Data Sheet (Cat.No.TMPY-04394)

TargetMol

Glucokinase Protein, Human, Recombinant

General Information

Synonyms:	glucokinase (hexokinase 4);HXKP;MODY2;FGQTL3;LGLK;HKIV;GLK;HK4;GK;HHF3
Protein Construction:	A DNA sequence encoding the human glucokinase isoform 1 (NP_000153.1) (Leu 2-Gln 465) was expressed, fused with two additional amino acids (Gly & Pro) at the N-terminus. Predicted N terminal: Gly
Species:	Human
Expression Host:	E. coli
Accession:	P35557-1
Molecular Weight:	52.2 kDa (predicted); 52.2 kDa (reducing conditions)

QC Testing

Biological Activity:	Kinase activity untested
Purity:	> 95 % as determined by SDS-PAGE
Endotoxin:	Please contact us for more information.
Formulation:	Supplied as sterile 20 mM Tris, 10% Glycerol, pH 8.0.

Preparation and Storage

Reconstitution:

A Certificate of Analysis (CoA) containing reconstitution instructions is included with the products. Please refer to the CoA for detailed information.

Stability & Storage:

It is recommended to store the product under sterile conditions at -20°C to -80°C. Samples are stable for up to 12 months. Please avoid multiple freeze-thaw cycles and store products in aliquots.

Actual storage temperature shall be subject to the COA.

Shipping:

Proteins are shipped with blue ice.

Protein Background

Glucokinase belongs to the bacterial glucokinase family. Hexokinases phosphorylate glucose to produce glucose-6-phosphate, the first step in most glucose metabolism pathways. Alternative splicing of this gene results in three tissue-specific forms of glucokinase, one found in pancreatic islet beta cells and two found in liver. The protein localizes to the outer membrane of mitochondria. In contrast to other forms of hexokinase, this enzyme is not inhibited by its product glucose-6-phosphate but remains active while glucose is abundant. Mutations in this gene have been associated with non-insulin dependent diabetes mellitus (NIDDM), maturity onset diabetes of the young, type 2 (MODY2) and persistent hyperinsulinemic hypoglycemia of infancy (PHHI). It can Catalyzes the initial step in utilization of glucose by the beta-cell and liver at physiological glucose concentration. Glucokinase has a

high Km for glucose, and so it is effective only when glucose is abundant. The role of GCK is to provide G6P for the synthesis of glycogen. Pancreatic glucokinase plays an important role in modulating insulin secretion. Hepatic glucokinase helps to facilitate the uptake and conversion of glucose by acting as an insulin-sensitive determinant of hepatic glucose usage. It has a pivotal role as glucose sensor of the pancreatic beta-cells. Glucokinase explains the capacity, hexose specificity, affinities, sigmoidicity, and anomeric preference of pancreatic islet glycolysis, and because stimulation of glucose metabolism is a prerequisite of glucose stimulation of insulin release, glucokinase also explains many characteristics of this beta-cell function. Glucokinase of the beta-cell is induced or activated by glucose in contrast to liver glucokinase, which is regulated by insulin. Tissue-specific regulation corresponds with observations that liver and pancreatic beta-cell glucokinase are structurally distinct. Glucokinase could play a glucose-sensor role in hepatocytes as well, and certain forms of diabetes mellitus might be due to glucokinase deficiencies in pancreatic beta-cells, hepatocytes, or both.

Reference

Matschinsky FM. (1990) Glucokinase as glucose sensor and metabolic signal generator in pancreatic beta-cells and hepatocytes. Diabetes. 39(6): 647-52.

Magnuson MA,et al.(2004) Glucokinase as a glucose sensor: past, present, and future. Glucokinase And Glycemic Disease: From Basics to Novel Therapeutics (Frontiers in Diabetes). Basel: S. Karger AG (Switzerland). pp. 18-30.

Cardenas ML. (2004) Comparative biochemistry of glucokinase. Glucokinase And Glycemic Disease: From Basics to Novel Therapeutics (Frontiers in Diabetes). Basel: S. Karger AG (Switzerland). pp. 31-41.