

RESEARCH MONOGRAPH . COMPOUND PROFILE

Human Chorionic Gonadotropin (HCG)

Human chorionic gonadotropin; a placental glycoprotein hormone that activates the LH receptor; used in IVF, hypogonadism, and HPG axis recovery.

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COMPOUND CLASS	Glycoprotein hormone (LH analog; placental origin)

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ABSTRACT

Human chorionic gonadotropin (hCG; CAS 9002-61-3; alpha subunit and unique beta subunit; total molecular weight approximately 36800 Da) is a placental glycoprotein hormone composed of an alpha subunit (shared with LH, FSH, and TSH) and a unique beta subunit. The compound is the principal hormone of pregnancy, produced by syncytiotrophoblasts of the implanting embryo and detected as the basis for pregnancy tests. Pharmacologically, hCG acts as an LH receptor agonist with a substantially longer half-life than endogenous LH (approximately 36 hours versus 30 minutes), making it useful as a pharmacological tool to stimulate Leydig cell testosterone production in males or to trigger ovulation in IVF protocols. Approved indications: male hypogonadotropic hypogonadism (testosterone restoration with preservation of fertility), cryptorchidism, and as ovulation trigger in IVF (single 5000 to 10000 IU injection). Off-label use in TRT users to restore testicular function or as part of post-cycle therapy after AAS or SARM use. Plasma half-life of urinary-derived (Pregnyl, Novarel) versus recombinant (Ovidrel) forms are similar; both work clinically. Used as the canonical LH receptor agonist in HPG axis research.

1. Compound Identification

Human Chorionic Gonadotropin (HCG) is described as glycoprotein hormone (lh analog; placental origin). Human chorionic gonadotropin; a placental glycoprotein hormone that activates the LH receptor; used in IVF, hypogonadism, and HPG axis recovery.

1.1 Class summary

Glycoprotein hormone (LH analog; placental origin)

1.2 Subtitle

Human chorionic gonadotropin; a placental glycoprotein hormone that activates the LH receptor; used in IVF, hypogonadism, and HPG axis recovery.

2. Abstract

Human chorionic gonadotropin (hCG; CAS 9002-61-3; alpha subunit and unique beta subunit; total molecular weight approximately 36800 Da) is a placental glycoprotein hormone composed of an alpha subunit (shared with LH, FSH, and TSH) and a unique beta subunit. The compound is the principal hormone of pregnancy, produced by syncytiotrophoblasts of the implanting embryo and detected as the basis for pregnancy tests. Pharmacologically, hCG acts as an LH receptor agonist with a substantially longer half-life than endogenous LH (approximately 36 hours versus 30 minutes), making it useful as a pharmacological tool to stimulate Leydig cell testosterone production in males or to trigger ovulation in IVF protocols. Approved indications: male hypogonadotropic hypogonadism (testosterone restoration with preservation of fertility), cryptorchidism, and as ovulation trigger in IVF (single 5000 to 10000 IU injection). Off-label use in TRT users to restore testicular function or as part of post-cycle therapy after AAS or SARM use. Plasma half-life of urinary-derived (Pregnyl, Novarel) versus recombinant (Ovidrel) forms are similar; both work clinically. Used as the canonical LH receptor agonist in HPG axis research.

3. Mechanism of Action

Glycoprotein LH receptor agonist with substantially longer half-life than endogenous LH; stimulates Leydig cell testosterone production and triggers ovulation.

The mechanistic profile described above represents the consensus position from peer-reviewed literature where available; for compounds with sparse formal characterization, this section reflects vendor-grade reports and structurally-related class pharmacology and should be interpreted with appropriate caution.

4. Pharmacokinetics and Routes of Administration

Pharmacokinetic data are summarized within the abstract for compounds with formal Phase 1 records. Compounds without published human pharmacokinetic studies are noted as such; investigators should treat the absence of data as a research limitation.

5. Reported Research Dose Ranges

Clinical 500 to 4000 IU subcutaneous or intramuscular every 1 to 3 days for hypogonadism; 5000 to 10000 IU single dose for ovulation trigger; 250 to 500 IU twice weekly for fertility preservation during TRT.

Doses are scaled from clinical use where the compound is approved as a medicine, from Phase 2/3 trials where development advanced, or from rodent dose-response data scaled by allometric assumptions where the compound has no human clinical record. Investigators should treat dose ranges from research-chemical-grade vendors as starting points for their own pharmacokinetic and tolerability characterization rather than validated dosing recommendations.

6. Sourcing and Quality Verification

Investigators should obtain analytical confirmation of identity (mass spectrometry; for peptides, additionally amino acid analysis or N-terminal sequencing) and purity (HPLC area-percent, ideally greater than 95 percent) on every lot. Vendor certificates of analysis vary in quality; third-party analytical confirmation through independent laboratories (e.g., Janoshik Analytical, Anabolic Lab) is the gold standard for research-grade peptides and small molecules.

For compounds with established pharmaceutical-grade marketing in any jurisdiction, sourcing from the marketed product (where legal and accessible) provides the highest quality assurance.

7. Reconstitution and Handling

Peptides should be reconstituted in bacteriostatic water or sterile water for injection in the volume appropriate to the desired concentration; lyophilized peptides should be allowed to come to room temperature before reconstitution to minimize precipitation. Reconstituted peptides should be stored refrigerated and used within the timeframe specified by the manufacturer (typically 14 to 30 days for bacteriostatic water reconstitutions, shorter for sterile water).

Small molecules: storage conditions vary by compound; consult the certificate of analysis for the specific product. Most are stable at room temperature in dry, dark conditions; oxidation-sensitive compounds (e.g., catecholamine precursors) require cool storage and protection from light.

8. Stack Interaction Considerations

Investigators combining this compound with other research substances should consider receptor-level interactions (additive effects at shared targets), enzyme-level interactions (CYP-mediated drug-drug interactions where applicable), and pharmacodynamic interactions (additive sedation, additive serotonergic activity, additive hemodynamic effects).

The stack interaction section in published monographs of well-characterized compounds is necessarily incomplete for any specific combination; investigators should treat novel combinations with elevated caution and titrate gradually.

9. References

1. Cole LA. Biological functions of hCG and hCG-related molecules. Reprod Biol Endocrinol 2010.
2. Hsieh TC, et al. Concomitant intramuscular human chorionic gonadotropin preserves spermatogenesis in men undergoing testosterone replacement therapy. J Urol 2013.
3. Ramasamy R, et al. Testosterone supplementation versus clomiphene citrate for hypogonadism. J Urol 2014.

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