

The background of the slide is a light gray color with a pattern of faint, semi-transparent chemical structures. These structures consist of various interconnected rings and lines, representing molecular frameworks, scattered across the entire page.

Casual Friday Series

Functional Blood Chemistry Series

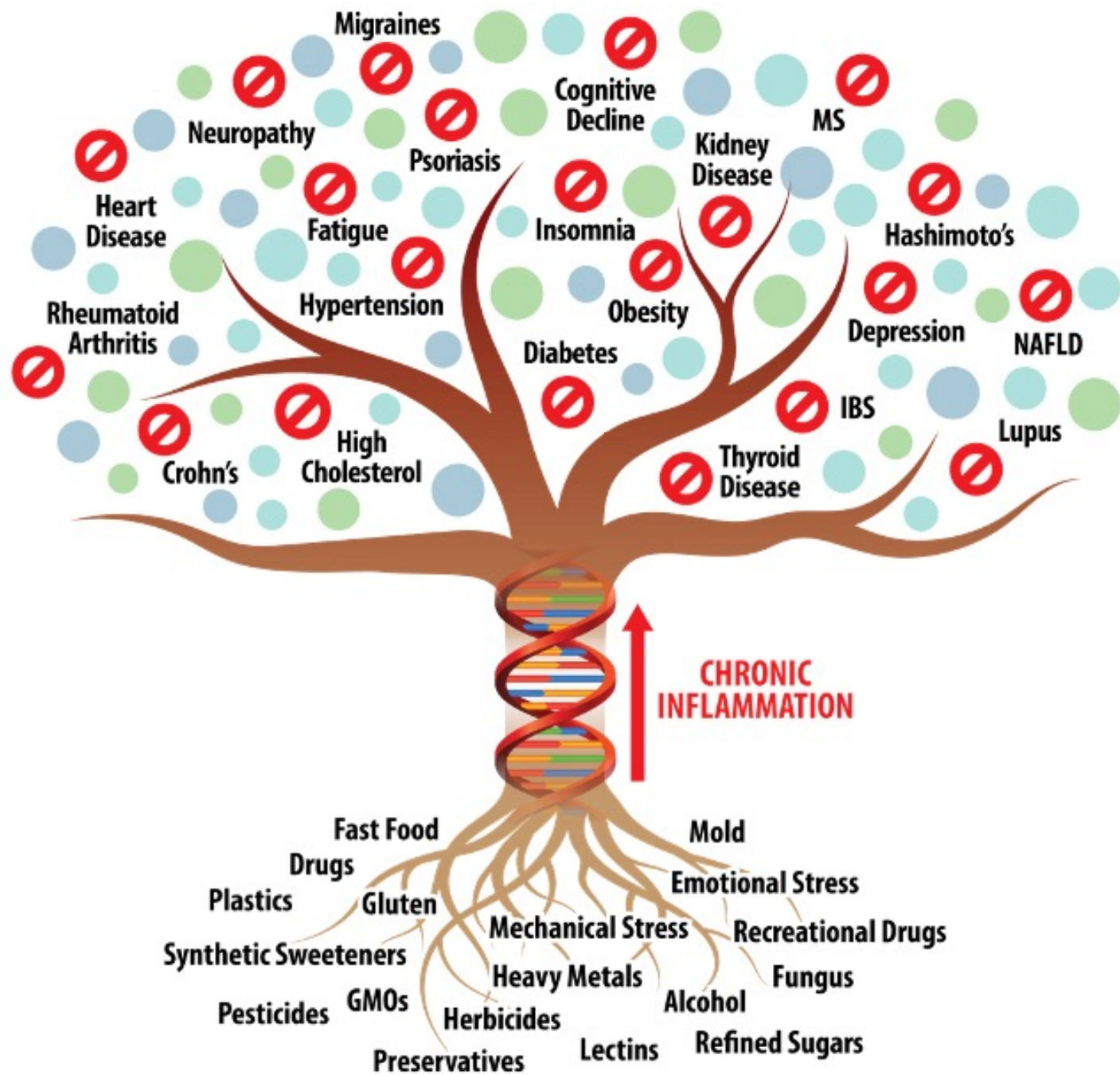
Pt. 19: Thyroid (III)

