

RESEARCH MONOGRAPH . COMPOUND PROFILE

Goserelin

A synthetic GnRH agonist provided as a subcutaneous depot implant; approved for prostate cancer, breast cancer, and endometriosis.

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COMPOUND CLASS	Synthetic GnRH agonist (decapeptide)

ABSTRACT

Goserelin (5-oxo-L-prolyl-L-histidyl-L-tryptophyl-L-seryl-L-tyrosyl-O-(1,1-dimethylethyl)-D-seryl-L-leucyl-L-arginyl-2-(carbamoylimino)hydrazinyl-L-prolinamide; CAS 65807-02-5; molecular formula C₅₉H₈₄N₁₈O₁₄; molecular weight 1269.41) is a synthetic GnRH agonist decapeptide developed at ICI (now AstraZeneca) and approved by the FDA in 1989 under the trade name Zoladex. Distinguished within the GnRH agonist class by formulation: subcutaneous biodegradable polymer implant rod releasing peptide over 28 days (3.6 mg) or 12 weeks (10.8 mg). Mechanism is identical to leuprolide and triptorelin. Approved for advanced prostate cancer, advanced breast cancer in pre- and perimenopausal women, endometriosis, and uterine leiomyomata. The implant delivery is preferred in some clinical settings for compliance and steady plasma profile. Used as a reference GnRH agonist with depot implant delivery.

1. Compound Identification

Goserelin is described as synthetic gnrh agonist (decapeptide). A synthetic GnRH agonist provided as a subcutaneous depot implant; approved for prostate cancer, breast cancer, and endometriosis.

1.1 Class summary

Synthetic GnRH agonist (decapeptide)

1.2 Subtitle

A synthetic GnRH agonist provided as a subcutaneous depot implant; approved for prostate cancer, breast cancer, and endometriosis.

2. Abstract

Goserelin (5-oxo-L-prolyl-L-histidyl-L-tryptophyl-L-seryl-L-tyrosyl-O-(1,1-dimethylethyl)-D-seryl-L-leucyl-L-arginyl-2-(carbamoylimino)hydrazinyl-L-prolinamide; CAS 65807-02-5; molecular formula C₅₉H₈₄N₁₈O₁₄; molecular weight 1269.41) is a synthetic GnRH agonist decapeptide developed at ICI (now AstraZeneca) and approved by the FDA in 1989 under the trade name Zoladex. Distinguished within the GnRH agonist class by formulation: subcutaneous biodegradable polymer implant rod releasing peptide over 28 days (3.6 mg) or 12 weeks (10.8 mg). Mechanism is identical to leuprolide and triptorelin. Approved for advanced prostate cancer, advanced breast cancer in pre- and perimenopausal women, endometriosis, and uterine leiomyomata. The implant delivery is preferred in some clinical settings for compliance and steady plasma profile. Used as a reference GnRH agonist with depot implant delivery.

3. Mechanism of Action

GnRH agonist decapeptide; identical pharmacology to leuprolide and triptorelin. Subcutaneous biodegradable implant for sustained release.

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 3.6 mg subcutaneous implant monthly or 10.8 mg every 12 weeks.

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. Furr BJA, Hutchinson FG. A biodegradable delivery system for peptides: pre-clinical experience with the gonadotropin-releasing hormone agonist Zoladex. J Control Release 1992.
2. Cockshott ID. Clinical pharmacokinetics of goserelin. Clin Pharmacokinet 2000.
3. Tunn UW. A 6-month depot formulation of leuprolide acetate is safe and effective in daily clinical practice. World J Urol 2007.

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