

RESEARCH MONOGRAPH . COMPOUND PROFILE

Ropinirole

A non-ergot indolone D2/D3 dopamine receptor agonist; alternative to pramipexole in Parkinson disease and restless legs syndrome.

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ABSTRACT

Ropinirole (4-[2-(dipropylamino)ethyl]-1,3-dihydro-2H-indol-2-one; CAS 91374-21-9; molecular formula C₁₆H₂₄N₂O; molecular weight 260.38) is a non-ergot indolone D₂/D₃ dopamine receptor agonist developed at SmithKline Beecham (now GSK) and approved by the FDA in 1997 under the trade name Requip. Affinity is approximately balanced at D₂ and D₃ (K_i approximately 24 and 30 nM respectively), distinguishing it from the more D₃-preferring pramipexole. Plasma half-life is approximately 6 hours; metabolism is via CYP1A2. Approved for Parkinson disease and restless legs syndrome. Comparable efficacy and tolerability to pramipexole in head-to-head studies, with similar impulse control disorder risk. Used as an alternative reference non-ergot dopamine agonist.

1. Compound Identification

Ropinirole is described as non-ergot d2/d3 dopamine agonist. A non-ergot indolone D2/D3 dopamine receptor agonist; alternative to pramipexole in Parkinson disease and restless legs syndrome.

1.1 Class summary

Non-ergot D2/D3 dopamine agonist

1.2 Subtitle

A non-ergot indolone D2/D3 dopamine receptor agonist; alternative to pramipexole in Parkinson disease and restless legs syndrome.

2. Abstract

Ropinirole (4-[2-(dipropylamino)ethyl]-1,3-dihydro-2H-indol-2-one; CAS 91374-21-9; molecular formula C₁₆H₂₄N₂O; molecular weight 260.38) is a non-ergot indolone D2/D3 dopamine receptor agonist developed at SmithKline Beecham (now GSK) and approved by the FDA in 1997 under the trade name Requip. Affinity is approximately balanced at D2 and D3 (K_i approximately 24 and 30 nM respectively), distinguishing it from the more D3-preferring pramipexole. Plasma half-life is approximately 6 hours; metabolism is via CYP1A2. Approved for Parkinson disease and restless legs syndrome. Comparable efficacy and tolerability to pramipexole in head-to-head studies, with similar impulse control disorder risk. Used as an alternative reference non-ergot dopamine agonist.

3. Mechanism of Action

Non-ergot D2/D3 dopamine receptor agonist (approximately balanced D2/D3 affinity). Mechanism comparable to pramipexole.

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 0.25 to 24 mg per oral administration daily, in divided doses or ER. Rodent studies 0.1 to 3 mg/kg/day.

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. Eden RJ, et al. Preclinical pharmacology of ropinirole. Pharmacol Toxicol 1991.
2. Brooks DJ. Dopamine agonists: their role in the treatment of Parkinson's disease. J Neurol Neurosurg Psychiatry 2000.
3. Stocchi F, et al. A randomized, double-blind, placebo-controlled study of dopamine agonists in advanced Parkinson disease. Mov Disord 2002.

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