

RESEARCH MONOGRAPH . COMPOUND PROFILE

Gonadorelin (GnRH)

Synthetic gonadotropin-releasing hormone, used clinically for diagnostic GnRH stimulation testing and for stimulation of LH/FSH release.

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COMPOUND CLASS	Decapeptide GnRH agonist

RESEARCH USE ONLY

ABSTRACT

Gonadorelin (GnRH, LHRH; CAS 9034-40-6; molecular formula C₅₅H₇₅N₁₇O₁₃; molecular weight 1182.31) is the synthetic decapeptide form of gonadotropin-releasing hormone. The compound is FDA-approved (Factrel) for diagnostic GnRH stimulation testing of pituitary gonadotropin reserve. Pulsatile administration (every 90 minutes) produces physiological LH/FSH release; continuous administration produces receptor downregulation and gonadotropin suppression (the basis for the leuprolide/goserelin class of long-acting analogs used in prostate cancer and endometriosis). Pharmacokinetics: plasma half-life 2 to 4 minutes. Diagnostic dose is 100 micrograms IV. Research-grade applications use the compound for stimulation of endogenous gonadotropin release on testosterone restoration protocols.

1. Compound Identification

Gonadorelin (GnRH) is described as decapeptide gnrh agonist. Synthetic gonadotropin-releasing hormone, used clinically for diagnostic GnRH stimulation testing and for stimulation of LH/FSH release.

1.1 Class summary

Decapeptide GnRH agonist

1.2 Subtitle

Synthetic gonadotropin-releasing hormone, used clinically for diagnostic GnRH stimulation testing and for stimulation of LH/FSH release.

2. Abstract

Gonadorelin (GnRH, LHRH; CAS 9034-40-6; molecular formula C₅₅H₇₅N₁₇O₁₃; molecular weight 1182.31) is the synthetic decapeptide form of gonadotropin-releasing hormone. The compound is FDA-approved (Factrel) for diagnostic GnRH stimulation testing of pituitary gonadotropin reserve. Pulsatile administration (every 90 minutes) produces physiological LH/FSH release; continuous administration produces receptor downregulation and gonadotropin suppression (the basis for the leuprolide/goserelin class of long-acting analogs used in prostate cancer and endometriosis). Pharmacokinetics: plasma half-life 2 to 4 minutes. Diagnostic dose is 100 micrograms IV. Research-grade applications use the compound for stimulation of endogenous gonadotropin release on testosterone restoration protocols.

3. Mechanism of Action

GnRH receptor agonist; pulsatile administration stimulates LH/FSH release, continuous administration causes receptor downregulation.

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

100 mcg IV for diagnostic testing; pulsatile or continuous regimens for clinical applications.

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. Conn PM, Crowley WF Jr. Gonadotropin-releasing hormone and its analogues. N Engl J Med 1991.

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