

# Proline may be an indispensable amino acid in piglets experiencing gut atrophy

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Proline may be a conditionally indispensable amino acid in piglets. Stress and low feed intake at weaning commonly causes gut atrophy. Proline is primarily synthesized within the small intestine. Therefore, during periods of gut atrophy piglets may not be able to synthesize enough proline to meet their requirement. Proline is also an important component of collagen and deficiency may limit future growth rate. We fed piglets intravenously (IV) to simulate intestinal atrophy. The objective was to determine if proline supplementation increased protein synthesis measured by amino acid oxidation, and/or plasma amino acid concentration to that of a healthy piglet.

Five male neonatal piglets (~1.8kg) were implanted with a jugular catheter for diet and isotope infusion and femoral catheter for blood sampling. They received an IV control solution and the same solution supplemented with proline (8.21g/100g, 1.25g/kg\*d). On d5, piglets received either the control or proline (PRO+) supplemented diets for 24h, followed by a primed, constant infusion of <sup>14</sup>C phenylalanine (PHE) for 4h. On d6 piglets received the other diet and underwent another infusion. Breath and blood samples were taken every half an hour to measure PHE flux, oxidation and plasma amino acid concentrations.

Plasma proline concentrations (mmol/L) increased significantly ( $P < 0.01$ ) with PRO+ bringing the plasma concentration within the sow-fed reference range. The decrease in PHE oxidation with PRO+ approached significance ( $P = 0.10$ )

## **Implications:**

Proline may be an indispensable dietary amino acid in piglets experiencing intestinal atrophy due to the stress of weaning, low feed intake or intestinal disease. (Funded by Alberta Pork and AARI)