\rightarrow Endocrine functions (consists of islets of Langerhans – rich supply of blood. (α cells secrete glucagon and β cells secrete insulin)

Insulin

Made up of two polypeptide chains, it is released in response to a rise in blood glucose level. Its main effect is on the liver, muscle and fat cells.

- 1. An increase in the rate of conversion of glucose -> glycogen (glycogenesis) in liver and muscle
- 2. An increase in the uptake of glucose by cells (skeletal muscles)
- 3. An increase in the use of glucose
- 4. An increase in the conversion of glucose -> fatty acids, fats and fat deposition
- 5. A decrease in glucose production (gluconeogenesis)



Production of insulin is regulated by a negative feedback mechanism.

Glucagon

It is a single polypeptide chain; main target is the liver. It stimulates:

- 1. Breakdown of glycogen into glucose (glycogenolysis)
- 2. Breakdown of proteins into amino acids and fats into glycerol and fatty acids.

3. Conversion of amino acids, glycerol and lactic acid into glucose (gluconeogenesis)

Glucagon operates by a second messenger mechanism.

Receptors in the liver bind glucagon which activates adenylyl cyclase to form cAMP, which activates phosphorylase enzymes which stimulate the breakdown of glycogen into glucose.

- Adrenaline released from the adrenal medulla of the adrenal glands stimulate the conversion of glycogen into glucose (fight or flight situations)
- Cortisol secreted from the adrenal cortex of the adrenal glands stimulates the release of amino acids, glycerol and fatty acids and increase the rate of synthesis or enzymes in the liver that convert amino acids and glycerol into glucose.

Defects in the insulin production, release or reception by target cells result in diabeletes mellitus. as blond curves Diagnosis: excretion of suc concentration becomes too high. Also. Streine tiredness.

TYPE I: (juvenile/insulin –dependent) around 40 years old

Pancreas does not produce insulin due to an autoimmune disorder that destroys islets of Langerhans. If not treated it results to lethal diabetic coma. One must follow a planned diet, exercise, and glucose monitoring and insulin injections – daily. Insulin is produced synthetically.

TYPE II: (maturity onset/insulin – independent) 40 years

- The pancreas produces a low amount of insulin
- Body cells do not respond to insulin