

RESEARCH MONOGRAPH . COMPOUND PROFILE

Lithium Carbonate (Low- Dose)

Prescription lithium carbonate at low doses (150-300 mg) studied for cognitive impairment and dementia prevention.

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COMPOUND CLASS	Mood stabilizer (low-dose)

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ABSTRACT

Lithium carbonate (CAS 554-13-2) is the principal lithium salt used clinically since 1949 for bipolar disorder, with approved doses providing 600 to 1800 mg lithium ion per day for mood stabilization. Low-dose lithium (providing 150 to 300 mg lithium ion per day, well below therapeutic mood stabilization range) has been studied for cognitive impairment, Alzheimer disease, and ALS with mixed results; effect sizes are small but mechanistically interesting given lithium's GSK-3 inhibition and inositol monophosphatase effects. Investigators using low-dose lithium should be aware of the still-narrow therapeutic index and potential renal and thyroid effects with chronic use.

1. Compound Identification

Lithium Carbonate (Low-Dose) is described as mood stabilizer (low-dose). Prescription lithium carbonate at low doses (150-300 mg) studied for cognitive impairment and dementia prevention.

1.1 Class summary

Mood stabilizer (low-dose)

1.2 Subtitle

Prescription lithium carbonate at low doses (150-300 mg) studied for cognitive impairment and dementia prevention.

2. Abstract

Lithium carbonate (CAS 554-13-2) is the principal lithium salt used clinically since 1949 for bipolar disorder, with approved doses providing 600 to 1800 mg lithium ion per day for mood stabilization. Low-dose lithium (providing 150 to 300 mg lithium ion per day, well below therapeutic mood stabilization range) has been studied for cognitive impairment, Alzheimer disease, and ALS with mixed results; effect sizes are small but mechanistically interesting given lithium's GSK-3 inhibition and inositol monophosphatase effects. Investigators using low-dose lithium should be aware of the still-narrow therapeutic index and potential renal and thyroid effects with chronic use.

3. Mechanism of Action

GSK-3 inhibition; inositol monophosphatase inhibition. Mood stabilization at higher doses; cognitive effects studied at low doses.

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

150 to 300 mg lithium carbonate per day for low-dose cognitive applications.

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. Forlenza OV, et al. Disease-modifying properties of long-term lithium treatment. Br J Psychiatry 2011.

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