PHARM.D • YEAR 3

Medicinal Chemistry

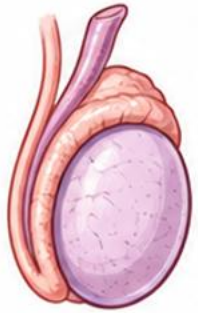
CHAPTER 12

Steroidal Hormones and Adrenocorticoids

PPT CHAPTER COVER



STEROID HORMONE FAMILIES



Testis
(male gonad)



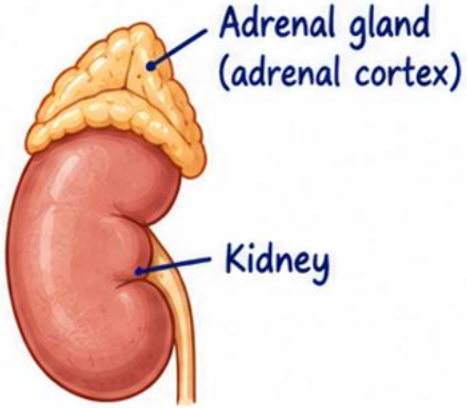
Ovary
(female gonad)

SHARED ORIGIN



Steroid hormones arise from cholesterol and commonly contain a fused four-ring nucleus.

Substituents and stereochemistry determine receptor activity.

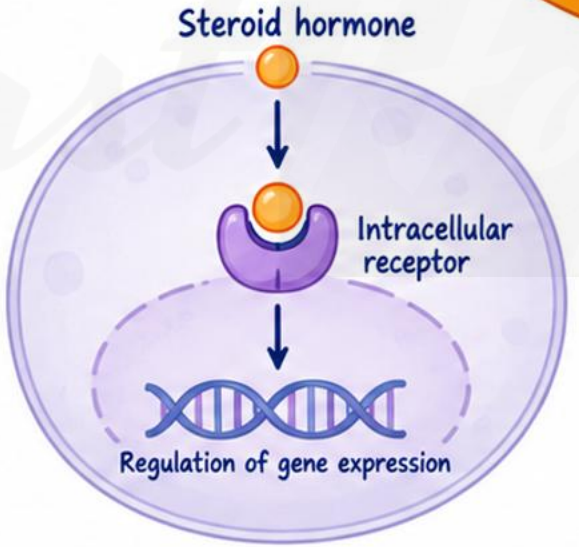


SEX HORMONES

Androgens: testosterone, supporting reproductive development and anabolic functions.

Estrogens: estradiol, estrone and estriol, regulating reproductive tissues and bone physiology.

Progesterone supports secretory endometrium and pregnancy.



ADRENOCORTICOIDS

Glucocorticoids regulate metabolism and inflammation.

Mineralocorticoids regulate sodium and potassium balance.

CARBON-SKELETON CHECK

Natural estrogens are commonly C_{18}; testosterone is C_{19}; progesterone and cortisol are C_{21}. Synthetic analogues may differ.

