



## THYROID FUNCTION TESTS

# A high proportion of serum rT<sub>3</sub> tests are ordered by a relatively small number of providers in the United States

### BACKGROUND

Different types of laboratory tests are available for evaluation of thyroid disorders. These tests are used mainly to measure either hormones (like TSH, T<sub>4</sub> and T<sub>3</sub>) or thyroid antibodies. Extensive clinical studies have been done to guide clinicians to choose the most effective test in every clinical situation.

Reverse T<sub>3</sub> (rT<sub>3</sub>) is not one of the primary hormones produced by thyroid gland. It is mostly produced inside the cells in other tissues from the breakdown of T<sub>4</sub>. The normal pathway is that T<sub>4</sub> is broken down to T<sub>3</sub>, which is the active hormone. T<sub>4</sub> can also be broken down to rT<sub>3</sub>, which is an inactive hormone. The production of T<sub>3</sub> and rT<sub>3</sub> is exactly opposite: the higher the T<sub>3</sub> level, the lower the rT<sub>3</sub> level; the lower the T<sub>3</sub> level, the higher the rT<sub>3</sub> level. Because of this relationship, and the fact that rT<sub>3</sub> is inactive, most clinicians do not use measurement of rT<sub>3</sub> for assessing a patient for hypothyroidism or hyperthyroidism. Still, some providers continue to order rT<sub>3</sub> in the assessment of thyroid function. This study was done to identify the ordering pattern of serum rT<sub>3</sub> by clinicians.

### THE FULL ARTICLE TITLE

Schmidt RL et al. Does reverse triiodothyronine testing have clinical utility? An analysis of practice variation based on order data from a national reference laboratory. *Thyroid* 2018 Jul; 28(7): 842-848.

### SUMMARY OF THE STUDY

The data from the National Reference Laboratory was used to conduct this study. The authors reviewed all the thyroid related tests that had been ordered from November 2015 to November 2016. They studied the records to find out the ordering pattern of the tests based on hospital types (for example, community versus academic hospitals) and providers (type of specialty). They also reviewed the published medical articles about rT<sub>3</sub> and did a Google search to identify the information available in internet to public about rT<sub>3</sub>.

They found that relatively small proportion of providers had ordered majority of rT<sub>3</sub> tests. Of the 100 providers who had ordered rT<sub>3</sub> the most, 60% were practitioner of functional medicine and 40% conventional medicine (thyroid specialists, internal medicine, family medicine and gynecologist). Functional medicine was defined as a form of alternative medicine often based on complementary and holistic treatment techniques.

The review of medical articles about this topic showed that 90% were published before 2000 and provided limited evidence to support measuring rT<sub>3</sub> for evaluation of regular thyroid disorders like hypothyroidism and hyperthyroidism. Most of the publications were about the effect of medications, medical conditions other than thyroid disease and severe illness on rT<sub>3</sub> level.

The Google search showed mostly links to published articles in medical journals. Most of the webpages that discussed the use of rT<sub>3</sub> level for clinical purposes were 8-fold more associated with functional medicine than conventional medicine.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that the majority of rT<sub>3</sub> tests are ordered by a relatively small proportion of clinicians, mostly providers practicing functional medicine. The review of medical literature does not support routine measurement of rT<sub>3</sub> in clinical care of a patient with hypothyroidism and hyperthyroidism. This is important for patients who have thyroid disease and would like to be involved in decision making regarding their care. This might be especially important for patients who have to pay or share the cost of their laboratory tests.

— Shirin Haddady, MD





## THYROID FUNCTION TESTS, continued

### ATA THYROID BROCHURE LINKS

Thyroid Function Tests: <https://www.thyroid.org/thyroid-function-tests/>  
Hypothyroidism (Underactive): <https://www.thyroid.org/hypothyroidism/>  
Hyperthyroidism (Overactive): <https://www.thyroid.org/hyperthyroidism/>  
Thyroid Disease and Complementary and Alternative Medicine (CAM): <https://www.thyroid.org/thyroid-disease-cam/>

### ABBREVIATIONS & DEFINITIONS

**TSH: thyroid stimulating hormone** – produced by the pituitary gland that regulates thyroid function; also the best screening test to determine if the thyroid is functioning normally

**Thyroxine (T4):** the major hormone produced by the thyroid gland. T<sub>4</sub> gets converted to the active hormone T<sub>3</sub> in various tissues in the body.

**Triiodothyronine (T3):** the active thyroid hormone, usually produced from thyroxine.

**Reverse Triiodothyronine (rT3):** the inactive thyroid hormone produced from thyroxine in various tissues in the body. Levels of T<sub>3</sub> and rT<sub>3</sub> are exactly opposite each other.

## Thyroid Awareness Monthly Campaigns

The ATA will be highlighting a distinct thyroid disorder each month and a portion of the sales for Bravelets™ will be donated to the ATA. The month of **January** is **Thyroid Awareness Month** and a bracelet is available through the **ATA Marketplace** to support thyroid cancer awareness and education related to thyroid disease.

