

PANCREAS

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Pancreas

Although the main secretion by pancreas is of digestive enzymes and bicarbonates ,into the duodenum pancreas contains patches of endocrine tissues :**Islets of Langerhans**.

Each Islet is composed of:

- 1-Alpha cells ,20%, secrete glucagon ,small polypeptides hormone.
- 2-Beta cells ,75%,secrete insulin ,insulin small protein hormone consist of polypeptides chains bound together.
- 3-Delta cells ,secrete somatostatin, small polypeptide hormone.

Insulin and glucagon :maintain blood sugar at a level of 100mg/100ml blood.

Nerves from both divisions of autonomic nervous system innervate the pancreatic islets.

There is well developed capillary network surround each islet.

- Effect of insulin and glucagon on their target tissues
- Pancreatic hormones play an important role in regulating the concentrations of nutrients in the circulating especially glucose and a.a.
- The main target tissues of the insulin are :

1-Liver

2-Adipose tissues

3-Skeletal muscles

4-Satiety center within the hypothalamus of the brain .(satiety center is a collection of neurons in the hypothalamus that control the appetite).

1-Insulin :

Is continuously produced but production increases when there is a high blood glucose ,it thus to decrease blood glucose by :

1- Encouraging all cells to take up more glucose out of the blood .

Insulin molecules binds to membrane bound receptors on the target cells .Then the receptors cause specific protein in the membrane to become phosphorylated,part of the cells response to insulin is to increase NO.of transport proteins in the membrane of cells for glucose and a.a .

- Finally insulin and its receptors are taken by endocytosis.
- Insulin molecules are released from receptors and broken down within the cell. The receptors can again become associated with plasma membrane.
- 2-Stimulate the **liver** to convert glucose to glycogen .
- 3-Stimulate the **adipose tissues** to convert glucose to fat.
- 4-Acts on **satiety center** of the hypothalamus so that no longer feel hungry to stop eating more sugar.

2-Glucagon

- From alpha cells ,produced when the blood glucose falls below 70 mg /100 ml .
- It increases blood sugar by acting on the **liver** to break down glycogen to glucose.
- When Blood glucose falls ,the body will :
- 1-First **reduce insulin** production.
- 2-Then secrete **glucagon**
- 3-secrete **somatostatin** ,to inhibit insulin production.

In case of continuous fasting :

Glucagon can no longer work switching over to
1-**cortisol** ,to break down fat and then protein.

2-**epinephrin** increases blood sugar by
breaking down fat and protein .

3-**GH** stimulate fat break down.

4-**Glucagon** delivered in a high conc. To the
liver to do the major effect.

The liver is rapidly metabolizes it .Thus glucagon
has less effect on skeletal muscles and adipose
tissues than on liver.

In the absence of insulin

- ↓ Movement of G.&A.A Into the cells
- satiety center cannot detect G in ECF
- Eventhough the conc. of these molecules ↑
- Intense sensation of hunger (**polyphagia**)
- high blood glucose level
- urine volume (**polyuria**), increases conc.of G enter the kidney, water osmosis .
- Sensation of thirst (**polydipsia**).

Hormones of the pineal body

1-Melatonin decreases GnRH released from the hypothalamus and inhibits the reproductive functions

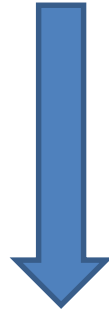
Regulates sleep- wake cycle

2-Arginin vasotocin

Work with the melatonin to regulate the reproductive functions

- Thymus located in the neck superior to the thorax .
- It secrets hormone thymocin which play important role in regulation of immune system development and maturation, with the thymus gland.

Hormones of the reproductive system



- Reproductive system