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 For my Steam project I decided to do something that I have least understanding in and I took objective – “categorize types of hormones”. This theme made me to get after research quickly and I realized how complex this part of human body is. “Hormones of the endocrine system are a vast topic with numerous hormones involved, affecting virtually every organ in the human body”.

 Hormones are biologically active substances of an organic nature that are produced in specialized cells of the endocrine glands. Hormones act in the blood, bind to target cell receptors, and have a regulatory effect on increased activity and function.

Hormones are chemically different. The duration of its biological action depends on the composition of the structural hormone, for example, from a fraction of a second for mediators and peptides to hours and days for steroid hormones and iodothyronines. Analysis of the chemical structures and physicochemical properties of hormones helps to understand the mechanisms of their action, methods for their determination in biological fluids and their synthesis.

 Hormones. Classification by chemical structure:

1. Derivatives of amino acids:
* tyrosine derivatives: thyroxine, triiodothyronine, dopamine, adrenaline, norepinephrine;
* tryptophan derivatives: melatonin, serotonin;
* histidine derivatives: histamine.
1. Protein-peptide hormones:
* polypeptides: glucagon, corticotropin, melanotropin, vazopressin, oxytocin, peptide hormones of the stomach and intestines;
* simple proteins (proteins): insulin, growth hormone, prolactin, parathyroid hormone, calcitonin;
* complex proteins (glycoproteins): thyrotropin, follitropin, lutropin.
1. Steroid hormones:
* corticosteroids (aldosterone, cortisol, corticosterone);
* sex hormones: androgens (testosterone), estrogens and progesterone.
1. Fatty acid derivatives - arachidonic acid and its derivatives: prostaglandin: prostacyclins, thromboxanes, leukotrienes.

 Hormones. Functional classification:

1. Effector hormones are hormones that act directly on the target organ.
2. Tropic hormones are hormones whose main function is to regulate the synthesis and release of effector hormones. Secreted by the adenohypophysis.
3. Releasing hormones are hormones that regulate the synthesis and secretion of adenohypophysis hormones, mainly tropic ones. They are secreted by the nerve cells of the hypothalamus.

 Even though hormones have different chemical structures, they share some common biological properties.

 Hormones. General properties:

1. Strict specificity of physiological action.
2. High biological activity: Hormones exert their physiological effects in extremely small doses.
3. Remote nature of action: target cells are usually located far from the site of hormone formation.
4. Many hormones (steroid and amino acid derivatives) are not species-specific.
5. generalized action.
6. Prolongation of action.

 A number of hereditary and acquired diseases are associated with a violation of hormonal metabolism, accompanied by serious problems in the development and functioning of the body (dwarfism and gigantism, diabetes and diabetes insipidus, myxedema, bronze disease, etc.).

 The anatomical classification of hormones (according to organ origin) turned out to be imperfect since some hormones are synthesized in several organs at once. For example, sex hormones are produced not only in the sex glands, but also in the adrenal cortex. Attempts to classify hormones according to their metabolic effects have also encountered some difficulties. For example, cortisol at physiological concentrations may have the same effect on salt metabolism as aldosterone.

Reference:

Campbell M, Jialal I. Physiology, Endocrine Hormones. Updated 2021 Oct 1. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2022 Jan.https://www.ncbi.nlm.nih.gov/books/NBK538498/

Wetsel WC, Valença MM, Merchenthaler I, Liposits Z, López FJ, Weiner RI, Mellon PL, Negro-Vilar A. Intrinsic pulsatile secretory activity of immortalized luteinizing hormone-releasing hormone-secreting neurons. Proc Natl Acad Sci U S A. 1992 May 01;89(9):4149-53.

https://opentextbc.ca/biology/chapter/18-1-types-of-hormones/