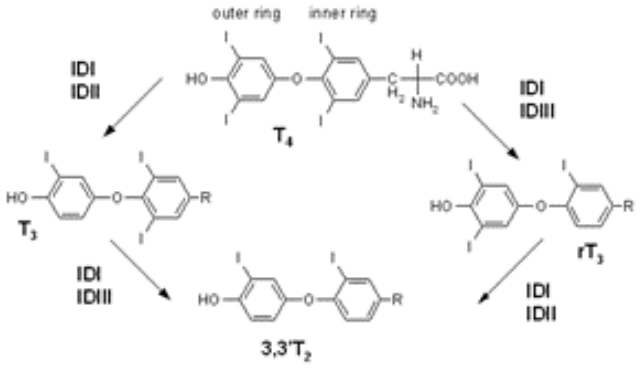
TRICORE

REVERSE T_3 TESTING

Did you know that Reverse T_3 (rT_3; 3,3',5'-triiodothyronine) differs only from the metabolically active isomer T_3 (3,5,3' triiodothyronine) by the potion of its iodine? Like T_3, rT_3 is produced from T_4 (thyroxine; 3,5,3',5'-tetraiodothyronine) by iodothyronine deiodinases (ID).



rT_3 has very low affinity for the nuclear hormone receptors THRα and THRβ and is an inactive by-product of thyroid hormone metabolism without physiological function.

While T_3 and rT_3 are produced in peripheral tissues at similar rates in healthy individuals, this balance can be altered in a number of factors.

What factors can affect rT_3 concentrations?

- Increased concentrations
  - Starvation, anorexia nervosa, severe trauma and hemorrhagic shock, hepatic dysfunction, postoperative states, severe infection, and in burn patients.
  - Drugs: amiodarone, cimetidine, dexamethasone, dopamine, levothyroxine, and propylthiouracil.
- Decreased concentrations
  - Drugs: bexarotene, dilantin, rifampicin, and salsalate.

When is rT_3 testing useful?

- The use of rT_3 testing is controversial[1].
- Historically, rT_3 has been proposed to differentiate euthyroid sick syndrome from hypothyroidism and to detect patients that may benefit from thyroid hormone replacement therapy. However, thyroid-stimulating hormone (TSH) is a better marker for thyroid disease status as increased TSH may better reflect hypothyroidism co-existing with euthyroid sick syndrome.

Should I use rT_3 for the routine evaluation of common thyroid disorders?

- **No**. TSH and free T_4 are the recommended tests for the diagnosis of thyroid disorders.

REFERENCE

[1] Halsall DJ, Oddy S. Clinical and laboratory aspects of 3,3',5'-triiodothyronine (reverse T3). Ann Clin Biochem. 2021 Jan;58(1):29-37. doi: 10.1177/0004563220969150. Epub 2020 Nov 4. PMID: 33040575.