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Glutamine metabolism in the lungs of glucocorticoid-treated rats.

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Abstract

1. The effect of dexamethasone (30 micrograms day⁻¹ 100 g⁻¹ body weight) on the regulation of glutamine metabolism was studied in the lungs of rats after 9 days of treatment. 2. Dexamethasone resulted in a negative nitrogen balance, and produced decreases in the blood concentrations of glutamine (32.3%) and glutamate (25.3%) but an increase in the blood concentration of alanine (33.9%). 3. Dexamethasone treatment increases the rates of production of glutamine and alanine by lung slices incubated in vitro. 4. Blood flow and arteriovenous concentration difference measurement across the lungs exhibited an increase in the net exchange rates of glutamine (131.6%) and alanine (113.2%) in dexamethasone-treated rats compared with corresponding pair-fed controls. 5. Dexamethasone treatment produced significant decreases in the lung concentrations of glutamine (47.2%), glutamate (30.9%) and 2-oxoglutarate (57.3%). The concentrations of alanine (52.1%), ammonia (24.7%) and pyruvate (43.7%) were increased. 6. The maximal activity of glutamine synthetase was increased (21.5%), but there was no marked change in that of glutaminase, in the lungs of dexamethasone-treated rats. 7. It is concluded that glucocorticoid administration enhances the rates of production of glutamine and alanine from lungs of rats (both in vitro and in vivo). This may be due to changes in efflux and/or increased intracellular biosynthesis of glutamine and alanine.