

## Neonatal oxytocin administration and weaning onto a gruel based diet reduce weight loss at weaning and enhance gastric leptin expression

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Administering oxytocin to neonatal rats has positive long-term effects on growth and development (Uvnas-Moberg and Petersson, 2005). These effects include a reduction in the stress response to weaning, increased post-weaning feed intake and alterations in the expression of gastrointestinal (GI) hormones regulating feed intake (Uvnas-Moberg *et al.*, 1998; Sohlstrom *et al.*, 1999). Two GI hormones of importance in regulating feed intake are ghrelin and leptin, which have antagonistic actions. Ghrelin expression is increased in response to fasting and leptin expression increases rapidly in response to feed intake. Since weaning the piglet is associated with stress and growth restriction, this study examined whether oxytocin given to young pigs could reduce the extent of the post-weaning growth check, along with any associated changes in ghrelin and leptin expression.

A total of 240 piglets (Large White x Landrace) suckling 20 sows were injected daily with 1mg/kg of either oxytocin or saline s.c. from 0-14 days of age. All piglets were weaned at 21 days onto either a dry pelleted diet or a gruel based diet that was fed for the first week post-weaning, after which all piglets received a dry pelleted feed. On day 10, 21 and 28 piglets were slaughtered and the fundus of the stomach collected for gene expression analysis via real-time polymerase chain reaction. All data were analyzed by analysis of variance.

Oxytocin administration resulted in enhanced gastric leptin expression at day 10 ( $P=0.028$ ). Gastric leptin was unaltered in oxytocin administered piglets at weaning ( $P=0.547$ ). Gastric ghrelin expression was also unaltered at day 10 ( $P=0.528$ ) and at weaning ( $P=0.930$ ) by oxytocin administration. Neonatal administration of oxytocin partially alleviated the post-weaning lag in growth by reducing weight loss over the first two days post-weaning (-214 vs. -293 g/day,  $P=0.03$ ). This was associated with increased expression of both gastric ghrelin ( $P=0.016$ ) and gastric leptin ( $P=0.017$ ). However, no differences in feed intake were observed between oxytocin- and saline-injected piglets over the first two days post-weaning (369 vs. 374 g/day,  $P=0.70$ ). In addition, weaning onto a gruel-based diet was effective in promoting a higher rate of daily gain compared to piglets not offered gruel in the first week after weaning (124 v 76 g/day,  $P<0.001$ ). This was associated with increased feed intake (561 vs. 131 g/day,  $P<0.001$ ) and enhanced gastric leptin expression at day 28 ( $P=0.018$ ). Gastric ghrelin expression at day 28 was not influenced by gruel feeding ( $P=0.895$ ). Oxytocin administration and weaning onto a gruel-based diet are both effective means of enhancing gastric leptin expression and reducing weaning weight loss.

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### References

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