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The maximal activity of phosphate-dependent glutaminase and glutamine metabolism in late-pregnant and peak-lactating rats.

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Abstract

The maximal activity of phosphate-dependent glutaminase was increased in the small intestine, decreased in the liver and unchanged in the kidney of late-pregnant rats. This was accompanied by increases in the size of both the small intestine and the liver. The maximal activity of phosphate-dependent glutaminase was increased in both the small intestine and liver but unchanged in the kidney of peak-lactating rats. Enterocytes isolated from late-pregnant or peak-lactating rats exhibited an enhanced rate of utilization of glutamine and production of glutamate, alanine and ammonia. Arteriovenous-difference measurements across the gut showed an increase in the net glutamine removed from the circulation in late-pregnant and peak-lactating rats, which was accompanied by enhanced rates of release of glutamate, alanine and ammonia. Arteriovenous-difference measurements for glutamine showed that both renal uptake and skeletal-muscle release of glutamine were not markedly changed during late pregnancy or peak lactation; but pregnant rats showed a hepatic release of the amino acid. It is concluded that, during late pregnancy and peak lactation, the adaptive changes in glutamine metabolism by the small intestine, kidneys and skeletal muscle of hindlimb are similar; however, the liver appears to release glutamine during late pregnancy, but to utilize glutamine during peak lactation