

RESEARCH MONOGRAPH . COMPOUND PROFILE

CX-614

A potent benzoxazine ampakine with research applications in BDNF upregulation and synaptic plasticity studies.

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COMPOUND CLASS	Benzoxazine ampakine

ABSTRACT

CX-614 (2H,3H,6aH-pyrrolidino-[2,1-3',2']1,3-oxazino-[6',5'-5,4]benzo[e]1,4-dioxan-10-one; CAS 215923-55-0; molecular formula C₁₆H₁₇NO₄; molecular weight 287.32) is a potent benzoxazine-class ampakine developed at Cortex Pharmaceuticals as part of the same program that produced CX-516 and CX-546. CX-614 shows substantially higher AMPA potentiation potency than CX-516 in cellular assays (approximately 100-fold greater per molecule). The compound has been used extensively as a research probe for BDNF upregulation studies; chronic ampakine treatment elevates hippocampal BDNF expression through transcriptional mechanisms downstream of AMPA potentiation, providing a pharmacological model for neurotrophin-mediated synaptic plasticity. CX-614 has not been advanced to human clinical trials. The compound is sold as a research chemical with limited availability.

1. Compound Identification

CX-614 is described as benzoxazine ampakine. A potent benzoxazine ampakine with research applications in BDNF upregulation and synaptic plasticity studies.

1.1 Class summary

Benzoxazine ampakine

1.2 Subtitle

A potent benzoxazine ampakine with research applications in BDNF upregulation and synaptic plasticity studies.

2. Abstract

CX-614 (2H,3H,6aH-pyrrolidino-[2,1-3',2']1,3-oxazino-[6',5'-5,4]benzo[e]1,4-dioxan-10-one; CAS 215923-55-0; molecular formula C₁₆H₁₇NO₄; molecular weight 287.32) is a potent benzoxazine-class ampakine developed at Cortex Pharmaceuticals as part of the same program that produced CX-516 and CX-546. CX-614 shows substantially higher AMPA potentiation potency than CX-516 in cellular assays (approximately 100-fold greater per molecule). The compound has been used extensively as a research probe for BDNF upregulation studies; chronic ampakine treatment elevates hippocampal BDNF expression through transcriptional mechanisms downstream of AMPA potentiation, providing a pharmacological model for neurotrophin-mediated synaptic plasticity. CX-614 has not been advanced to human clinical trials. The compound is sold as a research chemical with limited availability.

3. Mechanism of Action

Potent AMPA potentiator (benzoxazine class). Used as research probe for chronic AMPA stimulation effects on BDNF.

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

Sparse human dosing data; principally a research probe.

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. Lauterborn JC, et al. Ampakines have similar acute effects on basal and stimulated BDNF mRNA expression. Brain Res 2003.
2. Mackowiak M, et al. Cortical and hippocampal BDNF response to ampakine treatment. Neuropharmacology 2002.

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