Hormones

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What are Hormones?

A hormone is a class of signaling molecules produced by glands in multicellular organisms that are transported by the circulatory system to target distant organs to regulate physiology and behavior.

or

Or Hormones are substances produced by highly specialized tissues called the "Endocrine" or "ductless glands", carried by blood stream to a remote tissue or viscera called the "Target organ" on which they exert characteristic physiological effects.

Classification of Hormones

On the bases of proteinaceous nature Hormones are classified into two groups:

I. Proteinaceous Hormones (Peptide Hormones)

II. Non proteinacous Hormones (Steroid Hormones)

Proteinaceous Hormones (Peptide Hormones)

i. Peptide hormones are proteins that have an effect on the endocrine system of animals.

ii. Like other proteins, peptide hormones are synthesized in cells from amino acids according to mRNA transcripts.

iii. Several important peptide hormones are secreted from the pituitary gland. The anterior pituitary secretes three: prolactin, which acts on the mammary gland; adrenocorticotropic hormone (ACTH), which acts on the adrenal cortex to regulate the secretion of glucocorticoids and growth hormone, which acts on bone, muscle, and the liver.

iv. The posterior pituitary gland secretes antidiuretic hormone, also called vasopressin, and oxytocin.

v. Peptide hormones are produced by many different organs and tissues like pancreas (glucagon, insulin and somatostatin), the gastrointestinal tract (cholecystokinin, gastrin).

Main Peptide Hormones

I. Insulin
II. Glucagon
III. Adrenocorticotropic hormone (ACTH)
IV. Antidiuretic hormone (ADH)
V. Oxytocin
VI. Prolactin

Insulin

Function:

It regulates the metabolism of carbohydrates and fats by promoting the absorption of glucose from the blood to skeletal muscles and fat tissue and by causing fat to be stored rather than used for energy.

Deficiency:

Deficiency of Insulin causes diabetes mellitus in which Blood Suger level rises.

Excess :

Excess of insulin causes Hyperinsulinemia which may lead to hypoglycemia (low suger level)

Treatment:

Treatment for type 1 diabetes involves taking insulin. Hyperinsulinemia can be treated through diet.

Glucagon

Function:

Glucagon raises the concentration of glucose in the bloodstream. It causes the liver to convert stored glycogen into glucose, which is released into the bloodstream.

Deficiency:

Deficiency of Glucagon causes hypoglycemia (low suger level).

Excess :

Excess of Glucagon causes diabetes mellitus (high suger level)

Treatment:

Treatment for type 1 diabetes involves taking insulin. hypoglycemia can be treated through diet.

Adrenocorticotropic hormone (ACTH)

Function:

It acts on the adrenal cortex of kidney to regulate the secretion of glucocorticoids.

Deficiency:

Deficiency of ACTH cause **ACTH Deficiency**.

Excess :

Excess of ACTH cause Cushing's syndrome.

Treatment:

Cushing syndrome's treatment depends on the specific reason for cortisol excess and may include surgery, radiation, chemotherapy or the use of cortisol-inhibiting drugs.

While **ACTH Deficiency** is treated with **hydrocortisone supplementation.**

Antidiuretic hormone (ADH)

Function:

Its two primary functions are to retain water in the body and to constrict blood vessels. ADH regulates the body's retention of water by acting to increase water reabsorption in the collecting ducts of the kidney nephron

Deficiency:

(ADH) deficiency leads to the syndrome of diabetes insipidus.

Excess :

High levels of anti-diuretic hormone cause the kidneys to retain water in the body. This condition is called Syndrome of Inappropriate Anti-Diuretic Hormone secretion (SIADH)

Treatment:

SIADH is treated with drugs while diabetes insipidus is treated with Fluid replacement and drugs.

Oxytocin

Function:

The two main actions of oxytocin in the body are contraction of the womb (uterus) during childbirth and lactation.

Deficiency:

A lack of oxytocin in a nursing mother would prevent the milk-ejection reflex and prevent breastfeeding.

Excess :

High levels have been linked to benign prostatic hyperplasia, a condition which affects the prostate in more than half of men over the age of 50. This may cause difficulty in passing urine.

Treatment:

These diseases are treated by manipulating oxytocin levels.However more research is needed before any possible treatments are available.

Prolactin

Function:

Its function is to promote milk production (lactation) in mammals in response to the suckling of young after birth.

Deficiency:

The condition of having too little prolactin circulating in the blood is called hypoprolactinaemia. This condition is very rare and may occur in people with pituitary underactivity.

Excess :

The condition of having too much prolactin circulating in the blood is called hyperprolactinaemia

Treatment:

Both diseases are treated with proper medication.

Any Question??

Thank You All!!