

RESEARCH MONOGRAPH . COMPOUND PROFILE

Seletracetam

A second-generation UCB SV2A ligand discontinued after Phase 2 due to commercial considerations despite favorable efficacy.

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COMPOUND CLASS	Difluorovinyl pyrrolidinone (high-affinity SV2A ligand)

ABSTRACT

Seletracetam (UCB 44212; (2S)-2-[(4R)-4-(2,2-difluorovinyl)-2-oxopyrrolidin-1-yl]butanamide; CAS 357336-74-4; molecular formula C₁₀H₁₄F₂N₂O₂; molecular weight 232.23) is a second-generation SV2A ligand developed at UCB Pharma in parallel with brivaracetam. The compound features a difluorovinyl substituent at the pyrrolidinone 4-position, producing approximately 10-fold higher SV2A affinity than levetiracetam. Phase 2 trials in partial-onset seizures showed efficacy comparable to brivaracetam, but UCB discontinued the program in 2007 in favor of brivaracetam, which had a slightly more favorable safety profile in the development program. The compound is not approved by any regulatory authority and has no continuing clinical development. It is sold as a research chemical for investigational use. Pharmacokinetics in Phase 2 showed plasma half-life of approximately 8 hours and oral bioavailability above 80 percent. The compound provides an interesting case study in pharmaceutical decision-making where two structurally similar compounds with similar efficacy profiles led to selection of one for marketing.

1. Compound Identification

Seletracetam is described as difluorovinyl pyrrolidinone (high-affinity sv2a ligand). A second-generation UCB SV2A ligand discontinued after Phase 2 due to commercial considerations despite favorable efficacy.

1.1 Class summary

Difluorovinyl pyrrolidinone (high-affinity SV2A ligand)

1.2 Subtitle

A second-generation UCB SV2A ligand discontinued after Phase 2 due to commercial considerations despite favorable efficacy.

2. Abstract

Seletracetam (UCB 44212; (2S)-2-[(4R)-4-(2,2-difluorovinyl)-2-oxopyrrolidin-1-yl]butanamide; CAS 357336-74-4; molecular formula C₁₀H₁₄F₂N₂O₂; molecular weight 232.23) is a second-generation SV2A ligand developed at UCB Pharma in parallel with brivaracetam. The compound features a difluorovinyl substituent at the pyrrolidinone 4-position, producing approximately 10-fold higher SV2A affinity than levetiracetam. Phase 2 trials in partial-onset seizures showed efficacy comparable to brivaracetam, but UCB discontinued the program in 2007 in favor of brivaracetam, which had a slightly more favorable safety profile in the development program. The compound is not approved by any regulatory authority and has no continuing clinical development. It is sold as a research chemical for investigational use. Pharmacokinetics in Phase 2 showed plasma half-life of approximately 8 hours and oral bioavailability above 80 percent. The compound provides an interesting case study in pharmaceutical decision-making where two structurally similar compounds with similar efficacy profiles led to selection of one for marketing.

3. Mechanism of Action

SV2A high-affinity ligand; same mechanism class as levetiracetam and brivaracetam.

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

20 to 200 mg per day in Phase 2 trials.

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. Matagne A, et al. Seletacetam (UCB 44212). Neurotherapeutics 2007.
2. UCB Pharma Phase 2 program for UCB 44212; archived clinical trial data.

This monograph is provided for research use only. Not for medical, diagnostic, or therapeutic purposes. Not for human consumption. Compound class generalizations are noted where compound-specific data are sparse; investigators should weight the evidence accordingly.