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Glutamine and ketone-body metabolism in the small intestine of starved peak-lactating rats.

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Abstract

1. The effect of starvation on the metabolism of gut glutamine and ketone-bodies of peak lactating, non-lactating and virgin rats was investigated. 2. The arterial blood ketone-body concentration was increased by approximately 7-, 6- and 13-fold in 48 h-starved virgin, non-lactating and lactating rats, respectively. 3. The arterial blood glutamine concentration was decreased by approximately 32% in 48 h-starved lactating rats (p less than 0.001). 4. The maximal activity of phosphate-dependent glutaminase was increased or decreased in the small intestine of fed or 48 h-starved peak-lactating rats, respectively. 5. Portal drained viscera blood flow increased by approximately 25% in peak-lactating rats. 6. Arteriovenous difference measurements for ketone-bodies across the gut of 48 h-starved rats showed an increase in net uptake of ketone-bodies by approximately 10-, 17- and 29-fold in virgin, non-lactating and lactating rats, respectively. 7. Glutamine was extracted by the gut of peak-lactating rats at a rate of 487 nmol/100 g of body wt. which was greater by approximately 33% (p less than 0.001) than that of virgin or non-lactating animals. In peak lactating rats, 48 h-starvation resulted in marked decreases in the rates of glutamine removal from the circulation (p less than 0.001) which was accompanied by decreased rates of release of glutamate, alanine and ammonia