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Blood Chemistry: Thyroid

Dr. Ritamarie Loscalzo

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Thyroid Lab Ranges

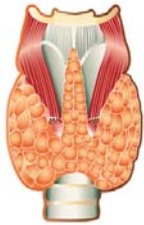


NAME of TEST	US Units	Lab Range	Ideal Range
TSH: Thyroid-stimulating hormone	µIU/mL	0.3-5.7	1.5-3.0
Total T4 or TT4 (total thyroxine)	µg/mL	4.5-12.5	6.0-12.0
Total T3 or TT3 (total triiodothyronine)	ng/dL	100.0-180.0	100.0-180.0
Free T4 or FT4 (thyroxine, free)	ng/dL	0.7-2.0	1.0-1.5
Free T3 or FT3 (triiodothyronine, free)	pg/dL	2.0-4.4	3.0-4.5
Thyroglobulin antibody screen (or antithyroglobulin)	IU/mL	0.0-1.0	0.0-1.0
Thyroid peroxidase (TPO) antibodies	IU/mL	0.0-34.0	0.0-2.0
Thyroxine-binding globulin (TBG)	µg/mL	18.0-27.0	18.0-27.0
Reverse T3 or RT3 (reverse triiodothyronine)	ng/dL	90.0-350.0	90.0-350.0
T3 uptake	%	27.0-37.0	28.0-38.0
Free Thyroxine Index (FTI)		1.2-4.9	1.2-4.9

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Types of Thyroid Dysfunction

- ✓ Hypothyroidism
- ✓ Hyperthyroidism
- ✓ Autoimmune Thyroid Conditions
 - Graves Disease
 - Hashimoto's Thyroiditis
- ✓ Subclinical Thyroid Conditions
 - Binding Protein Problems
 - Thyroid Receptor Resistance
 - Wilson's Temperature Syndrome
- ✓ Cancer



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Thyroid Lab Analysis

Basic Screen	Essential Extras
✓ Total T-4 (Thyroxin)	✓ Thyroid Peroxidase Antibodies
✓ T-3 uptake	✓ Antithyroglobulin Antibodies
✓ Free — Thyroxin Index (FTI) aka T-7	✓ Free T3
✓ TSH	✓ Free T4
	✓ Total T3
	✓ Reverse T3



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Medications Affecting Thyroid

✓ Antibiotics	✓ Diuretics
✓ Antidepressants	✓ Amphetamines
✓ Diabetic medication	✓ Adderall
✓ Hypertensive medication	✓ Anti-inflammatory
✓ Pain medication	✓ Arrhythmia medications
✓ Antacids	✓ Hormone replacement
✓ Cholesterol lowering medications	✓ Steroids and androgens
✓ Growth hormone modulators	✓ Anti-addiction drugs
✓ Anti-nausea medications	✓ Psychoactive medications, i.e. lithium, thiorazine



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Thyroid Case 1

Markers	Units	PATHOLOGICAL RANGE	FUNCTIONAL RANGE	12/22/09
TSH	mIU/L	0.3-5.7	1.8-3.0	2.58
Total Thyroxine (TT4)	ug/dl	4.5-12.5	6-12	6.7
Total Triiodothyronine (TT3)	ng/dL		100-180	
Free T4	ng/dL		1.0-1.5	
Free Thyroxine Index	mg/dl		1.2-4.9	2.2
Free T3	pg/mL		300-450	
T3 Uptake	md/dl	27-37	28-38	33
Reverse T3	pg/ml		90-350	
Thyroid Binding Globulin	ug/dl		18-27	
Thyroid Peroxidase Antibody (TPO)	IU/mL		< 2	140
Antithyroglobulin Antibody	-	a negative test is normal	< 1	

Would have been missed on normal screen



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Thyroid Case 2

CATEGORIES	Units	PATHOLOGICAL RANGE	FUNCTIONAL RANGE	10/06/09	06/26/08	11/20/06
THYROID MARKERS		Min Max	Min Max			
TSH	mIU/L	0.3 5.7	1.8 3.0	4.08	3.964	3.333
Thyroxine (T4)	ug/dl	4.5 12.5	6.0 12.0	7.5	7.5	
T3 Uptake	md/dl	27.0 37.0	28.0 38.0			
Free Thyroxine Index	mg/dl		1.2 4.9	2.9	2.9	
Total Triiodothyronine (TT3)	ng/dL		100.0 180.0			
Free T4	ng/dL		1.0 1.5	1.12		
Free T3	pg/mL		300.0 450.0			
Reverse T3	pg/mL		90.0 350.0			
Thyroid Binding Globulin	ug/dl		18.0 27.0			
Antithyroglobulin Antibody	a negative test is normal	0.0 1.0	0.0 1.0			
Thyroid Peroxidase (TPO) Ab	IU/mL	0.0 34.0	0.0 2.0			

