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Effect of experimental hypothyroidism on the control of 6-phosphofructo-1-kinase activity in rat jejunal mucosa.

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Abstract

Changes in the activity of 6-phosphofructo-1-kinase (PFK, EC 2.7.1.11) from the epithelial cells of rat small intestine during experimental hypothyroidism were studied. Hypothyroidism resulted in significant decreases in the plasma concentrations of total tri-iodothyronine, free tri-iodothyronine, total thyroxine, free thyroxine and insulin. These changes were associated with a significant increase in the plasma concentration of thyrotropin. The total activity and activity ratios (activity at 0.5 mM fructose 6-phosphate at pH 7.0/activity at pH 8.0 (v0.5/V)) of jejunal PFK of hypothyroid rats were significantly diminished as compared to control rats. PFK of hypothyroid rats was more sensitive to inhibition by ATP. The mucosal enzyme of both control and hypothyroid state was sensitive to stimulation by AMP and fructose 2,6-bisphosphate. It is concluded that during hypothyroidism the rate of glycolytic pathway in the small intestine is reduced as a result of a fall in glucose uptake, and the subsequent kinetic changes of PFK are primarily to maintain the concentrations of fructose 6-phosphate (and glucose 6-phosphate) during the reduced glycolytic flux. These changes in PFK activity may be caused by changes in plasma insulin concentrations, glucose utilization and fructose 2,6-bisphosphate concentrations