

Hormones

Hormones

chemical signals produced by endocrine glands and released into blood

Functions

maintain homeostasis, and regulate energy use, metabolism, and growth

Protein Hormones

short peptide sequences. water soluble, can't pass through cell membrane. Bonds to receptor on surface of target cell. Triggers signal transduction pathway.

Protein Hormone Mechanism

signal from hormone amplified and sent through cell.

Steroid Hormones

made from cholesterol. Insoluble in water. Targets cell by diffusion through cell membrane, binds to receptor in cytoplasm or nucleus. Turns genes on or off

Feedback Mechanism

Hypothalamus releases hormone that acts on pituitary gland, which releases 2nd hormone that stimulates other endocrine glands to release hormones. Final hormone targets certain tissues and inhibits pituitary from releasing more.

Pituitary Gland

Pituitary Gland (cont)

Growth Hormone Cont.

secreted in bursts during sleep. Production declines with age.

Growth Hormone Disorders

Dwarfism

deficiency in child's GH secretion during development

Gigantism

overproduction of GH during development. Poor blood flow. Tumor formed by pituitary.

Acromegaly

increased GH as an adult. Bone thickens.

Thyroid Gland

Location

Base of neck

Main Hormone

Thyroxine (T4) ..looses iodine atom- T3

Functions

increases protein synthesis, glucose metabolism, and oxygen consumption. Regulates growth and tissue differentiation.

Thyroid Regulation

Stimulus

Decrease in metabolic rate detected by hypothalamus

Effect

Hypothalamus releases *thyroid releasing hormone....* Anterior Pituitary Gland releases *thyroid stimulating hormone....* Thyroid releases T4, which acts on body cells

Result

increase in metabolic rate

Thyroid Disorders

Neurohormone Pathway

stimulus signals hypothalamus

hypothalamus produces hormones that act directly on target cells w/o stimulating endocrine glands

hormones released by hypothalamus are neurohormones

they travel along nerve cells and through blood stream until they reach the pituitary gland

Blood Glucose Regulation

Pancreas

secretes antagonistic hormones insulin and glucagon to main glucose levels

Islet of Langerhans - (Alpha Cells - Glucagon) (Beta Cells - Insulin)

Insulin

stimulated by high blood glucose levels. Insulin released and taken by glucose in blood. Liver converts glucose to glycogen for storage

Glucagon

stimulated by low blood glucose levels. Glucagon released by pancreas to breakdown glycogen.

Blood Glucose Regulation Diseases

Diabetes Mellitus

type 1 and type 2. Frequent urination

hyperglycaemia, excessive hunger, kidneys excrete glucose - sweet urine, persistent thirst

Type I

Insulin Deficiency. Born With. Immune system attacks insulin producing cells

*Type II

Insulin Resistance. Based on life style.

Blood Glucose Regulation Diseases

Pituitary Gland

base of hypothalamus. 2 parts.

Posterior Pituitary Gland

extension of hypothalamus. Same hormones as hypothalamus (*ADH and Oxytocin*)

Anterior Pituitary Gland

separate from hypothalamus. makes its own set of hormones that the hypothalamus can stimulate or inhibit

Growth Hormone

Stimulates Growth (hypertrophy, increases cells size and volume). **Stimulates Cell Reproduction** (increased mitosis).. **Stimulates Cell Metabolism** (increase protein synthesis and glycogen and fat breakdown)

Hyperthyroidism

overactive thyroid, doesn't always mean extra T4.

Weight loss, increased heat release, swollen neck

Grave's Disease - antibody targets TSH receptors stimulates TSH secretion. Bugged eyes.

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