- ❖ Insufficient information
- ❖ Progressively worsening TSH
- ❖ Follow-up:
 - ❖ Thyroid antibodies
 - ❖ Total T3, T4
 - ❖ Free T3
 - ❖ T3 Uptake



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Thyroid Case 3

CATEGORIES	Units	PATHOLOGICAL RANGE	FUNCTIONAL RANGE	CURRENT 01/25/10
THYROID MARKERS		Min Max	Min Max	
TSH	mIU/L	0.3 5.7	1.8 3.0	1.38
Thyroxine (T4)	ug/dl	4.5 12.5	6.0 12.0	10.4
T3 Uptake	md/dl	27.0 37.0	28.0 38.0	31
Free Thyroxine Index	mg/dl		1.2 4.9	3.2
Total Triiodothyronine (TT3)	ng/dL		100.0 180.0	
Free T4	ng/dL		1.0 1.5	
Free T3	pg/mL		300.0 450.0	
Reverse T3	pg/mL		90.0 350.0	
Thyroid Binding Globulin	ug/dl		18.0 27.0	
Antithyroglobulin Antibody	a negative test is normal	0.0 1.0	0.0 1.0	20
Thyroid Peroxidase (TPO) Ab	IU/mL	0.0 34.0	0.0 2.0	7

Would be missed by standard analysis

- ❖ TSH below optimal
- ❖ T4 getting close to top of range
- ❖ Positive antibodies, although low
- ❖ Follow-up
 - ❖ TSI antibodies – to differentiate Hashimotos from Graves
 - ❖ Free T3, T4



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Most Important Nutrients For Thyroid Gland

✓ Iodine ***	✓ Vitamin A
✓ Selenium	✓ Vitamin D3
✓ Zinc	✓ Vitamin B2
✓ Iron	✓ Vitamin B6
✓ Tyrosine	✓ Vitamin B12
	✓ Bioflavonoids

*** Most important nutrient for the thyroid



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Management of Autoimmune – Hashimoto's

- ✓ Support immune system
 - Support T regulatory cells (TH1 and TH2)
 - Avoid gluten and other allergy containing foods. In my experience, 100% gluten avoidance is mandatory for recovery
- ✓ Essential fatty acids
- ✓ Balance blood sugar
- ✓ Repair gut
- ✓ Decrease stress and support adrenals
- ✓ Increase vitamin D levels: ideal closer to 100
- ✓ Antioxidants:
 - Glutathione and glutathione enhancing foods and nutrients
 - Turmeric, ashwagandha, CoQ10, rehmannia



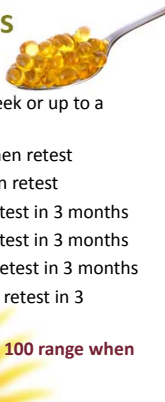
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Vitamin D With Hashimotos

Optimal Range: 90.0 -100.0 in the presence of antibodies

- ✓ **Vitamin D <20:** Take 20 000 IU every day for a week or up to a month, then 10 000 IU for 2 months, then retest
- ✓ **Vitamin D 20-30:** Take 10 000 IU for 3 months, then retest
- ✓ **Vitamin D 30-40:** Take 6000 IU for 3 months, then retest
- ✓ **Vitamin D 40-60:** Take 4000 - 6000 IU per day; retest in 3 months
- ✓ **Vitamin D 60-90:** Take 2000 - 4000 IU per day; retest in 3 months
- ✓ **Vitamin D 80-100:** Take 1000 - 2000 IU per day; retest in 3 months
- ✓ **Vitamin D >100:** Get out in the sun regularly and retest in 3 months.

It's a good idea to maintain vitamin D in the 90 - 100 range when thyroid antibodies are present.



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Thyroid Resources and Books

- ✓ *Why Do I Still Have Thyroid Symptoms When My Lab Tests are Normal?*
– Dr. Datis Kharrazian, DHSc, DC, MS
- ✓ *Overcoming Thyroid Disorders*
– David Brownstein, M.D.
- ✓ *Thyroid Health: 10 Steps to Total Health*
– Richard L. Shames, M.D., and Karilee Halo Shames, R.N., PhD
- ✓ *Iodine Why You Need It and Why You Can't Live Without It*
– David Brownstein, M.D.



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