Product Data Sheet

Bovine Insulin

Cat# INSL15-N-10 Bovine Insulin (Pancreas) Size: 10 mg

Description

Insulin is the principal hormone responsible for glucose metabolism. It is synthesized in the cells of the islets of Langerhans as the precursor, proinsulin, which is processed to form C-peptide and insulin and both are secreted in equimolar amounts into the portal circulation. The mature insulin molecule comprises two polypeptide chairs, the A chain (21 amino acids) and the B chain (30 amino acids), which are linked by two inter-chain disulphide bridges. There is, in addition, a single intra-chain disulphide bridge in the A chain. The sequence of insulin is highly conserved in mammalian species, and is homologous with the insulin-like growth factors IGF-I and IGF-II. Secretion of insulin is mainly controlled by plasma glucose concentration and the hormones have a number of important metabolic actions. Its principal function is to control the uptake and utilization of glucose in peripheral tissues via the glucose transporter. This and other hypoglycemic activities, such as the inhibition of hepatic gluconeogenesis and glycogenolysis are counteracted by the hyperglycemic hormones including glucagons, epinephrine (adrenaline), growth hormone and cortisol. Insulin concentrations are severely reduced in insulin-dependent diabetes (DDM) and some other conditions such as hypopituitarism. Insulin concentrations may be raised in non-insulin-dependant diabetes (NIDDM), obesity, insulinoma and some endocrine dysfunctions such as Cushing's Syndrome and Acromegaly. The main clinical utility measurement is in the investigation of hypoglycemia. Insulin assay have been used in the following applications:

Bovine Insulin Structure

A-Chain:


B-Chain:


Interchain disulfide bonds are located between the cysteines at positions A7 and B7 and between positions A20 and B19. An intrachain disulfide bond occurs between the cysteines at A6 and A11. Bovine insulin differs from human insulin at the following positions: alanine for threonine at A8, valine for isoleucine at A10, and alanine for threonine at the carboxyl terminal of the B-chain.

Bovine insulin is often included as a medium supplement for cell culture. The concentration range is 1-10 mg/ml depending on the cell type.

Source and properties of protein

Source

Bovine pancreas, purified from an ethanol/phosphoric acid extract of bovine pancreas by multiple ammonium sulfate and isoelectric precipitations. It is then crystallized without zinc followed by crystallization with zinc. The zinc content of the final product is approximately 0.5%. Zinc can be removed by solubilizing the insulin in dilute acetic acid, adding excess EDTA to chelate the zinc, and then precipitating the insulin at its pl.

Appearance

White powder with a faint yellow cast

Formula weight

5733.5

Molecular formula

C254H377N65O75S6

Isoelectric point

pI = 5.3 for the native protein

E1%(278nm)

10.6 (33 mM phosphate, pH 7.0)

Potency/activity

Hplc ~30 USP/mg

Stability

Under dark at -20°C and dry conditions

Solubility

Insulin has low solubility at neutral pH. It can be solubilized at 2 mg/ml in dilute acetic or hydrochloric acid, pH 2-3. A stock solution can be stored frozen at -20°C in single-use aliquots. Freeze-thaw cycles should be avoided. Alternatively, it can be stored for up to 12 months at 2-8°C if it is sterile filtered through a low protein binding membrane or if it contains a suitable bacteriostat, such as 0.1% thimerosal or sodium azide. Insulin solutions cannot be autoclaved. Insulin can also be solubilized in 125 mM NaHCO3. However, alkaline stock solutions are not recommended since high pH increases the rate of deamidation and aggregation.

For in vitro research use only

Related Material available for ADI

Human Insulin and Insulin and C-peptide ELISA kits

INSL15-N-10 90604A