Effect of weaning age on cortisol release in piglets

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ABSTRACT. The effect of weaning age on the adrenal cortex, which plays a vital role in the stress response, is currently unknown. Therefore, plasma adrenocorticotropic hormone (ACTH) and cortisol levels, weights and relative weights of adrenal glands, and steroidogenesis-related protein and enzyme expression levels in piglets weaned on different days were determined. Piglets weaned at 35 days had significantly lower ACTH levels than those weaned at 14 or 21 days, and cortisol levels of piglets weaned at 21, 28, and 35 days were significantly lower than those of piglets weaned on day 14. Adrenal gland weights of piglets weaned at 28 and 35 days and relative adrenal gland weights of piglets weaned at 35 days were significantly lower than those of piglets weaned at 14 days. However, no significant difference was detected in the expression of melanocortin-type 2 receptor mRNA, which is associated with weaning age. Steroidogenic acute-regulatory (StAR) mRNA and cholesterol side-chain cleavage cytochrome P450 mRNA
expression levels in piglets weaned at 28 and 35 days were significantly lower than in those weaned at 14 or 21 days, and P450 11β mRNA expression levels in piglets weaned at 28 and 35 days were significantly lower than in those weaned at 14 days. Therefore, early-weaned piglets exhibited increased adrenal gland weights and StAR and steroidogenic enzyme expression, all of which contributed to high cortisol levels. The high plasma ACTH and cortisol levels in early-weaned piglets indicate that these animals would be greatly affected by stress.

**Key words:** Weaning age; Piglet; Adrenal cortex; Cortisol; Adrenal gland weight; Steroidogenic enzyme