

A new method of assessing rates of the futile cycle during glycolytic and gluconeogenic metabolism

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A method for assessing rates of the futile cycle is presented, and it is illustrated in vitro. Glycolytic- and gluconeogenic-type cycles are simulated for the reactions catalyzed by phosphofructokinase (EC 2.7.1.11) and fructose-1,6-bisphosphatase (EC 3.1.3.11) in assay systems in which the cycle rates in either direction can be varied and determined. While either system is sustaining a net flux of carbons in a given direction, the flux of radioactively labeled carbons in the opposite direction is determined. Different cycle rates are obtained by varying phosphofructokinase activity while keeping fructose-1,6-bisphosphatase activity constant in the 'gluconeogenic' simulation and varying fructose-1,6-bisphosphatase while keeping phosphofructokinase activity constant in the 'glycolytic' simulation. A direct, linear relationship was found between the cycle rate and the radioactive labeling of fructose 1,6-bisphosphate from [U-14C]glucose 6-phosphate during net gluconeogenic carbon flux.