Islet’s of Langerhans
(Pancreas)

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Pancreas

- The pancreas has two main functions: an **exocrine** function that helps in digestion and an **endocrine** function that regulates blood sugar.
- **Location of the Pancreas**

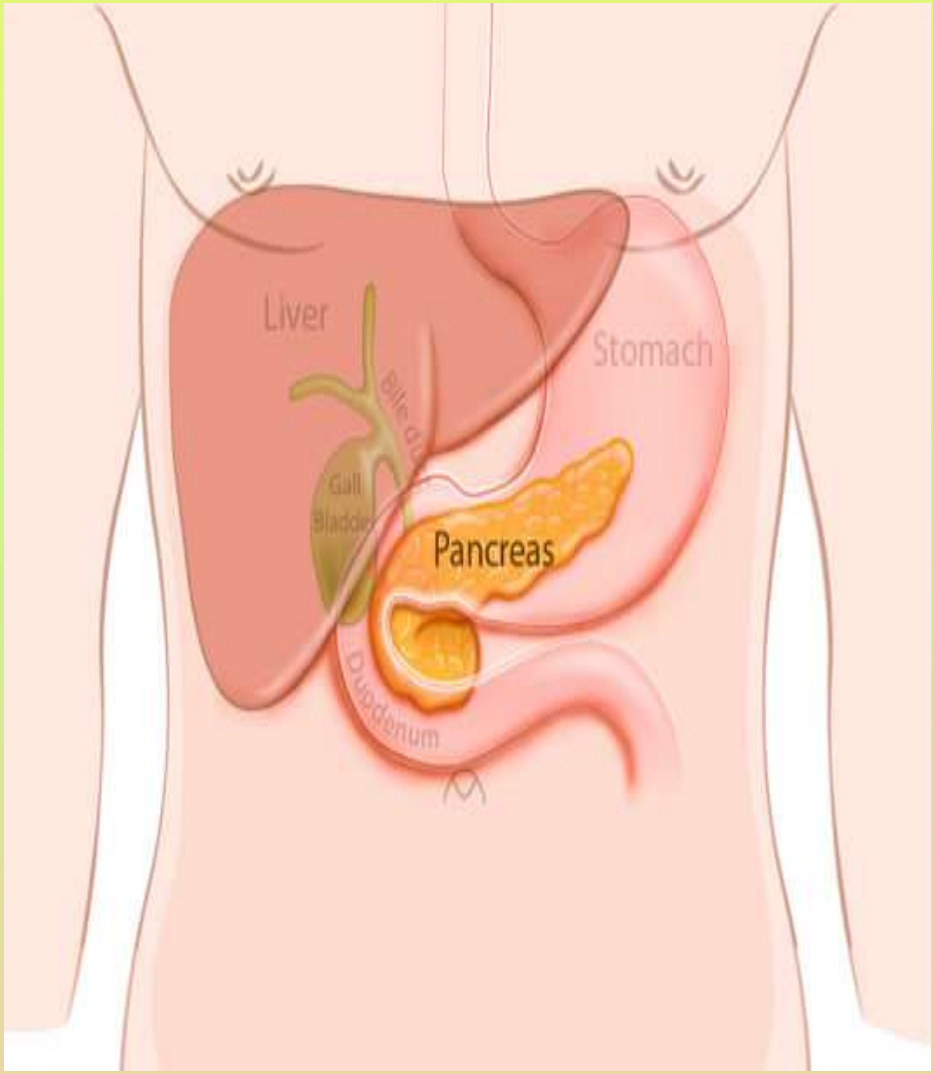
The pancreas is located behind the stomach in the upper left abdomen.

It is surrounded by other organs including the small intestine, liver, and spleen. It is spongy, about six to ten inches long, and is shaped like a flat pear.

