ISLETS OF LANGERHANGS

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The Pancreas is a rather diffused gland which is a mixture of two histologically and functionally separate tissues. The bulk of the gland is exocrine in function and forms clusters of glandular cells called acini or lobules lined with cuboidal epithelium. Scattered among the exocrine cells are patches of tissues named Islets of Langerhangs after their discoverer in 1869, and these consists of endocrine cells that discharge their secretion directly in the blood. These cells are small prism shaped, closely packed together and without a lumen, they collectively formed an endocrine gland.

Four kinds of cells have been identified in the islets:

(i) Alpha(α) cells (60% to 70%) which contain alcohol-soluble granules, produce glucagon. Alpha(α) cells are also called A-cells

(ii) Beta(β) Cells (32 to 38%) whose granules are not soluble in alcohol. Beta cell also called B-cells (produce insulin)

(iii) Delta cells (D-cells) produce somatostanin.

(iv) F-cells :- produce Pancreatic polypeptid.

Delta cells and F-cells constitute 2%-8% of the islets of Langerhangs. Beta cells usually found toward the centre of islet, the alpha cells towards the periphery of the islets and D (delta) and F-cells found scattered.

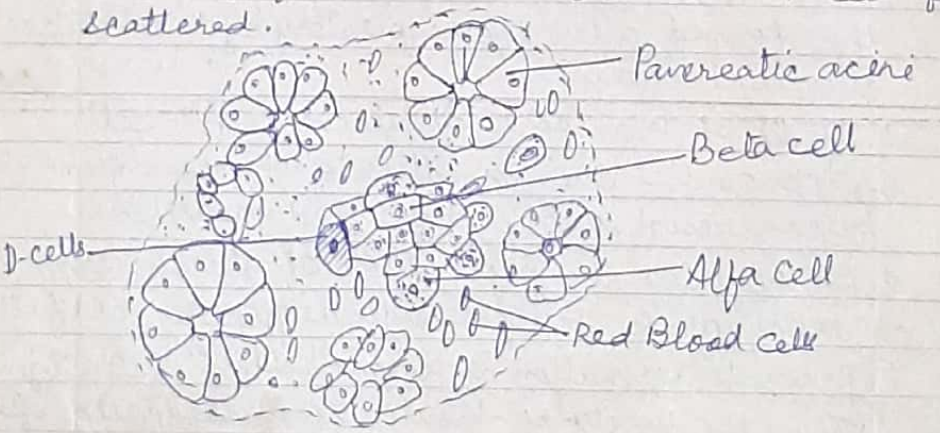

Fig Physiological anatomy of Pancreas.

Insulin :-

Insulin is the hypoglycemic antidiabetic factor and the protein hormone which regulates blood glucose.

Banting and Best extracted insulin in the year 1921 for which they get Noble prize in 1923. Abert prepare pure crystalline insulin in 1926.

Insulin is a relatively small protein of 51 amino acids disposed in two parallel chains A and B, interconnected by two disulphide bonds. A chain has 21, and the B chain 30 amino acid units, thus one molecule of insulin has 51 amino acids in all. Its molecular weight is 6,000.

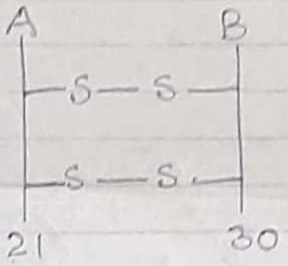

Fig: The insulin structure.

Functions :-

1. Increase combustion of sugar in tissues. Insulin accelerates the phosphorylation of glucose by the enzyme glucokinase or hexokinase. Glucose-6-phosphate thus formed enters the respiratory cycle to liberated chemical energy.
2. It helps transport of glucose into cell.
3. It promotes the formation of glycogen from glucose (glycogenesis) in the liver and muscles.
4. It reduces the production of glucose from non-carbohydrate sources such as protein and fats.
5. Prevents formation of Ketone bodies (Antiketogenic effect) When the supply of insulin is inadequate fat metabolism is also affected, because fat must be used instead of carbohydrate for release of energy through cellular oxidation. The large increase in