

# Tryptophan Requirements of Neonatal Piglets

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**Introduction:** Tryptophan (Trp) is an indispensable amino acid for pigs and is the third limiting amino acid in cereal-based diets. We have previously shown that the gut has a high requirement for methionine and threonine. Our objective was to determine if there is a difference in the gut requirement for tryptophan as separated from the requirement of the whole body.

Pigs were fed a complete diet either into the stomach (intragastrically) or intravenously. The intravenous model induces gut atrophy, which simulates the gut of a pig, which has suffered from gut stresses such as imbalanced diet, low feed intake, diarrhea or other intestinal disease. However, unlike these illnesses, this model is much less variable and is more reproducible.

Infusion of diet containing graded levels of Trp (0.025-0.40 g Trp/kg body weight/day) was combined with the infusion of a radioactive isotope of phenylalanine to measure amino acid flux, phenylalanine synthesis, and phenylalanine oxidation. The Trp requirement for both the intravenously and intragastrically (orally) fed piglets was 0.13 g Trp/ kg/day, with a safe intake (upper 95% confidence interval) of 0.17 and 0.16 g Trp/kg/day, respectively. This is very similar to the previous estimate of 0.15 g Trp/kg/day included in the 1998 nutrient requirements of swine (NRC, 1998).

**Implications:** Our objective was to determine amino acid requirements of young weaned piglets and the requirements of the gut for amino acids, as separated from the needs of the whole body. We have determined that young weaned piglets (6-8 days old) do not need additional tryptophan when they suffer from gut atrophy, as would be induced by diarrhea or intestinal diseases. Ultimately, we hope to develop diets, which will enhance gut function in young weaned piglets, thereby resulting in better performance, fewer gastrointestinal problems, and less morbidity and mortality. (Supported by Alberta Pork, Alberta Agricultural Research Institute).