

Poster presentation

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## Effects of surgical castration on the behavioural and physiological responses of weaned pigs

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Surgical castration is an acute stressor that can affect the behaviour, endocrine and immune responses of pigs [1,2]. Therefore, it may impair the health and welfare of these animals. This could be of particular concern at weaning, which constitutes a severe nutritional, physical and psychological stressor often associated with increased disease susceptibility [3]. Thus, an experiment was carried out to evaluate the effect of surgical castration on post-weaning behaviour and on the behavioural, endocrine and immune responses elicited by a low-dose lipopolysaccharide (LPS) challenge after weaning. At 5 days-of-age, 64 male piglets were randomly assigned to undergo surgical castration or were left untreated. Pigs were weaned at 28 days-of-age. Behaviour post-weaning and mixing was assessed during a 1-h period, during which agonistic interactions were recorded. One day post-weaning, pigs were injected with a single dose of 0 or 5 µg/kg of body weight (BW) of LPS from *Escherichia coli*. Sickness behaviour was studied by scan sampling every 5 minutes for 45 minutes at 0, 1, 2, 3, 4, 6 and 8 h after the challenge was initiated. Blood samples were taken at 0, 2, 12 and 24 h after injection and were analysed for plasma concentrations of tumor necrosis factor-alpha (TNF-α), interleukin 1-beta (IL-1β), C-reactive protein (CRP), serum amyloid A (SAA) and cortisol. Saliva samples were also taken when pigs were 3, 4, 5, 6 and 8 weeks-of-age for subsequent determination of salivary testosterone concentrations. Results showed that entire males were more aggressive than castrated pigs immediately after weaning ( $P < 0.05$ ). Administration of LPS provoked behaviours characteristic of sickness including a reduction in general activity, as well as decreased eating and exploratory behaviours ( $P <$

0.05). Significant treatment by challenge interactions showed that castration reduced the occurrence of sickness behaviours induced by LPS, such as depressed general activity ( $P < 0.01$ ), anorexia ( $P < 0.01$ ) and reduced exploratory behaviours ( $P < 0.05$ ). LPS administration increased TNF-α levels ( $P < 0.05$ ), with peak concentrations 2 h after injection ( $P < 0.01$ ). CRP levels of LPS-treated pigs were higher than saline-treated animals at 12 h ( $P < 0.05$ ). LPS administration tended to increase plasma SAA levels ( $P < 0.1$ ), but did not increase cortisol levels. Nonetheless, castration did not affect the response of pro-inflammatory cytokines, acute phase proteins and cortisol to the challenge. Concentrations of testosterone in saliva were higher in entire males ( $P < 0.001$ ). Furthermore, salivary testosterone levels in entire males varied with age and were markedly elevated at 4 weeks-of-age ( $P < 0.001$ ), which coincided with weaning. These results show that surgical castration reduces aggressiveness at weaning. It is likely that peak levels of testosterone are in part responsible for the higher frequency of agonistic encounters among entire male pigs [4]. In addition, castration affects the coping mechanisms of weaned pigs against a low-dose LPS challenge. It is also possible that entire males may be more efficient in overcoming the bacterial endotoxin challenge, taking into consideration the beneficial effects of sickness behaviour in the recovery from infection [5]. In conclusion, surgical castration reduces aggressiveness at weaning and also impairs the behavioural, but not the endocrine and immune responses elicited by low-dose LPS challenge in pigs.

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