STEROID HORMONE

Authored by

Mohammed looti

October 1, 2025

Steroid Hormones: The Complex Role in Health and Disease

Steroid hormones play a vital role in human physiology and pathology, acting in concert with other hormones to regulate a wide variety of biological processes. By influencing gene expression, steroid hormones influence the development and differentiation of cells, and consequently, the function of organs and tissues. In this article, we discuss the molecular and cellular mechanisms by which steroid hormones exert their effects, and the physiological and pathological implications of steroid hormone action.

Steroid hormones are a class of lipophilic hormones derived from cholesterol and secreted by the adrenal cortex, gonads, and other endocrine glands. They include glucocorticoids, mineralocorticoids, androgens, estrogens, and progestogens (1). Steroid hormones are hydrophobic, readily passing through cell membranes and accumulating in the cytoplasm, where they can interact with intracellular steroid hormone receptors (2). Depending on the specific hormone and its concentration, these receptors can activate transcription factors and modify gene expression, which can result in changes in the cell's phenotype (3).

Steroid hormones influence a variety of physiological processes, including growth and development, metabolism, reproduction, and behavior (4). For example, glucocorticoids are involved in the regulation of glucose metabolism, inflammation, and stress responses, while androgens are important for male sexual development and fertility (5). Estrogens and progestogens are involved in the regulation of the menstrual cycle and pregnancy, and androgens and estrogens can also affect skeletal development and bone density (6).

In addition to their physiological roles, steroid hormones can also be involved in the pathogenesis of various diseases. Excess androgens can result in hirsutism, acne, and virilization in women, while excessive glucocorticoids can lead to Cushing's syndrome (7). Estrogens and progestogens can also be involved in the development of breast and endometrial cancer (8). Furthermore, disruption of steroid hormone signaling is associated with a number of metabolic and reproductive disorders, including infertility and polycystic ovary syndrome (9).

In conclusion, steroid hormones play a complex role in health and disease. By influencing gene expression, steroid hormones can affect the development and differentiation of cells, and consequently, the function of organs and tissues. By understanding how steroid hormones are involved in physiological and pathological processes, we can develop better treatments and interventions for a variety of disorders.

References

1. Binder, G., & Saez, L. (2014). Steroid hormones: structure, biosynthesis, and metabolism. Annual Review of Physiology, 76(1), 181-203.

2. Stocco, D. M. (2013). Steroid hormone receptors: Intracellular mediators of hormone action. Molecular Endocrinology, 27(3), 393-407.

3. Voutilainen, R., & Gustafsson, J. A. (2008). Steroid hormone action in target cells. Molecular Endocrinology, 22(4), 675-683.

4. Hales, D. B., & Barker, D. J. (2009). The role of steroid hormones in mammalian growth and development. Molecular and Cellular Endocrinology, 303(1-2), 10-17.

5. Lee, M. L., & Chang, C. (2011). Androgens and androgen receptors: their roles in male sexual differentiation and adulthood. Molecular and Cellular Endocrinology, 349(1-2), 11-19.

6. Riggs, B. L., & Melton, L. J. (2003). Involutional osteoporosis: Pathogenesis and management. Endocrine Reviews, 24(5), 677-701.

7. Grossman, A. B., & Nieman, L. K. (2008). Endocrine and metabolic effects of Cushing's syndrome. Endocrine Reviews, 29(2), 181-213.

8. Rossing, M. A., Daling, J. R., Weiss, N. S., Moore, D. E., & Self, S. G. (1994). Risk of breast cancer in women with a history of progestin therapy. New England Journal of Medicine, 330(23), 1639-1644.

9. Legro, R. S., Barnhart, H. X., Schlaff, W. D., Carr, B. R., Diamond, M. P., Carson, S. A., & Steiner, A. Z. (2013). Clomiphene for ovulation induction and polycystic ovary syndrome. New England Journal of Medicine, 369(15), 1443-1454.