Steroid Hormones

Steroid hormones are cholesterol-derived hormones that can travel through the cell membrane because they are lipid soluble. They bind to the nuclear membrane and release intracellular receptors that affect DNA transcription and influence protein products. Because they affect transcription, their effects can be long-lasting, as those increased protein products are often circulated for a larger period of time. However, they are also slow-acting because of the time it takes to alter DNA transcription. There are certain triggers that result in hormone release, varying with each steroid hormone. Some examples of steroid hormone function are controlling metabolism, immune functions, sexual characteristic development, inflammation and homeostasis. Notable steroid hormones include testosterone, aldosterone, estrogen and cortisol.

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Characteristics

Nuclear Membrane
Nuclear-symbol membrane
Steroid hormones travel through the cell membrane and bind to receptors either in the cytosol or on the nuclear membrane to influence genomic processes.

Long-Lived and Slow-Acting
Old and Slow Tortoise
Because steroid hormones affect DNA transcription, their effects are generally much longer lived (until the gene is turned off and all of the gene products are gone). Penetrating the cell membrane and affecting transcription (and translation) is a longer process. Thus, steroid hormones are slow acting and do not produce immediate responses.

Cholesterol-Derived
Cholesterol-burger Driver
Natural steroid hormones are derived from cholesterol and synthesized in the gonads and adrenal glands. Thus, the hormones are specialized forms of lipids and pass through the cell membrane, unlike peptide hormones.

Intracellular Receptors
Receptors Inside-cell
Because steroid hormones are lipids and can pass through the cell membrane, they bind to intracellular and intranuclear receptors.

DNA Transcription
DNA Train-scribe
Steroid hormones can bind to intranuclear receptors and affect DNA transcription by turning certain genes on or off as a response mechanism.

Examples

Testosterone
Testes-stereo
Testosterone is the primary male sex hormone, and this steroid hormone has numerous effects on the body. It plays a role in genital differentiation, puberty, hair patterns, as well as muscle growth.

Aldosterone
Aldo-sterero
Alsosterone is a mineralocorticoid steroid hormone. Aldosterone controls plasma sodium, and as a byproduct of sodium's activity on homeostasis, this hormone has a large effect on arterial blood pressure.

Estrogen

Easter-egg

Estrogen is a steroid hormone that serves as the primary female sex hormone. It has a myriad of functions, playing a role in ovulation, sexual libido, bone formation, coagulation, lipid metabolism and uterine structure.

Cortisol

Court-of-Sol

Cortisol is a type of steroid hormone referred to as a glucocorticoid. In response to stress and low blood sugars, it is released, working to increase blood sugar. This hormone also decreases bone formation and suppresses the immune system.