

Metabolism. 1988 Jun;37(6):602-9.

Glucose, glutamine, and ketone-body metabolism in human enterocytes.

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Abstract

Suspensions of metabolically viable human small-intestinal epithelial cells (enterocytes) were used to assess the metabolism of substrate(s) normally derived from the blood circulation to the intestinal mucosa (glucose, glutamine, and ketone bodies). Glutamine, glutamate, and glucose were the only substrates that caused major increases in oxygen consumption by isolated human enterocytes. In human enterocytes 72% of glucose could be accounted for as lactate. Human enterocytes utilized glutamine at about 14.90 $\mu\text{mol}/\text{min}/\text{g}$ dry wt, with glutamate, alanine, aspartate, and ammonia as the major end-products. Human enterocytes utilized 3-hydroxybutyrate and acetoacetate at similar rates. Under the experimental condition employed, the respiratory fuels of human enterocytes include glutamine, glucose, and to a lesser extent, ketone bodies as indicated in the proportion of oxygen consumption attributed to these fuels and to the extent of utilization