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B.Sc. (H) Zoology
Part - II
Topic IV

(Pancreas) - [Insulin hormone] Dr. Sambhal
Dept of Zoology

- Pancreas is an Endodermal mixed (Compound) gland.
- It's also known as (Diffuse or Composite) gland.
- It consists of both Exocrine & Endocrine tissue.
- Besides acini (Exocrine part), the Pancreas contains about 2.0 billion scattered microscopic clusters of - Endocrine cells called "Islets of Langerhans" (Paul - Langerhans - 1869).
- Endocrine part discharge their secretion directly in the blood. Its cells are small, porous shaped - closely packed together & without a lumen, they collectively form an Endocrine gland.
- In mammals, the Pancreatic (Islets of Langerhans) have four cell types.
 - α -cells (25%) - Glucagon.
 - β -cells (65%) - Insulin
 - δ -cells (10/14) - Somatostatin (SS)

Insulin

- Banting & Best extracted insulin in the year (1921) for which they were awarded Nobel Prize in (1923)
- Albert prepared pure crystalline insulin in (1926)
- Insulin is the hypoglycaemic antidiabetic factor & the protein hormone, which regulates blood glucose.

Chemical Structure

- It is relatively small protein.
- It consists of 51 Amino acids disposed into two parallel chains A & B.
- It is connected by two disulphide bonds
- A chain has 21 & B chain 30 Amino acids units.
- One molecule of Insulin has 51 Amino acids
- Its m.wt is 5,600.
- Insulin deficiency causes Diabetes mellitus (Normal range of Glucose (80-120 mg/100ml))

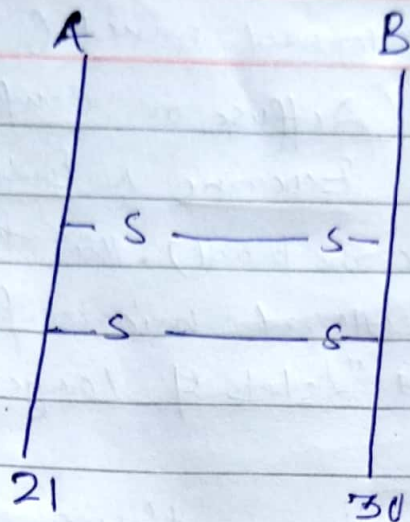
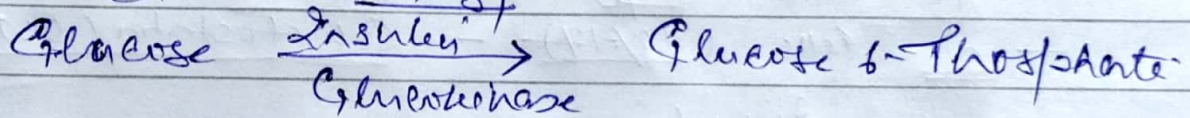


Fig - show Insulin structure.

Functions

- Increases Combustion of sugar in tissues. - Insulin accelerates the phosphorylation of Glucose by the enzyme Glucokinase or Hexokinase. Glucose-6-phosphate enters the respiratory cycle to liberates chemical energy.



- It helps in the transport of Glucose into cells.
- It stimulates Glycogenesis - Insulin promotes the formation of Glycogen from Glucose in the Liver & Muscle cells.
- It prevents Gluconeogenesis - It reduces the production of Glucose from non-carbohydrate source, such as Proteins & Fats.
- Prevents formation of Ketone Bodies (Antiketogenic effect).
- It stimulates Protein synthesis & growth.
- It reduces (decreases) Lipemia.