

PEPTIDE HORMONES

Peptide hormones are polymers of small numbers of amino acids (from fewer than ten to a few hundred); in other words, they are small proteins.

Peptide hormones released from the anterior pituitary bind to specific receptors on a limited number of cell types (steroidogenic cells). Signals resulting from this binding are amplified through the production of steroid hormones, leading to the regulation of transcription of genes in all cells.

Peptides hormones are proteins that effect endocrine system

Like other proteins peptide hormones are synthesized in cells from amino acids to mRNA transcript.

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

The posterior pituitary gland secrets anti diuretic hormone also called vasopressin and oxytocin. Peptide hormones are produced by many different organs And tissues like pancreas (Glucagon and insulin , somatostatin) the gastrointestinal tract(cholecystokinin, gastrin).

Main peptide hormones

1. Glucagon
2. Insulin
3. adrenocorticotrophic hormone
4. Antidiuretic hormone
5. Oxytocin
6. Prolactin

INSULIN

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

Deficiency of insulin causes diabetes mellitus in which blood sugar level rises.

Excess of insulin causes hyperinsulinemia which may lead low blood sugar level(hypoglycaemia).

Treatment of type one diabetes involves taking insulin. Hyperinsulinemia can be treated to 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 blood stream.

Deficiency of Glucagon causes hypoglycaemia (low blood sugar level)

Excess of Glucagon causes diabetes mellitus (high sugar level)

Treatment of type one diabetes involves taking insulin. Hypoglycemia can be treated with diet.

ADRENOCORTICOTROPIC HORMONE (ACTH)

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

ACTH deficiency arises as a result of decreased or absent production of adrenocorticotrophic hormone (ACTH) by the pituitary gland. A decline in the concentration of ACTH in the blood leads to a reduction in the secretion of adrenal hormones, resulting in adrenal insufficiency (hypoadrenalism).

Excess of ACTH causes Cushing's syndrome.

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

While ACTH deficiency is treated with hydrocortisone supplementation.

ANTIDIURETIC HORMONE (ADH)

Function: It has two primary functions: to retain water in the body and constrict blood vessels. ADH regulates body retention of water by acting to increase water reabsorption in the collecting ducts of kidney nephrons.

Deficiency of ADH leads to the syndrome of diabetes insipidus.

High levels of anti-diuretic hormone cause kidneys to retain water in the body. This condition is called the syndrome of inappropriate antidiuretic hormone secretion (SIADH).

SIADH is treated with the 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 child birth and lactation.

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

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

These diseases are treated by manipulating oxytocin levels.

PROLACTIN

Function:Its function is to promote milk production in mammals In response to suckling of the young afterbirth.

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

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

Both diseases are treated with proper medication.

How does the synthesis of steroids differ from that of peptide hormones?

- While peptide hormones are encoded by specific genes, steroid hormones are synthesized from the enzymatic modification of cholesterol.
- Thus, there is no gene which encodes aldosterone, for example.
- **As a result:**
 - There are far fewer different types of steroid hormones than peptide hormones.
 - Steroid structures are the same from species to species
 - The regulation of steroidogenesis involves control of the enzymes which modify cholesterol into the steroid hormone of interest.