

# Handling newborn piglets alters metabolism and may improve subsequent growth

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There is an increasing body of evidence that handling of newborn animals has long term positive effects on their ability to cope with physiological and psychological stressors (Meaney *et al.* 1996). Enhanced growth performance in the rat has also been a result of neonatal handling (Levine 1957). We sought to observe the effects of neonatal handling on newborn piglets.

Two litters of piglets were allocated to be either control (n = 18) or handled (n = 19). Handling involved gentle separation of the piglets from the sow for 15 minutes each morning on days 0, 1, 2 and 3 post-farrowing. Liveweight was recorded at birth, weaning (day 21), and at the end of the grower and finisher phases. Blood samples were collected at weaning for the measurement of endocrine parameters by radioimmunoassay. In the finisher phase (from day 112 – 150) 10 pigs from each treatment were housed individually and feed intake and growth were recorded. Data were analysed with an unpaired T-test.

Five handled piglets were lost due to overlay or ill thrift. This gave the remaining piglets some comparative advantage over controls during the remainder of the suckling phase. At weaning, control and handled piglets weighed  $6.28 \pm 0.251$  kg and  $7.63 \pm 0.310$  kg respectively. The average daily liveweight gain from birth to slaughter (150 days) of handled pigs was 14% greater than controls ( $0.71 \pm 0.018$  kg vs.  $0.61 \pm 0.018$  kg respectively,  $P = 0.0013$ ). The slaughter weight of handled pigs was 12.5% greater than controls ( $83.2 \pm 2.00$  kg vs.  $72.8 \pm 2.10$  kg respectively,  $P = 0.0023$ ). Feed intake and feed to liveweight gain ratios were similar. Endocrine measurements from weaner plasma samples are shown in Table 1.

Handling piglets neonatally may elicit long-term advantages in terms of weight gain. The data should be interpreted with caution because of the potential effects of differences in individual sow milk production and litter size at weaning, but the pigs do display endocrine profiles that are markedly different. Basal growth hormone is similar and therefore does not appear to contribute to the difference in growth rate. The difference in cortisol secretion is consistent with the conclusions of Meaney *et al.* (1996) that the handling procedure potentiates the negative feedback of glucocorticoids in the pre-frontal cortex of the brain. The lower cortisol status may also explain the suppression in plasma insulin levels by decreasing resistance to the actions of insulin in peripheral tissues.

These results suggest that neonatal handling may have a persistent effect on growth efficiency in the pig by suppressing the activity of the hypothalamic-pituitary-adrenal axis.

Levine, S. (1957). Infantile experience and resistance to physiological stress. *Science* **126**, 405.

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**Table 1** Endocrine profiles of 3-week old pigs at weaning; mean concentrations  $\pm$  standard errors of hormones in plasma and significance of differences (P).

	Control	Handled	P
Cortisol (ng/ml)	$37.2 \pm 3.80$	$18.4 \pm 3.20$	0.0024
Stress induced cortisol* (ng/ml)	$68.7 \pm 7.90$	$51.9 \pm 4.00$	0.087
Basal growth hormone (ng/ml)	$7.3 \pm 0.37$	$6.5 \pm 0.91$	0.43
Insulin (ng/ml)	$3.0 \pm 0.44$	$1.0 \pm 0.29$	0.0008

\*Response to restraint in a supine position.