

THE NUMBER OF VILLUS AND CRYPT CD4+ T CELLS IN THE JEJUNUM OF PIGLETS INCREASES AFTER WEANING

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Weaning of piglets is accompanied by marked changes in intestinal morphology, such as villous atrophy and crypt hyperplasia. Epithelial compromise may allow antigens to pass into the lamina propria where a localised inflammatory response can occur (McCracken *et al.*, 1999), resulting in decreased production. Dietary bovine immunoglobulin G (IgG) increases the IgG content in the piglet gut (Morel *et al.*, 1995), and may ameliorate the weaning check by enhancing gut immunity and function. This experiment tested the hypothesis that an IgG-fortified bovine colostrum powder (Immucalac) fed before and for 24 h after weaning would reduce inflammatory responses associated with weaning.

At weaning (28 d), one randomly selected piglet was euthanased from each of 12 litters that were offered *ad libitum* either Immucalac (780 g/kg CP, 75 g/kg IgG) in liquid form (200 g/kg DM) (n=6) or a starter diet (14.8 MJ DE/kg, 225 g/kg CP; n=6) for 21 days during the suckling period. Remaining piglets were weaned into conventional flat decks and fed the same diet that they had been offered as a supplement during the suckling period. After 24 h, another four piglets from each of the two dietary treatments were euthanased. Samples of jejunum were collected and processed, and populations of CD4+ and CD8+ T cells (indicators of the inflammatory response) were analysed and enumerated according to methods described by McCracken *et al.* (1999). Data were analysed by two-way ANOVA with time of sampling and diet as independent variables.

Table 1. Numbers of CD4+ T cells in the jejunum of pigs (cells per villus or per crypt).

Diet type	Solid		Immucalac		SEM	Statistics ¹		
	Before	After	Before	After		Time (T)	Diet (D)	T x D
Villi	1.7	7.6	4.0	9.8	0.88	***	***	NS
Crypt	10.6 ^a	19.8 ^c	11.6 ^a	15.9 ^b	1.64	***	*	***

¹NS, not significant, *P<0.05, ***P<0.001. ^{a,b,c}Values within rows with different superscripts are significantly different (P<0.05).

Numbers of CD4+ T cells in villi increased after weaning (8.7 vs. 2.8, P<0.001) and were higher in pigs given Immucalac (6.9 vs. 4.3, P<0.001). In the crypts an interaction (P<0.001) for CD4+ numbers occurred with more T cells found after weaning. However, feeding Immucalac to piglets reduced T-cell proliferation by 25% compared to piglets fed the starter diet. There were no treatment differences in CD8+ T cell counts (data not shown). Increased numbers of CD4+ T cells in villi after weaning concurs with the work of McCracken *et al.* (1999), and may be attributed to low food intake after weaning (186 vs. 36 g DM/group in piglets receiving Immucalac and starter diet, respectively). However these data did not support fully the hypothesis tested in this experiment, since villi and crypts responded differently to Immucalac. The reason(s) for this are unknown, but may be related to the difference in supplement intake that occurred during lactation (294 vs 134 g DM/litter/day in piglets fed Immucalac and starter diet, respectively). Alternatively, breakdown of the extracellular matrix that occurs after weaning and is associated with intestinal inflammation (McCracken *et al.*, 1999) may have a dietary component.

References

- MCCRACKEN, B.A., SPURLOCK, M.E., ROOS, M.A., ZUCKERMANN, F.A. and GASKINS, H.R. (1999). *Journal of Nutrition*. 129:613-619.
 MOREL, P.C.H., SCHOLLUM, L.M., BUWALDA, T.R. and PEARSON, G. (1995). In "Manipulating Pig Production V", p. 181, eds D.P. Hennessy and P.D. Cranwell. (Australasian Pig Science Association: Werribee).