

## Effect of changing amino acid concentration on urea and glucose release in sheep liver

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Perfusing the ovine dorsal hepatic lobe with a physiological mixture of amino acids increases urea production, while inhibiting glucose production. Conversely, infusing glutamine or alanine alone increases glucose production by approximately 40%, while not significantly increasing urea production (1). In this study, we examine the effect of adding extra glutamine, alanine or lysine to the physiological mixture of amino acids.

The isolated dorsal hepatic lobe (four wethers, 23–33 kg) was perfused with modified Krebs-Henseleit medium (1). The following mixtures of amino acids were co-infused: Low Nitrogen (LN), High Nitrogen (HN = 3x LN), LN or HN plus either Ala, Lys or Gln. The concentration of arginine was kept at 0.08 mmole/L in all treatments. The LN mixture reflected portal concentrations of amino acids in sheep fed a poor quality protein diet. Urea and glucose concentrations were determined in samples of effluent perfusate.

Glucose production was inhibited by 22% by the HN infusion, and by a further 20% by added Ala, Lys or Gln. Urea release doubled in response to the latter treatments. The addition of Ala or Gln to LN or HN did not significantly affect urea release. While it is unlikely that the carbon deficit is due to the export of amino acids such as Gln, there is preliminary evidence that glucose was stored as glycogen during the HN infusion.

Treatment	Release (nmoles g <sup>-1</sup> min <sup>-1</sup> ) of	
	Glucose <sup>1</sup>	Urea <sup>1</sup>
LN	903.14 ± 89.51 <sup>a</sup>	1011.84 ± 91.4 <sup>b</sup>
LN + Ala	703.03 ± 139.14	1001.11 ± 138.42 <sup>b</sup>
LN + Lys	656.77 ± 56.94	985.44 ± 148.23 <sup>b</sup>
LN + Gln	639.83 ± 55.06	1098.54 ± 96.11 <sup>b</sup>
HN	708.68 ± 79.00	1936.43 ± 180.83 <sup>a</sup>
HN + Ala	573.50 ± 54.02 <sup>b</sup>	1847.30 ± 187.63 <sup>a</sup>
HN + Lys	507.78 ± 86.9 <sup>b</sup>	1917.99 ± 266.29 <sup>a</sup>
HN + Gln	543.52 ± 47.20 <sup>b</sup>	1881.73 ± 172.25 <sup>a</sup>

<sup>1</sup>mean ± SEM

<sup>a, b</sup>Mean values within a column with unlike superscripts differ significantly, P < 0.05.

1. Ali AM, Rossouw HC, Silove M, van der Walt JG. *Exp Physiol* 2000; 85: 469–478.