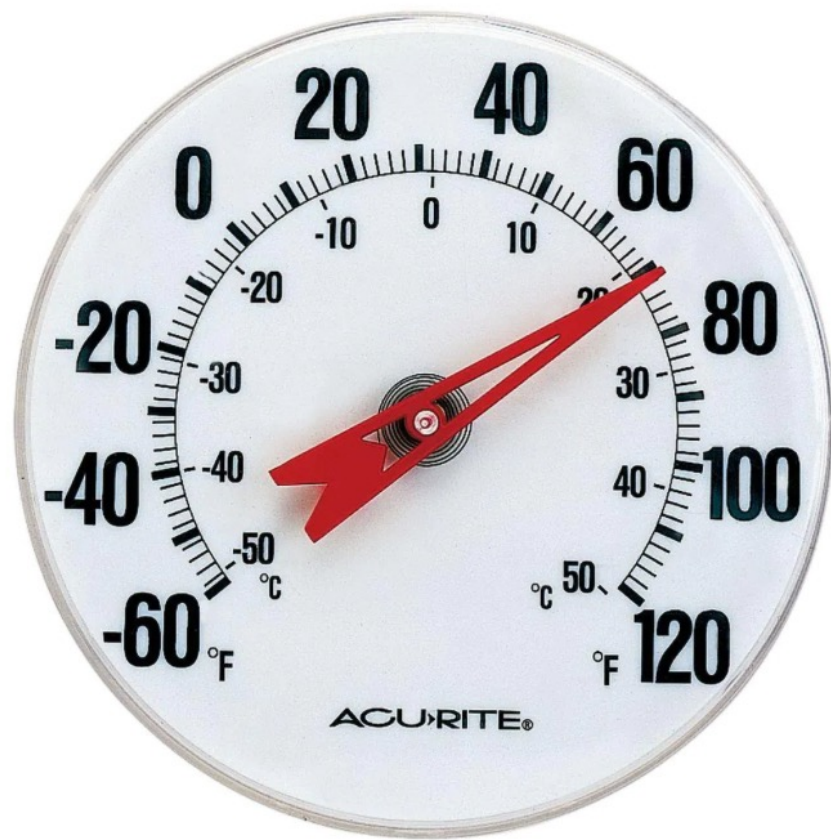
A Biogenetix Clinical Presentation

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Disclaimer

- *Information in this presentation is not intended to diagnose, treat, reverse, cure, or prevent any disease. While this presentation is based on medical literature, findings, and text, The following statements have not been evaluated by the FDA.*
- *The information provided in this presentation is for your consideration only as a practicing health care provider. Ultimately you are responsible for exercising professional judgment in the care of your own patients.*





Primary Hypothyroidism

TSH	↑
Total T4	↓/WNL
Total T3	↓/WNL
Reverse T3	↓/↑/WNL
T3 Uptake	↓/WNL
TBG	
Thyroid Peroxidase Ab (TPO)	+ -
Thyroglobulin Ab (TBG)	+ -
Thyroid Stimulating Ab (TSI)	-
Thyroid Blocking Ab (TBI)	-



Primary Hyperthyroidism

TSH	↓
Total T4	↑/WNL
Total T3	↑/WNL
Reverse T3	↓/↑/WNL
T3 Uptake	↑/WNL
TBG	
Thyroid Peroxidase Ab (TPO)	+ -
Thyroglobulin Ab (TBG)	+ -
Thyroid Stimulating Ab (TSI)	+ -
Thyroid Blocking Ab (TBI)	+ -



Pituitary Suppression

TSH	↓
Total T4	↓
Total T3	↓
Reverse T3	↓/↑/WNL
T3 Uptake	↓/WNL
TBG	
Thyroid Peroxidase Ab (TPO)	+ -
Thyroglobulin Ab (TBG)	+ -
Thyroid Stimulating Ab (TSI)	-
Thyroid Blocking Ab (TBI)	-



Underconversion

TSH	WNL
Total T4	WNL
Total T3	↓
Reverse T3	↓/↑/WNL
T3 Uptake	↓/WNL
TBG	
Thyroid Peroxidase Ab (TPO)	+ -
Thyroglobulin Ab (TBG)	+ -
Thyroid Stimulating Ab (TSI)	-
Thyroid Blocking Ab (TBI)	-



Elevated TBG (Hypothyroid Symptoms)

TSH	WNL
Total T4	WNL
Total T3	↓
Reverse T3	↓/↑/WNL
T3 Uptake	↓
TBG	↑
Thyroid Peroxidase Ab (TPO)	+ -
Thyroglobulin Ab (TBG)	+ -
Thyroid Stimulating Ab (TSI)	-
Thyroid Blocking Ab (TBI)	-



Low TBG (Hyperthyroid Symptoms)

TSH	WNL
Total T4	WNL
Total T3	↑
Reverse T3	↓/↑/WNL
T3 Uptake	↑
TBG	↓
Thyroid Peroxidase Ab (TPO)	+ -
Thyroglobulin Ab (TBG)	+ -
Thyroid Stimulating Ab (TSI)	-
Thyroid Blocking Ab (TBI)	-

