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## **Metabolism of glucose, glutamine, long-chain fatty acids and ketone bodies by lungs of the rat.**

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### **Abstract**

The maximum activities of some key enzymes of metabolism were studied in lungs of fed and 48-h-starved rats. The maximum activity of hexokinase in the lung is similar to that of other tissues of the body, but lower than that of phosphorylase and 6-phosphofructokinase. High activities of glucose-6-phosphate dehydrogenase and 6-phosphogluconate dehydrogenase were found in lung tissue, suggesting the importance of the pentose phosphate pathway in the lung. The activities of hexokinase and 6-phosphofructokinase were decreased whereas that of phosphorylase increased in response to starvation. Of the enzymes of the tricarboxylic acid cycle whose activities were measured, that of oxoglutarate dehydrogenase was the lowest, yet its activity (approximately 4.2 nmol/min per mg protein at 37 degrees C) was considerably greater than the flux through the cycle (0.46 nmol/min per mg protein at 37 degrees C; calculated from oxygen consumption by incubated lung slices). The activities of both oxoglutarate dehydrogenase and citrate synthase were decreased by starvation. The activities of 3-oxoacid CoA-transferase and acetoacetyl-CoA thiolase were low in lung tissue compared to those of other tissues (eg kidney, brain) and that of 3-hydroxybutyrate dehydrogenase was very low. The activity of carnitine palmitoyl transferase is higher in the lung, suggesting that fatty acids (and possibly acetoacetate) could provide acetyl-CoA as substrate for the tricarboxylic acid cycle. Very low rates of utilization of 3-hydroxybutyrate were observed during incubation of lung slices, but that of oleate was 1.2 nmol/h per mg of protein