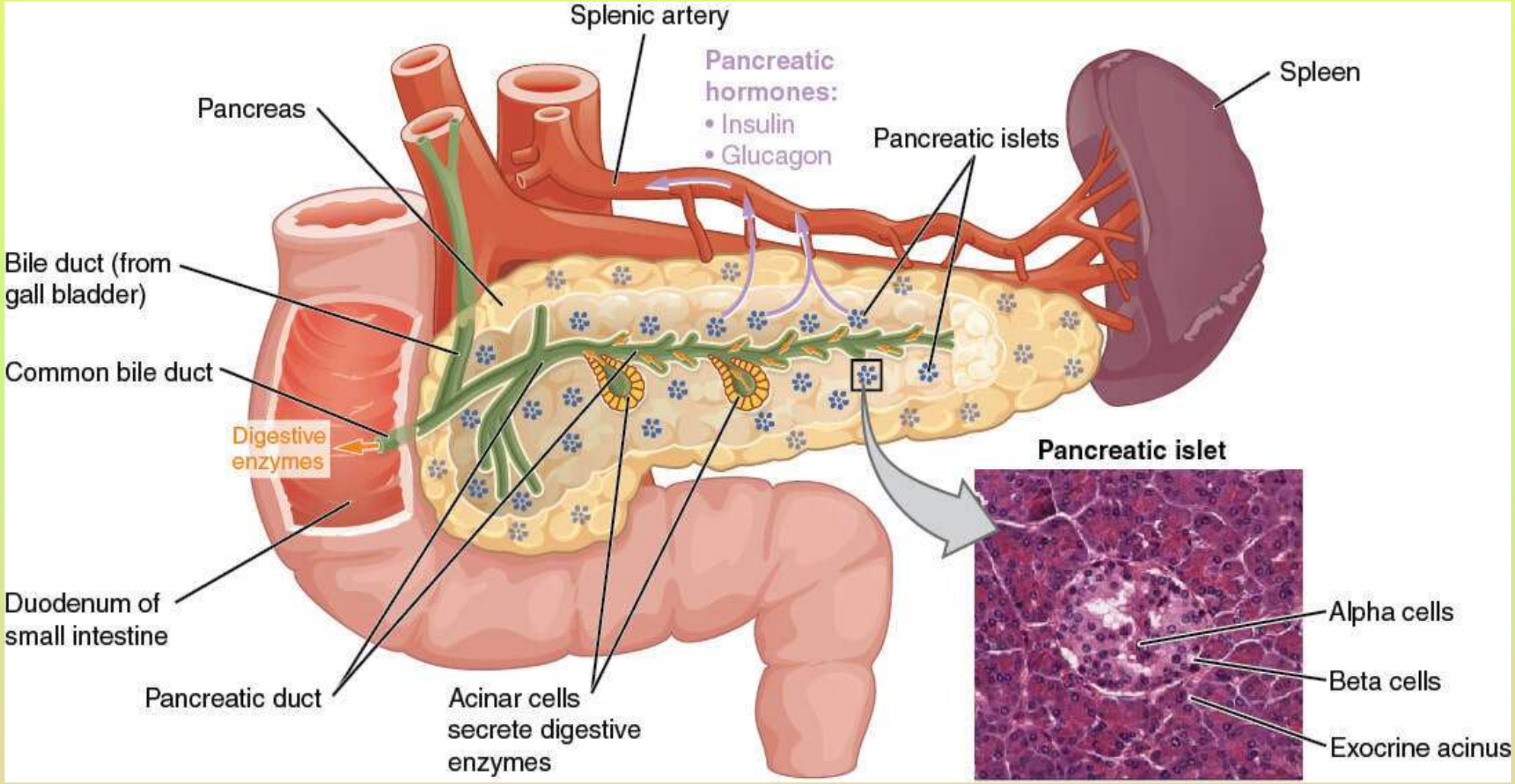
The wide part, called the head of the pancreas, is positioned toward the center of the abdomen.

The head of the pancreas is located at the juncture where the stomach meets the first part of the small intestine.

This is where the stomach empties partially digested food into the intestine, and the pancreas releases digestive enzymes into these contents.



