Biochemistry & Physiology: Open Access

ISSN: 2168-9652

Rogers, Biochem Physiol 2022, 11:1

Commentary Open Access

Biochemistry of Hormones: A brief discussion

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Introduction

The term hormone is derived from greek word ὁρμῶν, means setting in motion. It refers to the fact that a hormone excites or stimulates a targeted part which is known as the target gland. These chemicals are made in endocrine glands for example in ocaries, testes & thyroid glands. Mechanism of exocytosis is used to transport hormones from one place to another [1]. These are the chemicals which circulate directly in the blood stream & go throughout the body & carry messages or signals to different parts of the body (also known as a signalling molecule that acts at a quite far of place from the site of its production). Hormones play a very vital role in effective communication between different organs & tissues. In vertebrate class of species these tiny chemicals play multiple roles such as regulation of different physiological process & different behavioral activities such as sleep, sensory perception, respiration, growth & development, movement, reproduction. While on the other hand in the plant kingdom hormones modulate different aspects of development from germination to biological aging. In animal kingdom endocrine glands are specialized organs those secret hormones into the endocrine signaling system. Hormones are secreted in response to different biochemical signals received. Hormones play a very vital role in effective communication between different organs & tissues. In vertebrate class of species these tiny chemicals play multiple roles such as regulation of different physiological process & different behavioral activities such as sleep, sensory perception, respiration, growth & development, movement, reproduction [2]. While on the other hand in the plant kingdom hormones modulate different aspects of development from germination to biological aging. In animal kingdom endocrine glands are specialized organs those secret hormones into the endocrine signaling system. Hormones are secreted in response to different biochemical signals received. We can group hormones into four classes:

1. Peptides or Proteins
2. Steroids
3. Monoamines
4. Lipid based hormones

The major types of hormonal signalling are as follow:

1. Endocrine
2. Paracrine
3. Autocrine
4. Intracrine

Hormones effect on human body & its biochemistry

1. Mood Swings
2. Irregular Sleep patterns
3. Programmed Cell death
4. Metabolism
5. Cravings for food
6. Proper functioning of reproductive parts

Therapeutic use of hormones: Many hormones & their analogs are used as medication.

Hormones produced by the pituitary gland

Anterior pituitary

1. Adrenocorticotrophic hormone (ACTH)
2. Thyroid-stimulating hormone (TSH)
3. Luteinising hormone (LH)
4. Follicle-stimulating hormone (FSH)
5. Prolactin (PRL)
6. Growth hormone (GH)
7. Melanocyte-stimulating hormone (MSH)

Hormones produced by different glands in the body

1. Cortisol
2. Oestrogen
3. Thyroxine
4. Testosterone
5. Progesterone

1. Peptide or Protein hormones: Protein hormones which have small amino acid chain are termed as peptide hormones while longers chains are termed as protein hormones. Thes both binds with plasma proteins. These hormones are removed or degraded from blood via the process of excretion.

2. Steroid hormones: These are the three six-carbon rings plus one conjugated five-carbon ring. These are fat soluble so they are never stored anywhere, they easily move from one location to different location via cell membranes.

3. Monoamines: It contains one amino group connected to an aromatic ring by a two-carbon chain (such as -CH2-CH2-) best example is serotonin.

4. Lipid based hormones: Lipid hormones are derived from

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Received: 25-Jan-2022, Manuscript No. bcp-22-52462; **Editor assigned:** 27-Jan-2022, PreQC No. bcp-22-52462 (PQ); **Reviewed:** 01-Feb-2022, QC No. bcp-22-52462; **Revised:** 04-Feb-2022, Manuscript No. bcp-22-52462 (R); **Published:** 11-Feb-2022, DOI: 10.4172/2168-9652.1000356

Citation: Rogers A (2022) Biochemistry of Hormones: A brief discussion. Biochem Physiol 11: 356.

cholesterol and thus are structurally similar to it. Chemically talking these structures are usually ketones or alcohols.

Sex hormones, also known as sex steroids, gonadocorticoids and gonadal steroids, are different sort of steroid hormones that interacts with vertebrate steroid hormone receptors. These hormones include androgens, estrogens, and progestogens. Naturally sex hormones are made by the gonads (ovaries in female & testes in male) by the adrenal glands or by simply conversion from other sex steroids in other tissues such as that of liver or fat [3].

Classification

The two main classes of sex hormones are androgens and estrogens, of which the most crucial human derivatives are testosterone and estradiol, respectively. Progestogen are termed as a third class of sex steroids. Progesterone is the most vital & is only naturally occurring human progesterone. Androgens are said to be male sex hormones as it has masculinizing effects, on the other hand estrogens & progestogen are termed as female sex hormones. Note although all types of hormones are present in each sex but at very different levels for example, in males estrogens & progestogen are found in very small quantities similarly in females androgens are found in very small quantity. Synthetic sex hormones: With the advancement of science & technology many different synthetic sex steroids have been developed. Synthetic sex hormones are usually used for contraception [4,5].

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