

[Clin Sci \(Lond\)](#). 1988 Jul;75(1):93-100.

## **Effect of glucocorticoid treatment on glucose and glutamine metabolism by the small intestine of the rat.**

[Salleh M](#), [Ardawi M](#), [Maizoub MF](#), [Newsholme EA](#).

Department of Clinical Biochemistry, College of Medicine and Allied Sciences, King Abdulaziz University, Jeddah, Saudi Arabia.

### **Abstract**

1. The effect of dexamethasone (30 micrograms day<sup>-1</sup> 100 g<sup>-1</sup> body wt.) on the metabolism of glucose and glutamine was studied in the small intestine of rats after 9 days of treatment. 2. Dexamethasone treatment resulted in negative nitrogen balance (P less than 0.001), and produced increases in the concentrations of plasma glucose (22%, P less than 0.05), alanine (32%, P less than 0.001) and insulin (127%, P less than 0.001), but a decrease in the plasma concentration of glutamine (20%, P less than 0.05). 3. Portal-drained visceral blood flow increased by approximately 22% (P less than 0.001) in dexamethasone-treated rats, and was accompanied by a decrease in the arterio-venous concentration difference of glucose (43%, P less than 0.001) and an increase in that of lactate (22%, P less than 0.05), glutamine (35%, P less than 0.01), glutamate (33%, P less than 0.01) and alanine (21%, P less than 0.05). 4. Enterocytes isolated from dexamethasone-treated rats showed decreased and increased rates of glucose and glutamine utilization, respectively. 5. The maximal activities of hexokinase, 6-phosphofructokinase, citrate synthase and oxoglutarate dehydrogenase were decreased (30-64%, P less than 0.001) in intestinal mucosal scrapings of dexamethasone-treated rats, whereas the activity of glutaminase was increased (35%, P less than 0.001). 6. It is concluded that glucocorticoid administration decreases the rate of glucose utilization but increases that of glutamine (both in vivo and in vitro) by the epithelial cells of the small intestine. This may be caused by changes in the maximal activities of key enzymes in the pathways of glucose and glutamine metabolism in these cells