

Gut Mucins in Piglets are Dependent upon Dietary Threonine

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Threonine (THR) is one of the limiting amino acids in barley and wheat based pig diets. THR is very important in intestinal function because it is involved in the synthesis of intestinal mucins. The mucus lining of the gut protects against toxins, bacteria, self-digestion, and physical abrasions.

We previously determined that the THR requirement in piglets fed orally (IG) was more than 2.5 times higher than the requirement of pigs fed intravenously (IV) (*Advances in Pork Production* 1999, vol. 10, abstract #27). The difference in requirement implies that THR is highly utilized within the gut. Because THR is abundant in gut mucins, we hypothesized that much of the oral supply of THR was being used in mucin production.

Study Design and Results: To investigate our hypothesis, twenty-one piglets (1-3 d old; 1.8 kg) were fed one of three treatments for 8 days: 1) THR-adequate diet (0.6 g/kg/d THR IG), 2) THR-deficient diet (0.1 g/kg/d THR IG), or 3) THR-supplemented diet (0.1 g/kg/d THR IG + 0.5 g/kg/d THR IV). All pigs were fitted with catheters for feeding, blood sampling, and infusion of THR/saline.

Nitrogen balance and plasma urea showed that the THR deficient piglets deposited less protein. Gut mucosal weight, mucin content, and villus height were all lower in the THR deficient piglets. Deficient piglets also exhibited diarrhea, which was not due to any apparent disease. In most parameters measured, observations in the supplemented piglets were intermediate in value between the two other treatment groups.

Implications: Lower villus height results in decreased intestinal absorptive area. Furthermore, lower mucin and mucosal weight leads to impairment of disease resistance and inability to adapt to dietary changes and gut stress such as encountered during weaning. (Supported by Alberta Pork and Alberta Agricultural Research Institute).