



General Biology(Zoology)
First Stage – Biology Depart
Lecture: 6 – Animal Hormone

Hormones in Animals

Hormones are chemicals secreted by various endocrine glands directly into the blood and transported to the respective organs, where they act by regulating various metabolic processes. The organ affected by the hormone is called the target organ. The target cells have specific receptors to recognize the respective hormones.

There are two types of glands present in our body.

- **Endocrine Glands**– These glands that do not have ducts and transport their secretions directly to the site of action through the blood, e.g. [adrenal glands](#), pituitary glands, etc.
- **Exocrine Glands**– These glands have ducts to pass their secretions, e.g., sweat, liver, etc.

Hormones are secreted by **endocrine glands**.

Hormone Functions – Various Hormones And Their Functions

Here is a list of different Hormones, along with their functions and their respective glands.

Hormones	Functions
Hypothalamus Gland	
Gonadotropin-releasing hormone (GnRH)	Stimulates Pituitary gland to release gonadotropins
Pituitary Gland	
Growth hormone	Regulates body growth
Thyroid Gland	
Thyroxine	Regulates body metabolism
Pancreas Gland	
Insulin and Glucagon	Regulates blood sugar level
Adrenal Gland	
Epinephrine	Regulates heart rate and blood pressure
Testes	
Testosterone	Development of sperms and male characteristics
Ovaries	
Estrogen and Progesterone	Development of eggs and female characteristics



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Hormones control the functions of all the organs. They affect the diverse processes of growth and development, reproduction and sexual characteristics. Very small amounts of hormones can induce very prominent responses in the body. Most of the hormones are proteins or steroids.

However, too much or too less of something is always dangerous. When a hormone produces too much or too little hormones, it results in hormonal imbalance.

Types of Hormonal Imbalances

1. **Adrenal Insufficiency**– Addison’s disease is caused as a result of insufficient adrenalin secretion. The symptoms like fatigue, dehydration and skin changes indicate Addison’s disease.
2. **Cushing’s Disease**– Hypersecretion of ACTH from pituitary gland may result in an overactive adrenal gland. This is a type of Cushing’s syndrome, which occurs in people with high corticosteroid levels.
3. **Acromegaly (Gigantism)**– The hypersecretion of growth hormone from the pituitary gland in kids results in the development of an abnormally large body.
4. **Hyperthyroidism**– When the thyroid gland produces more thyroxine hormone, it results in hyperthyroidism. The symptoms include fast heart rate, sweating, etc.
5. **Hypothyroidism**– When the thyroid gland produces less amount of thyroxine, it results in [hypothyroidism](#). The symptoms include goitre (thyroid gland enlargement), fatigue, constipation, dry skin, etc.

Classification Of Hormones in Animals

On the basis of chemical structure, hormones can be classified into the following:

Protein/Peptide Hormones

These hormones comprise polypeptide chains of linked amino acids. The peptide hormones are synthesized and stored in the secretory vesicles. They are found in the cell membrane and are released from the parent cell through exocytosis. Examples include oxytocin and vasopressin or ADH (antidiuretic hormone), which are synthesized in the brain and released into the bloodstream from the posterior pituitary gland.

This group also covers tiny proteins such as growth hormones that are synthesized by the pituitary and the large glycoproteins such as the FSH (follicle-stimulating hormone) which is also synthesized by the pituitary. After being stored in the vesicles, a stimulus triggers a response causing it to release, e.g. insulin is secreted due to high blood glucose levels. These hormones are insoluble in lipids and soluble in water. The receptors are found on the target’s cell surface as they cannot permeate through the plasma membrane of the cells.



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Steroid Hormones

These hormones are derived from cholesterol, lipid-derived hormones. They are produced from precursors on demand and are released from the parent cell through simple diffusion. These hormones bind themselves to the proteins while being carried in the blood and generally have the target response of causing induction of the new protein production.

These hormones are the primary group of lipids hormones. They are usually alcohols or ketones chemically. E.g. Estrogen and testosterone, which are secreted by the female and male reproductive system respectively. These hormones are water-insoluble. They stay for a longer period of time in comparison to the peptide hormones as they are carried by transport proteins in the blood. Example: The hormone Cortisol. It has a half-life ranging from 60-90minutes.

Amino-acid derived Hormones

They are comparatively smaller molecules that are derived from tryptophan and tyrosine amino acids. The norepinephrine and epinephrine are secreted by the adrenal gland, they are commonly known as catecholamines. Melatonin is secreted by the pineal gland situated in the brain, which is responsible for controlling the sleep-wake cycle.

Female Hormone List

Hormones, which are responsible for female secondary sexual characteristics are known as female hormones. some of them are also produced naturally in male but in very less amount and are not dominant. They play a role in the fertility of a woman since they are more dominant in a female's body. Listed below are female hormones:

- Progesterone – These hormones assist in pregnancy, prepare the uterus lining for the fertilized egg and bring down the synthesis of estrogen post the stage of ovulation
- Estrogen – It plays a major role in puberty, pregnancy, menstruation, menopause
- HCG(Human chorionic gonadotropin) – secreted by the placenta.
- Testosterone – Though it is considered to be a male hormone, it is similar to the amount of estrogen that is produced in men as a small amount of testosterone is also formed in women.