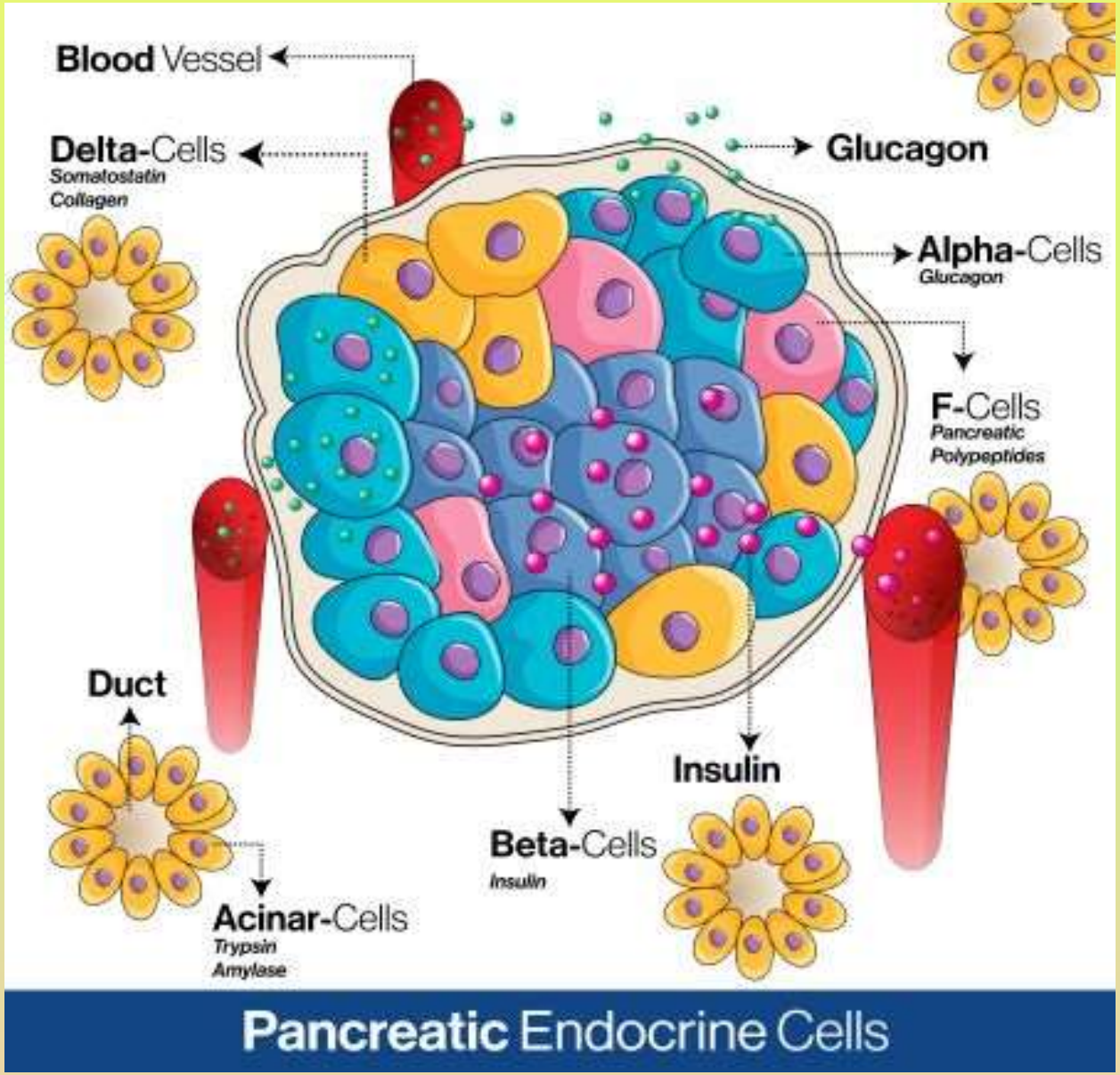
Pancreas Structure



Pancreatic Islets

- The pancreatic islets are comprised of various cells types:
- The β cells of the pancreas account for about 60% of the total islet mass, followed by α cells that occupy 30% of the mass. The remaining 10% is covered by the δ and PP cells.

1. Alpha cells: produce glucagon, a peptide hormone
2. Beta cells: produce insulin and peptide hormones.
3. Delta cells: produce somatostatin that inhibits glucagon and insulin secretion and suppresses growth hormone release by the pituitary gland
4. F cells/ PP cells: Produce pancreatic polypeptide, functions is activate glucagon.



Insulin

- Beta cells of the pancreatic islets are stimulated to produce insulin with high levels of blood glucose. Reduced blood glucose concentrations suppress beta cell production of insulin.

Actions of insulin:

- Promotes absorption of glucose by the liver, adipose tissue, and skeletal muscle cells.
- Absorbed glucose in these tissues/organ is converted to glycogen via glycogenesis or fats via lipogenesis. In the liver, both pathways are present.