THE HYPOTHALAMIC-PITUITARY-GONADAL AXIS

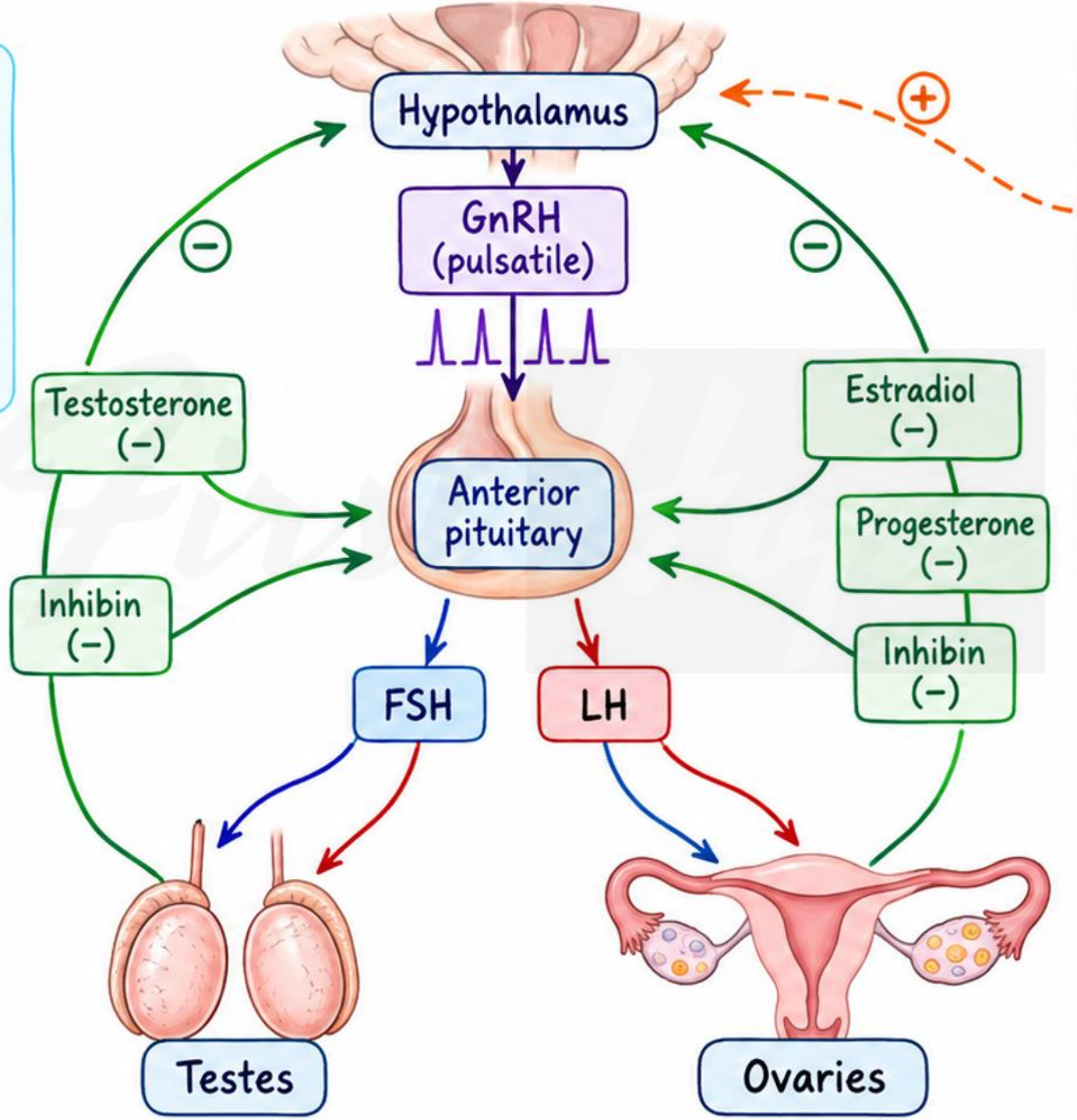
PULSATILE CONTROL

Hypothalamic GnRH pulses stimulate anterior-pituitary LH and FSH. Continuous stimulation can downregulate the response.

TESTES

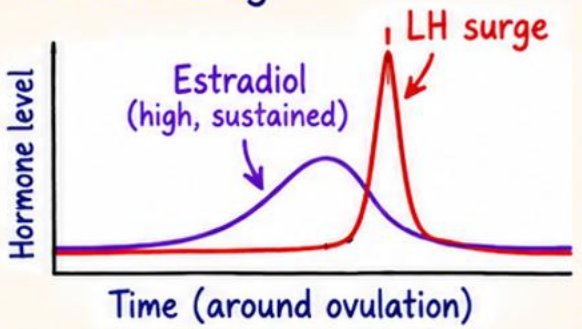
LH acts on Leydig cells to support testosterone production.

FSH acts on Sertoli cells and supports spermatogenesis.



IMPORTANT EXCEPTION

Sustained high estradiol before ovulation produces positive feedback and the LH surge.