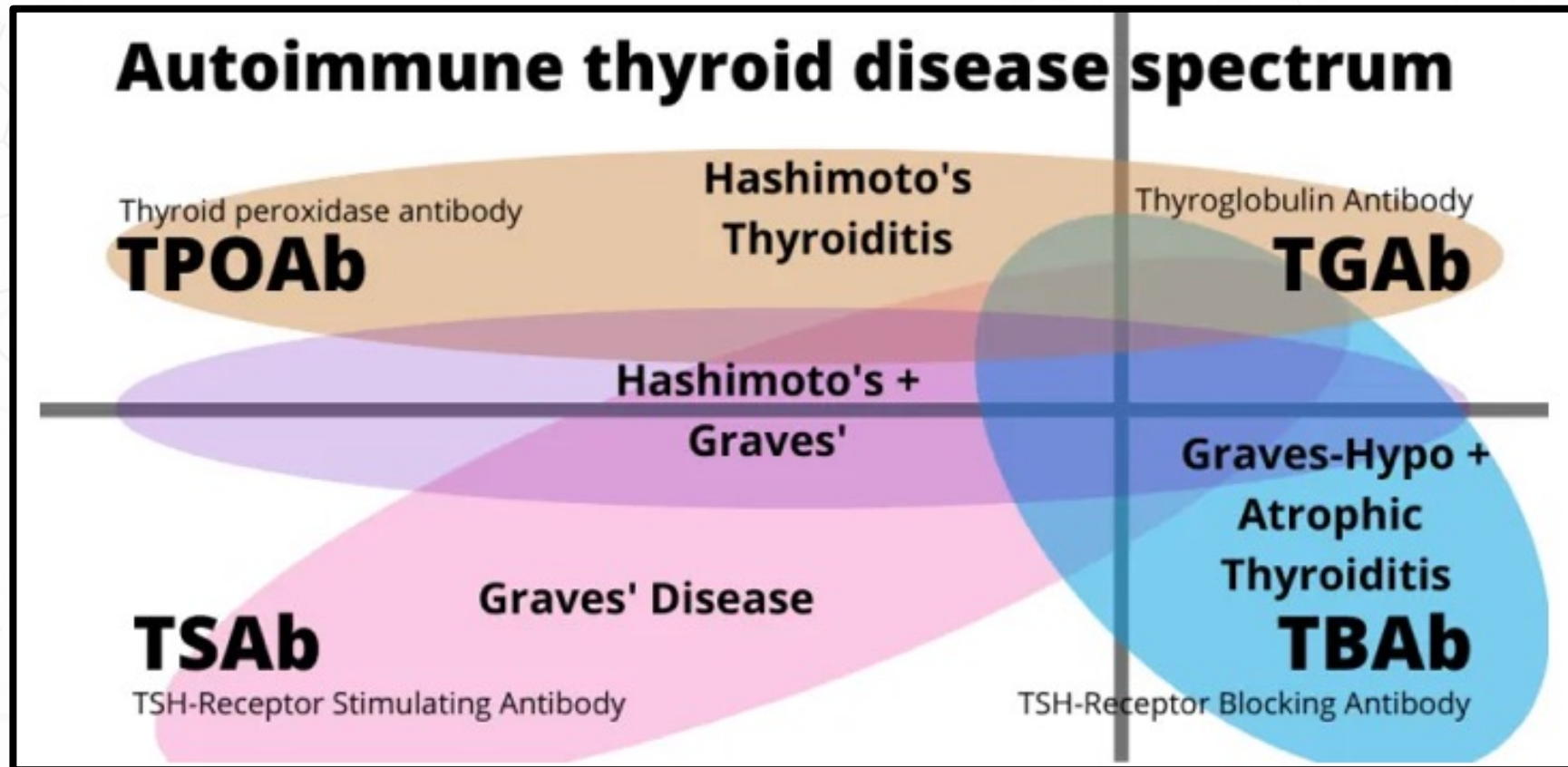


Thyroid Resistance

TSH	WNL
TotalT4	WNL
Total T3	WNL
Reverse T3	WNL
T3 Uptake	WNL
TBG	WNL
Thyroid Peroxidase Ab (TPO)	—
Thyroglobulin Ab (TBG)	—
Thyroid Stimulating Ab (TSI)	—
Thyroid Blocking Ab (TBI)	—



Autoimmunity



The role of the immune system and cytokines involved in the pathogenesis of autoimmune thyroid disease (AITD)

