

RESEARCH MONOGRAPH . COMPOUND PROFILE

Tiratricol (TRIAC)

A naturally occurring T3 metabolite with thyroid-receptor activity; used in resistance to thyroid hormone syndrome and (off-label) for fat loss.

DOCUMENT	KDC-MN-291
ISSUED	2026-05-09
REVISION	1.0
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COMPOUND CLASS	T3 metabolite (3,3',5-triiodothyroacetic acid)

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ABSTRACT

Tiratricol (TRIAC, 3,3',5-triiodothyroacetic acid; CAS 51-24-1; molecular formula $C_{14}H_9I_3O_4$; molecular weight 621.93) is a natural T3 metabolite formed by deamination and oxidative decarboxylation of T3. The compound retains thyroid hormone receptor activity with TR-beta selectivity (approximately 2- to 4-fold over TR-alpha). Approved in France, Mexico, and other markets for resistance to thyroid hormone syndrome (Refetoff syndrome), where the TR-beta selectivity allows TR-beta target tissue (pituitary, liver) effects without the cardiac TR-alpha hyperthyroid effects. Off-label use in obesity and as an athletic fat-loss compound has been documented; the FDA has issued warnings against unapproved supplement products containing tiratricol owing to severe thyrotoxic adverse events at supratherapeutic doses. Plasma half-life is approximately 7 hours, shorter than T4 but longer than T3. Used as a reference TR-beta-selective thyromimetic in research.

1. 1. Compound Identification

Tiratricol (TRIAC) is described as t3 metabolite (3,3',5-triiodothyroacetic acid). A naturally occurring T3 metabolite with thyroid-receptor activity; used in resistance to thyroid hormone syndrome and (off-label) for fat loss.

1.1. 1.1 Class summary

T3 metabolite (3,3',5-triiodothyroacetic acid)

1.2. 1.2 Subtitle

A naturally occurring T3 metabolite with thyroid-receptor activity; used in resistance to thyroid hormone syndrome and (off-label) for fat loss.

2. Abstract

Tiratricol (TRIAC, 3,3',5-triiodothyroacetic acid; CAS 51-24-1; molecular formula $C_{14}H_9I_3O_4$; molecular weight 621.93) is a natural T3 metabolite formed by deamination and oxidative decarboxylation of T3. The compound retains thyroid hormone receptor activity with TR-beta selectivity (approximately 2- to 4-fold over TR-alpha). Approved in France, Mexico, and other markets for resistance to thyroid hormone syndrome (Refetoff syndrome), where the TR-beta selectivity allows TR-beta target tissue (pituitary, liver) effects without the cardiac TR-alpha hyperthyroid effects. Off-label use in obesity and as an athletic fat-loss compound has been documented; the FDA has issued warnings against unapproved supplement products containing tiratricol owing to severe thyrotoxic adverse events at supratherapeutic doses. Plasma half-life is approximately 7 hours, shorter than T4 but longer than T3. Used as a reference TR-beta-selective thyromimetic in research.

3. Mechanism of Action

T3 metabolite with TR-beta-selective thyroid hormone receptor activity. Approximately 2- to 4-fold TR-beta over TR-alpha selectivity.

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. 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. 5. Reported Research Dose Ranges

Clinical (resistance to thyroid hormone) 350 to 2800 mcg per oral administration daily, in divided doses. Off-label fat loss (not recommended) 0.5 to 3 mg/day. Rodent studies 0.05 to 0.5 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. 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. 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. 9. References

1. Beck-Peccoz P, Persani L. Thyrotropin-secreting pituitary adenomas. Endocr Rev 1996.
2. Sherman SI, Ladenson PW. Organ-specific effects of tiratricol: a thyroid hormone analog with hepatic, not pituitary, superagonist effect. J Clin Endocrinol Metab 1992.
3. Cohen-Lehman J, et al. Effects of amiodarone therapy on thyroid function. Nat Rev Endocrinol 2010.

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