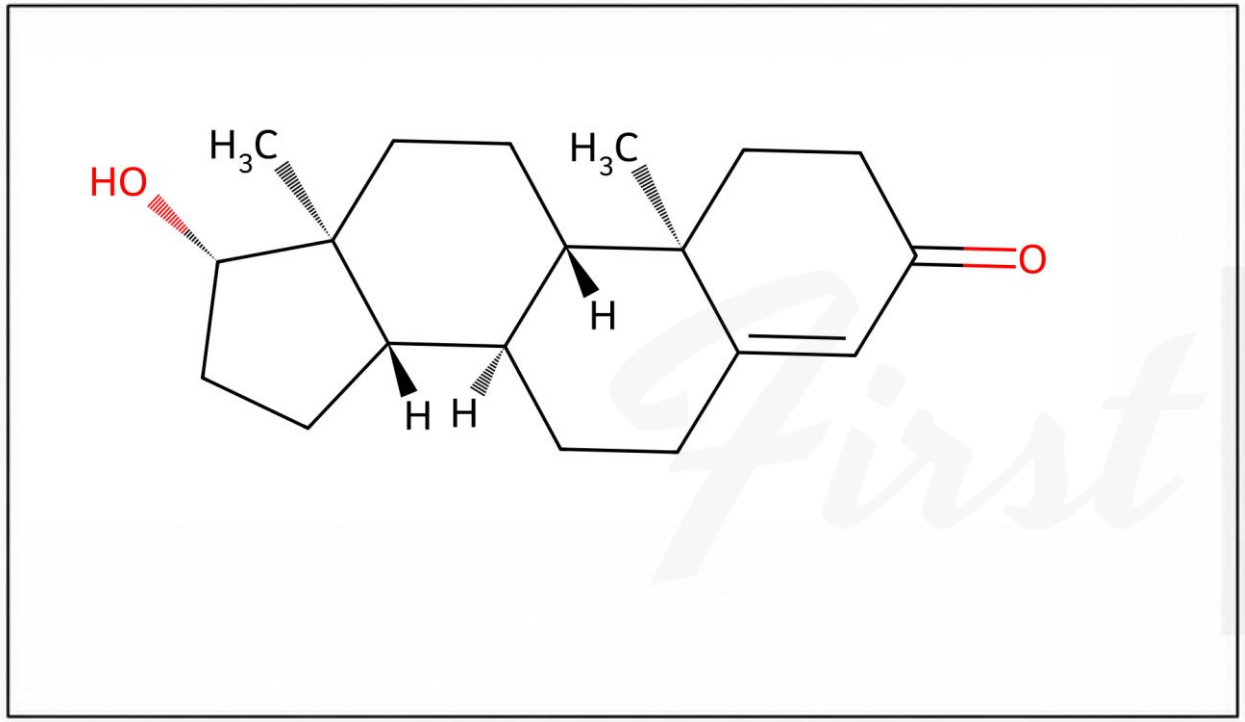
FEEDBACK

Sex steroids usually exert negative feedback. Inhibin selectively reduces FSH.

REMEMBER

Feedback depends on hormone, timing and physiological context.

TESTOSTERONE



CHEMISTRY

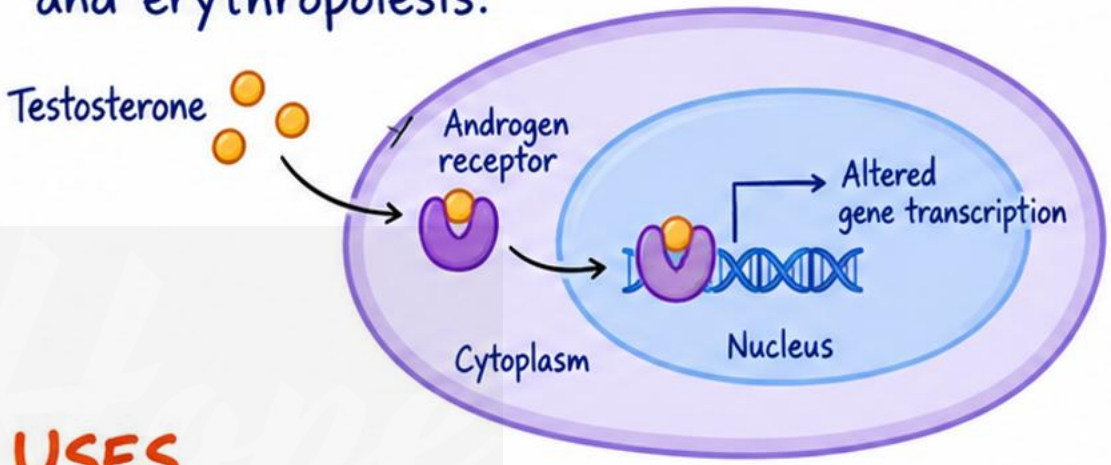
Formula: $C_{19}H_{28}O_2$

IDENTIFY

A C_{19} androgen with a 3-ketone, 4-5 double bond and 17-beta hydroxyl group.

ACTION

Androgen-receptor activation alters gene transcription, supporting sexual development, muscle and bone functions and erythropoiesis.



USES

Replacement in confirmed androgen deficiency and selected supervised hormonal therapies.