Hanna Mikoś, Marcin Mikoś, Monika Obara-Moszyńska, Marek Niedziela ¹

Autoimmune thyroid disease (AITD) is the most common organ-specific autoimmune disorder. AITD development occurs due to loss of immune tolerance and reactivity to thyroid autoantigens: thyroid peroxidase (TPO), thyroglobulin (TG) and thyroid stimulating hormone receptor (TSHR). This leads to infiltration of the gland by T cells and B cells that produce antibodies specific for clinical manifestations of hyperthyroidism in Graves' disease (GD) and chronic autoimmune thyroiditis (cAIT). In addition, T cells in Hashimoto's thyroiditis induce apoptosis in thyroid follicular cells, leading ultimately to the destruction of the gland. Cytokines are involved in the pathogenesis of thyroid diseases working in both the immune system and directly targeting the thyroid follicular cells. They are involved in the induction and effector phase of the immune response and



Autoimmunity

In GD, thyroid stimulating immunoglobulins (TSI) bind to the TSH receptor (TSHR) and mimic TSH stimulation of the thyroid gland. Because TSI induced thyroid hormone secretion is not controlled by negative feedback, such stimulation causes uncontrolled hyperthyroidism.⁸

TSI are IgG antibodies that can cross the placental barrier and cause neonatal thyrotoxicosis in newborns delivered by mothers with GD.^{9,10}

The TSH receptor contains a large extracellular domain that presents epitopes for a variety of autoantibodies, including TSI and Thyroid Blocking Immunoglobulins TBI.¹¹⁻¹³ In contrast to TSI, TBI bind to the TSH receptor and inhibit TSH stimulation of thyroid cells, leading to hypothyroidism. Commonly used Thyrotropin Receptor Autoantibody (TRAb) assays do not distinguish between TSI and TBI.



Autoimmunity

“Hashimoto's thyroiditis, or inflammation of the thyroid gland, is an autoimmune disorder. That means it is caused by a malfunction in your immune system. Instead of protecting your thyroid tissue, your immune cells attack it. These immune cells can cause hypothyroidism(underactive thyroid), a goiter (enlarged thyroid), or both. Eventually, the thyroiditis process can even destroy your entire thyroid, if left undetected or untreated.”

“Doctors aren't entirely sure why the immune system, which is supposed to defend the body from harmful viruses and bacteria, sometimes turns against the body's healthy tissues.”