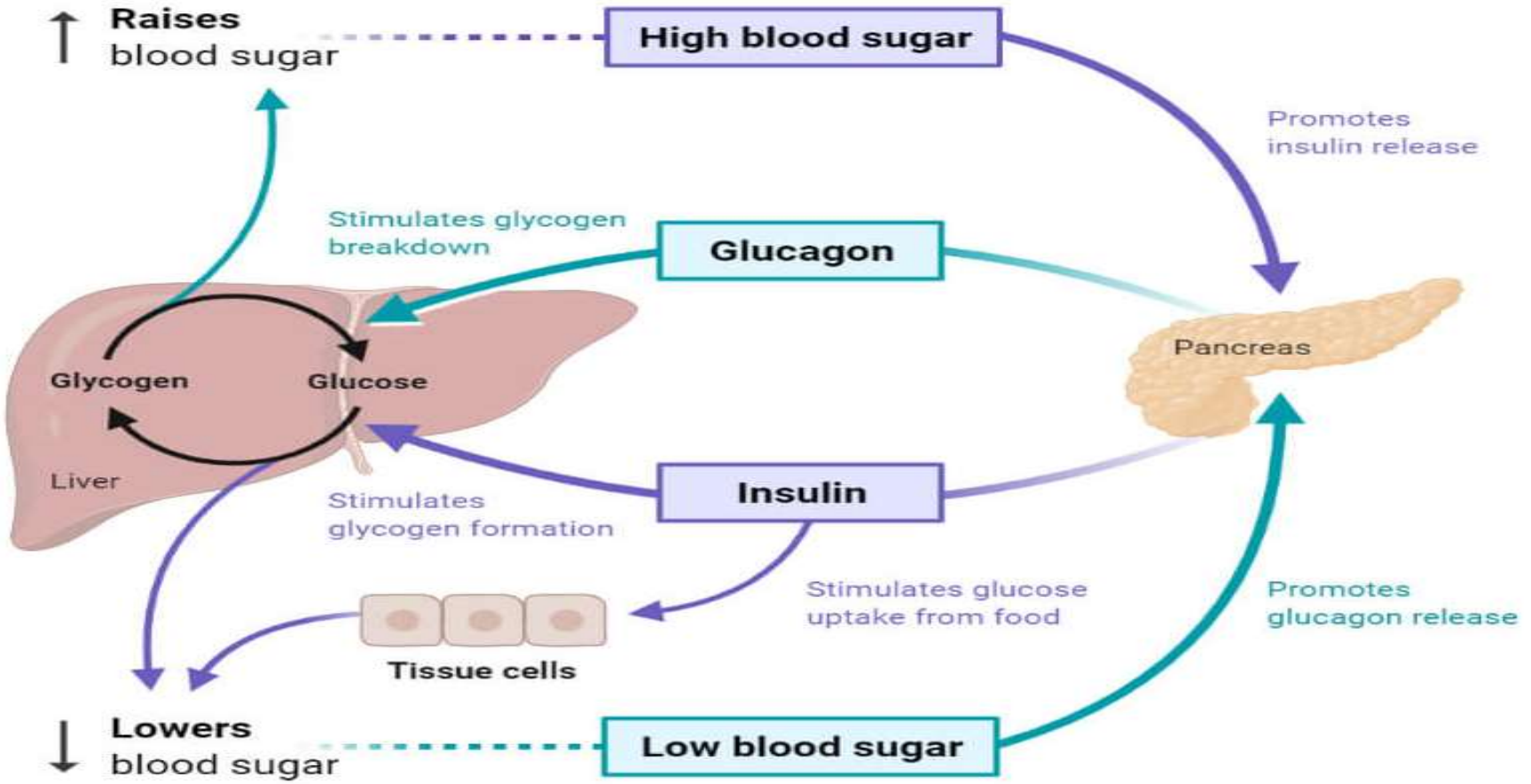
Glucagon

- Regulation: Alpha cells are stimulated to produce glucagon in low blood glucose level.

Actions of glucagon include:

- Increases circulating concentrations of glucose by promoting gluconeogenesis (generation of glucose from non-carbohydrate sources) and glycogenolysis (breakdown of glycogen to glucose-1-phosphate)
- Decreases fatty acid synthesis by the liver and adipose tissue
- Increases lipolysis by the liver and adipose tissue, which affects the rate of glucose production

Regulation of Blood Glucose



Delta cells: produce **somatostatin** that inhibits glucagon and insulin secretion and suppresses growth hormone release by the pituitary gland

