

HCG

Human Chorionic Gonadotropin · Investigational Research Compound ·
Glycoprotein Hormone



A plain-language guide to what HCG is, how its gonadotropin signaling is designed to work, and what published research has found so far — written for newcomers to peptide science, not just specialists.

COMPOSITION

HCG
5,000iu

STRUCTURE

Glycoprotein hormone,
alpha/beta subunit heterodimer

STUDIED HALF-LIFE

~24–36 hours (plasma), among
the longest of gonadotropin
hormones

1 What Is HCG?

Human Chorionic Gonadotropin (HCG) is a naturally occurring glycoprotein hormone composed of an alpha subunit shared with LH, FSH, and TSH, and a distinct beta subunit that gives it its unique biological activity. It is normally produced by the placenta during pregnancy, but its structural similarity to Luteinizing Hormone (LH) is what makes it a research tool in reproductive and endocrine science.

Because HCG binds the same LH/hCG receptor as endogenous LH, most research interest centers on its use as an LH mimetic — a way to study and stimulate gonadal signaling pathways (testicular Leydig cell function in males, ovarian follicular signaling in females) independent of upstream pituitary regulation.

NEW TO THIS? KEY TERMS

Glycoprotein hormone — a hormone family (HCG, LH, FSH, TSH) built from a shared alpha subunit and a hormone-specific beta subunit.

LH/hCG receptor — the shared receptor on gonadal cells that both LH and HCG activate.

Leydig cells — testicular cells that produce testosterone in response to LH/HCG receptor activation.

HPG axis — the hypothalamic-pituitary-gonadal axis, the signaling loop HCG is studied for interacting with directly at the gonadal level.

2 How It's Designed to Work

HCG's research profile rests on three linked steps — direct receptor activation that bypasses the pituitary, a steroidogenic signal in gonadal tissue, and a downstream cascade of reproductive-hormone effects:

RECEPTOR ACTIVATION LH/hCG RECEPTOR BINDING Studied as binding the LH/hCG receptor on gonadal cells with high affinity and a longer duration of action than endogenous LH, directly activating the same pathway without requiring pituitary signaling.	STEROIDOGENIC SIGNAL cAMP / TESTOSTERONE SYNTHESIS Receptor binding activates the cAMP-PKA pathway in Leydig and theca cells, studied as driving cholesterol conversion into testosterone and other steroid hormones.	DOWNSTREAM CASCADE GONADAL FUNCTION EFFECTS Downstream effects studied include maintained testicular size and endogenous testosterone production, and — in female reproductive research — induced ovulation.
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The receptor binding, steroidogenic signaling, and downstream cascade are studied together as one mechanism — a placental hormone repurposed in research as a direct, pituitary-independent gonadal signal.

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3 What the Research Shows

HCG has one of the longest clinical research histories of any hormone in this class, spanning decades of use in reproductive endocrinology. Below is a plain-language summary of frequently cited findings relevant to current research applications.

Testicular Function Preservation Coviello et al., *Journal of Clinical Endocrinology & Metabolism*, 2005
Studies of men on testosterone-suppressing regimens reported that low-dose HCG co-administration maintained intratesticular testosterone concentrations and preserved spermatogenesis compared to suppression alone.

Ovulation Induction Research Practice Committee of the American Society for Reproductive Medicine, *Fertility & Sterility*, 2008 (review)
Reviews of assisted-reproduction protocols reported HCG reliably triggers final oocyte maturation and ovulation when substituted for the natural LH surge, a role it has held in fertility research for decades.

Hypogonadotropic Hypogonadism Studies Liu & Handelsman, *Endocrine Reviews*, 2003 (review)
Reviews of HCG use in men with pituitary-driven low testosterone reported restored testicular steroidogenesis and, in many cases, restored fertility, distinguishing it from direct testosterone replacement.

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4 Effects Observed in Research

Across the studies above, three effects recur most often. These are findings from controlled research settings, not guarantees or claims about any individual outcome.

Testicular Size & Testosterone Maintenance

Preserved testicular volume and intratesticular testosterone production reported during studies of pituitary suppression.

Fertility & Spermatogenesis Support

Restored or maintained sperm production reported in men with hypogonadotropic hypogonadism and in fertility-preservation research.

Ovulation Induction

Reliable triggering of final oocyte maturation reported in assisted-reproduction research protocols.

5 Storage & Reconstitution Guide

HCG is supplied as a lyophilized (freeze-dried) powder that must be reconstituted before use in the lab. The steps below reflect standard handling practice — always defer to the certificate of analysis (COA) that ships with each vial.

BEFORE RECONSTITUTION

Keep the lyophilized vial refrigerated (2–8°C) for short-term storage, or frozen (–20°C) for longer-term storage, protected from light at all times. The unreconstituted powder is stable for the longest window — reconstitute only what will be used in the near term.

RECONSTITUTING WITH BACTERIOSTATIC WATER

Bring the vial to room temperature. Using a sterile syringe, draw bacteriostatic water and inject it slowly down the inside wall of the vial — not directly onto the powder — to avoid agitating and denaturing the hormone. Gently swirl to dissolve; never shake.

RESULTING CONCENTRATION FOR A 5,000IU VIAL

Bacteriostatic Water Added	Resulting Concentration
1 mL	5,000 iu/mL
2 mL	2,500 iu/mL
5 mL	1,000 iu/mL
10 mL	500 iu/mL

AFTER RECONSTITUTION

Store the reconstituted solution refrigerated at 2–8°C and protected from light. Reconstituted HCG solutions are generally most stable when used within a few weeks — check the COA for the exact window for each lot. Avoid repeated freeze–thaw cycles, label vials with the reconstitution date, and discard any solution that appears cloudy, discolored, or has been left at room temperature for an extended period.

SOURCES

Coviello, A.D. et al. Low-dose hCG maintains intratesticular testosterone in normal men with testosterone-induced gonadotropin suppression · *Journal of Clinical Endocrinology & Metabolism*, 2005 · Practice Committee of the American Society for Reproductive Medicine. Ovulation induction and controlled ovarian stimulation (review) · *Fertility & Sterility*, 2008 · Liu, P.Y. & Handelsman, D.J. The present and future state of hormonal treatment for male infertility · *Endocrine Reviews*, 2003.

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