-measures analysis of variance in SPSS v24.0 (IBM, Armonk, NY, USA).

The concentration of LH after kisspeptin injection was greater than before kisspeptin injection for 15- and 18-week-old gilts ($P < 0.05$) (Fig. 1). Panel A (Fig. 1) shows that the increase in LH in 18-week-old gilts after a 5 mg injection of kisspeptin was not significantly different from the increase in LH after a 10 mg injection of kisspeptin. There was no significant difference in the increase in LH between 15-week-old gilts given 10 mg of kisspeptin or 18-week-old gilts given 5 mg or 10 mg of kisspeptin.

Fig. 1. Mean luteinising hormone concentration in response to a single intravenous kisspeptin (Kiss) injection for 18- (*a*) and 15-week-old (*b*) gilts. A 5 mg or 10 mg dose was given to 18-week-old gilts and a 10 mg dose was given to 15-week-old gilts. Injections were given at time 0 as indicated by the arrow. Bloo samples were collected every 15 min commencing 60 min before injection and concluding 6 h after injection.



Our data indicate that the neuroendocrine production of LH in pigs is stimulated by kisspeptin. This effect is evident in pigs that are 15 weeks old. Further research into the role of kisspeptin in the control of reproduction and seasonality in pigs in warranted.

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