

Influence of glutamine on immune development in newly weaned piglets

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Our research program is aimed at identifying natural dietary ingredients that are available at a reasonable cost that will improve the health of pigs while reducing the reliance upon antibiotics. We conducted an experiment to determine the effect of weaning and supplementing the weaning diet with additional glutamine (GLN) on parameters of immune development and defense in piglets. Immune parameters were assessed at weaning (21 days, n=10) and at 35 d following supplementation with diets \pm GLN (n=10/diet group).

Diet did not affect feed intake, weight gain or final body weight. With age, the *in vivo* activity of neutrophils decreased ($p < 0.03$). Neutrophils from GLN-fed piglets were more granular ($p < 0.05$) both before and after stimulation, suggesting enhanced neutrophil internal killing capacity. With age, the basal activity (rate of incorporate of ³H-thymidine) of immune cells from blood and Peyer's Patches (PP), in the absence of a stimuli, decreased ($p < 0.01$). However, after stimulation, immune response was greater in the 35d old piglets. Compared to 21d, cells from mesenteric lymph nodes (MLN) of 35d piglets had a 2-fold higher response to phytohemagglutinin (PHA), pokeweed mitogen (PWM), and lipopolysaccharide and cells from blood of 35d old piglets had a 9-fold higher response to PHA and PWM ($p < 0.05$). GLN-fed piglets had proportionately less immature cells in blood and MLN and less CD4+ and CD8+ T cells in PP that expressed markers of antigen exposure ($P < 0.05$). Adhesion of Enterotoxogenic *E. coli* to isolated enterocytes (distal ileum) increased significantly ($p < 0.04$) with age but was not affected by diet.

Implications: Our results confirm the importance of the weaning period for immune development. Feeding GLN has potential beneficial effects on neutrophil lysosomal activity, peripheral immune cell maturation and antigen expose in the gut. Additional studies with immuno-essential nutrients and dietary ingredients that stimulate the immune system are on-going or planned (Supported by NSERC & Degussa)