

Dietary cysteine reduces cysteine synthesis from methionine in parenterally and enterally fed neonatal piglets

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We have shown that cysteine can meet 50% of the total sulfur amino acid (SAA) requirement in both enterally and parenterally fed piglets and that, the gut uses approximately 30% of the SAA. However, parenterally fed piglets receiving no dietary cysteine have significantly lower plasma total cysteine concentrations than enterally fed piglets receiving the same diet. Therefore, there may be a higher requirement for cysteine, when the gut is compromised.

The contribution of the gut to cysteine synthesis and oxidation was determined in 64 piglets (~ 7 days old) receiving one of eight intakes of cysteine with methionine was held constant at 0.25 g kg⁻¹ d⁻¹. Methionine and cysteine oxidation ¹⁴CO₂ was determined in a cross-over design on day 6 and day 8, during a 6 h, primed, constant infusion of either 1-[¹⁴C]methionine or 1-[¹⁴C]cysteine.

Cysteine synthesis decreased linearly as cysteine intake increased and reached plateau at the total SAA requirement in enterally fed piglets and at double the estimated total SAA requirement in parenterally fed piglets. Basal cysteine synthesis was greater in the parenterally fed piglets than the enterally fed piglets, although cysteine oxidation was not different between routes of feeding. Therefore, during parenteral feeding there may be a greater demand for cysteine for conversion to products such as taurine or glutathione.

Implications: Cysteine is a dietary dispensable amino acid for the neonatal pig; however, sow's milk contains high concentrations of cysteine relative to that supplied in weaning diets. Therefore, cysteine supplementation during the weaning phase, when the gut is often compromised may be beneficial.

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