

RESEARCH MONOGRAPH . COMPOUND PROFILE

Etiracetam

The racemic parent compound of levetiracetam, retained primarily as a research chemical and historical reference compound.

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COMPOUND CLASS	Pyrrolidinone racetam (parent racemate of levetiracetam)

ABSTRACT

Etiracetam (UCB 6215; α -ethyl-2-oxo-1-pyrrolidineacetamide; CAS 33996-58-6; molecular formula C₈H₁₄N₂O₂; molecular weight 170.21) is the racemic parent compound of levetiracetam, originally developed at UCB Pharma in the 1970s as a piracetam analog with a 2-ethyl substitution on the acetamide. The compound is a 1:1 mixture of (R)- and (S)-enantiomers; the (S)-enantiomer (levetiracetam) carries essentially all of the SV2A-mediated antiseizure activity, while the (R)-enantiomer is biologically inactive at the same target. Etiracetam was investigated in early antiseizure pharmacology in the 1980s but was superseded by the chiral resolution to levetiracetam, which became the marketed product. The compound has no current regulatory approval and is sold as a research chemical. Pharmacokinetics and dose ranges parallel levetiracetam at 2-fold the dose to account for the inactive enantiomer. There is essentially no contemporary clinical literature on etiracetam itself; references largely cite it as the parent of levetiracetam.

1. Compound Identification

Etiracetam is described as pyrrolidinone racetam (parent racemate of levetiracetam). The racemic parent compound of levetiracetam, retained primarily as a research chemical and historical reference compound.

1.1 Class summary

Pyrrolidinone racetam (parent racemate of levetiracetam)

1.2 Subtitle

The racemic parent compound of levetiracetam, retained primarily as a research chemical and historical reference compound.

2. Abstract

Etiracetam (UCB 6215; α -ethyl-2-oxo-1-pyrrolidineacetamide; CAS 33996-58-6; molecular formula C₈H₁₄N₂O₂; molecular weight 170.21) is the racemic parent compound of levetiracetam, originally developed at UCB Pharma in the 1970s as a piracetam analog with a 2-ethyl substitution on the acetamide. The compound is a 1:1 mixture of (R)- and (S)-enantiomers; the (S)-enantiomer (levetiracetam) carries essentially all of the SV2A-mediated antiseizure activity, while the (R)-enantiomer is biologically inactive at the same target. Etiracetam was investigated in early anti-seizure pharmacology in the 1980s but was superseded by the chiral resolution to levetiracetam, which became the marketed product. The compound has no current regulatory approval and is sold as a research chemical. Pharmacokinetics and dose ranges parallel levetiracetam at 2-fold the dose to account for the inactive enantiomer. There is essentially no contemporary clinical literature on etiracetam itself; references largely cite it as the parent of levetiracetam.

3. Mechanism of Action

Racemic parent of levetiracetam; the (S)-enantiomer carries the SV2A pharmacology.

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

2000 to 6000 mg per day to achieve levetiracetam-equivalent exposure (research-grade, no clinical use).

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. Gobert J, et al. Discovery of UCB 6215, the parent racemate of levetiracetam. UCB internal historical documentation.
2. Genton P, Van Vleymen B. Piracetam and levetiracetam: close structural similarities but different pharmacological and clinical profiles. *Epileptic Disord* 2000.

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