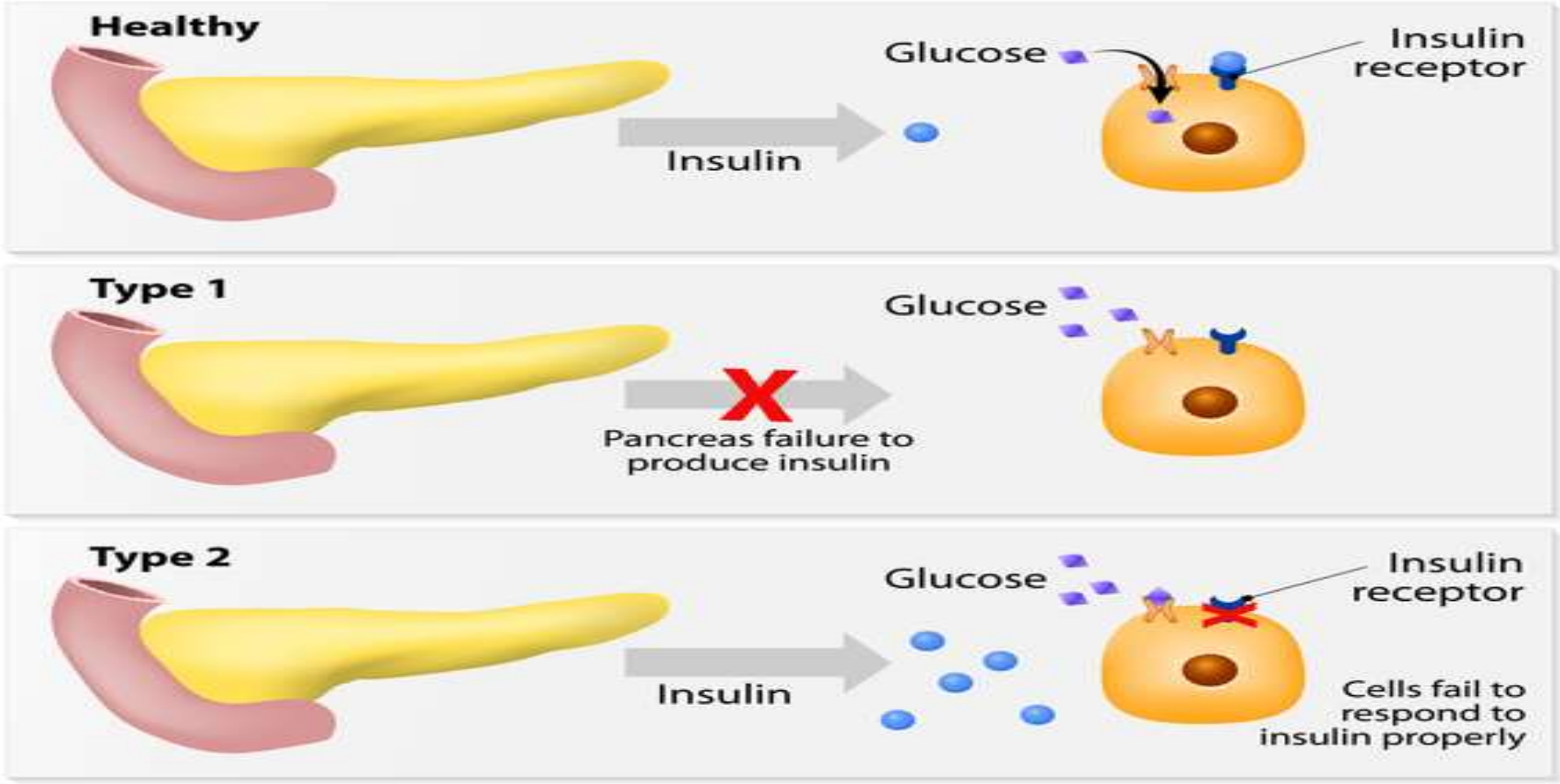
F cells/ PP cells: Produce pancreatic polypeptide, functions is activate glucagon.

Diseases and Disorders of Pancreas

• Diabetes Mellitus

- **Diabetes mellitus is a condition resulting from either the hyposecretion or hypoactivity of insulin.**
- **Diabetes mellitus is of two types; type 1 diabetes mellitus results from the hyposecretion of insulin, whereas type 2 diabetes mellitus results from the hypoactivity of released insulin.**
- **The lack of insulin in the body results in increased blood glucose levels which then causes excess loss of glucose via urine.**
- **Type 1 diabetes mellitus is common among children and is characterized by the immediate onset of symptoms.**
- **Type 2 diabetes mellitus, in turn, occurs more in adults and often results in late-onset of symptoms.**
- **Diabetes mellitus can be life-threatening in some conditions, resulting in kidney failure and other serious conditions. In most cases, however, the condition is chronic and doesn't result in death.**
- **The treatment of diabetes mellitus is performed in the form of insulin shots which helps maintain the level of insulin in the body.**

DIABETES MELLITUS



References:

1. T.B. of Physiology-Guyton & Hall
2. T.B. of Physiology- G.N. Vankhede
3. References from Google

Thank You!