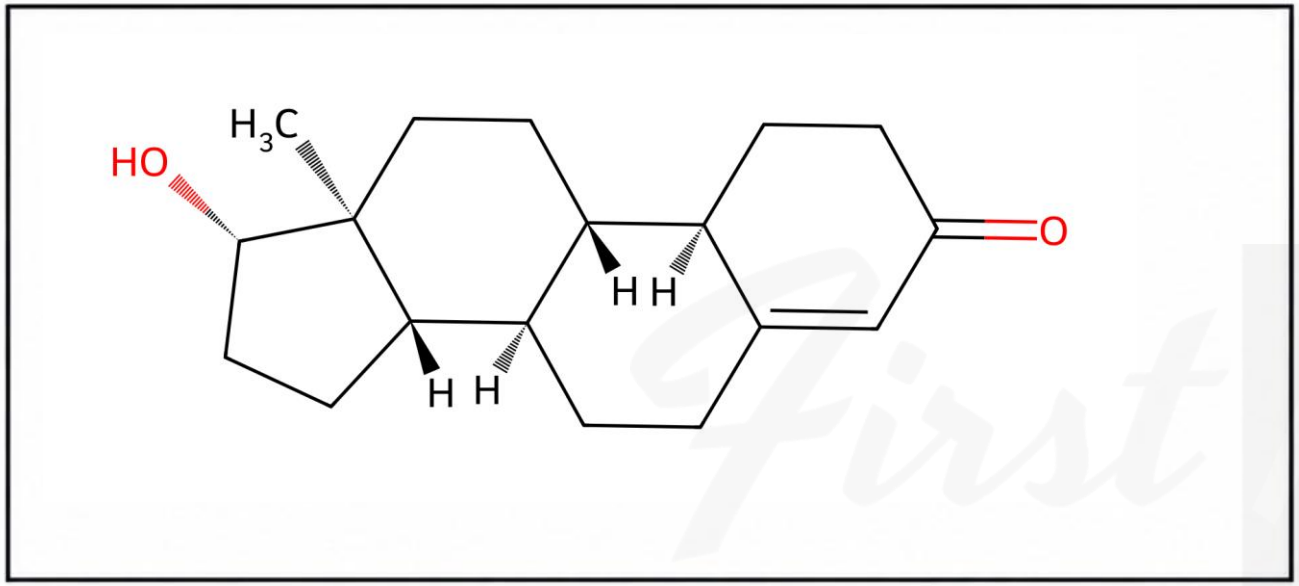
CHEMISTRY LINK

17-position esterification modifies delivery and duration; an ester product is not the same formula as free testosterone.

CAUTIONS

Erythrocytosis, acne and suppression of sperm production. Performance-enhancing misuse is not a legitimate therapeutic indication.

NANDROLONE



CHEMISTRY

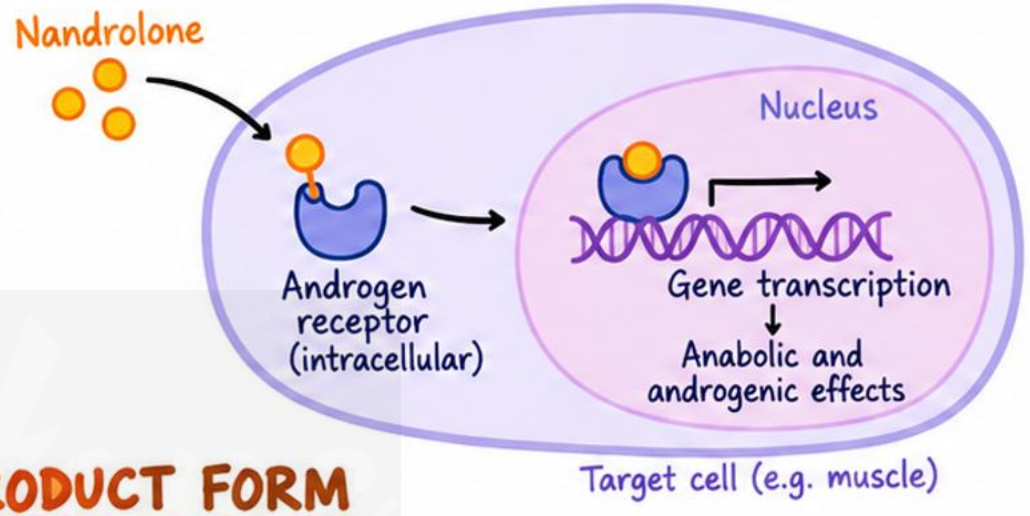
Formula: $C_{18}H_{26}O_2$

IDENTIFY

19-Nortestosterone: a C_{18} androgen lacking testosterone's C_{19} angular methyl group. Correct name: nandrolone, not "Andralone".

ACTION

Androgen-receptor agonism produces anabolic and androgenic effects.



PRODUCT FORM

Nandrolone decanoate is a long-acting ester; its formula differs from the free parent shown.

USES

Selected historical or locally authorised anabolic indications. Use and availability are tightly regulated.

CAUTIONS

Virilisation, reproductive-axis suppression and other systemic harms. Bodybuilding misuse is not a clinical indication.

EXAM CHECK

Compare the C_{19} methyl difference with testosterone.

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