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Glutamine and glucose metabolism in human peripheral lymphocytes.

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Abstract

The metabolism of glutamine and glucose in resting and concanavalin A-stimulated human peripheral lymphocytes was investigated. Glutamine was metabolized at a high rate by resting and mitogen-stimulated human peripheral lymphocytes and the major end-products of glutamine metabolism were glutamate, aspartate, CO₂, and ammonia: the carbon from glutamine may contribute about 21% to respiration. Concanavalin A enhanced the formation of all end-products except glutamate, indicating that more glutamine was metabolized beyond the stage of glutamate in the mitogen-stimulated cells. Mitogenic stimulation caused an increase in the rates of glucose utilization, lactate production and ¹⁴CO₂ from variously labeled [¹⁴C] glucose. Concanavalin A caused an increase in the oxidation of pyruvate as indicated by the enhanced release of ¹⁴CO₂ from [2-¹⁴C]-, [3,4-¹⁴C]-, and [6-¹⁴C]-glucose. When both glucose and glutamine were presented to the cells, the rates of utilization of both substrates increased and the increased rates of glucose and glutamine utilization could be accounted for mainly by increased rates of lactate and glutamate production, respectively