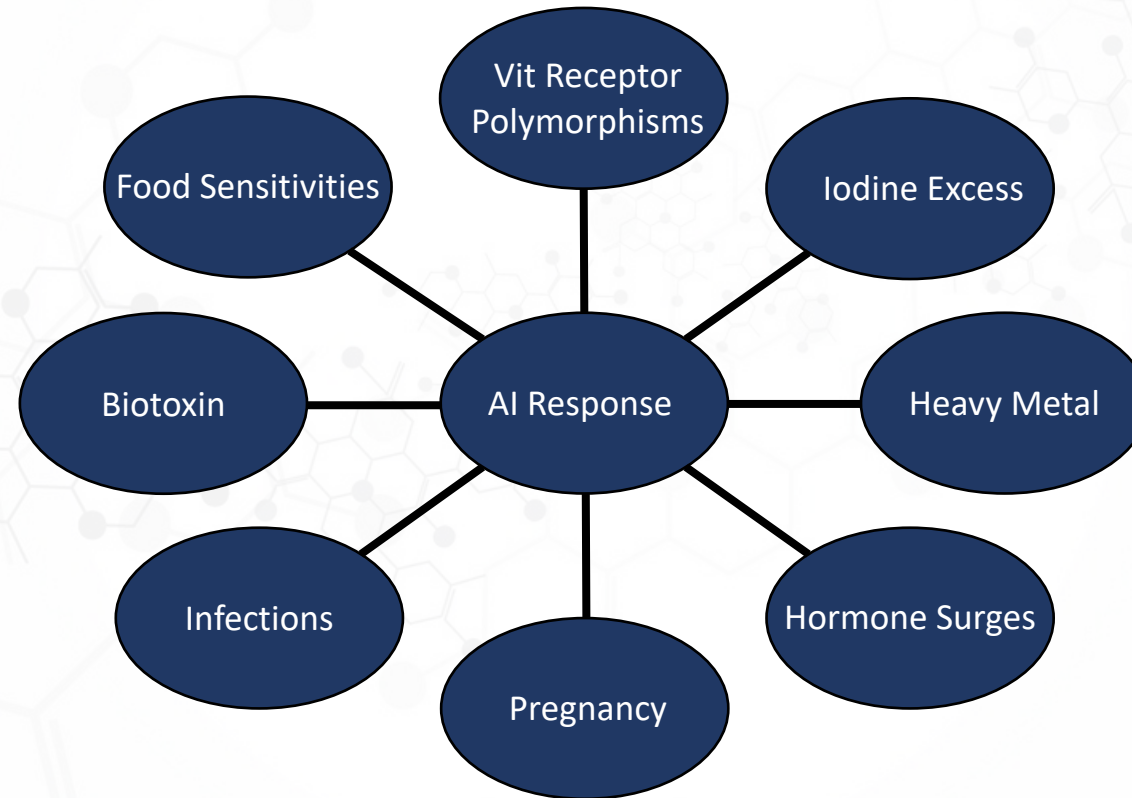


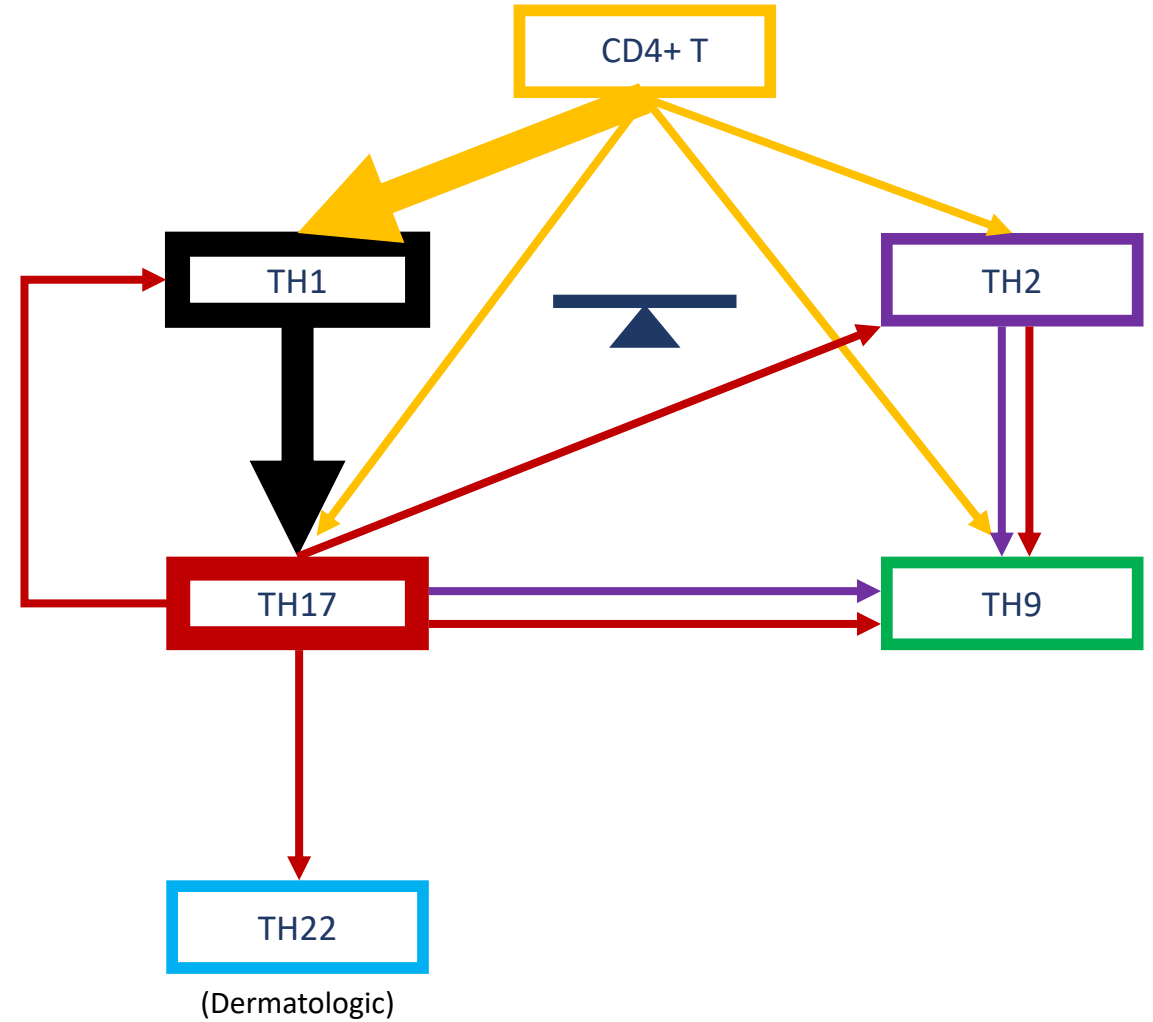
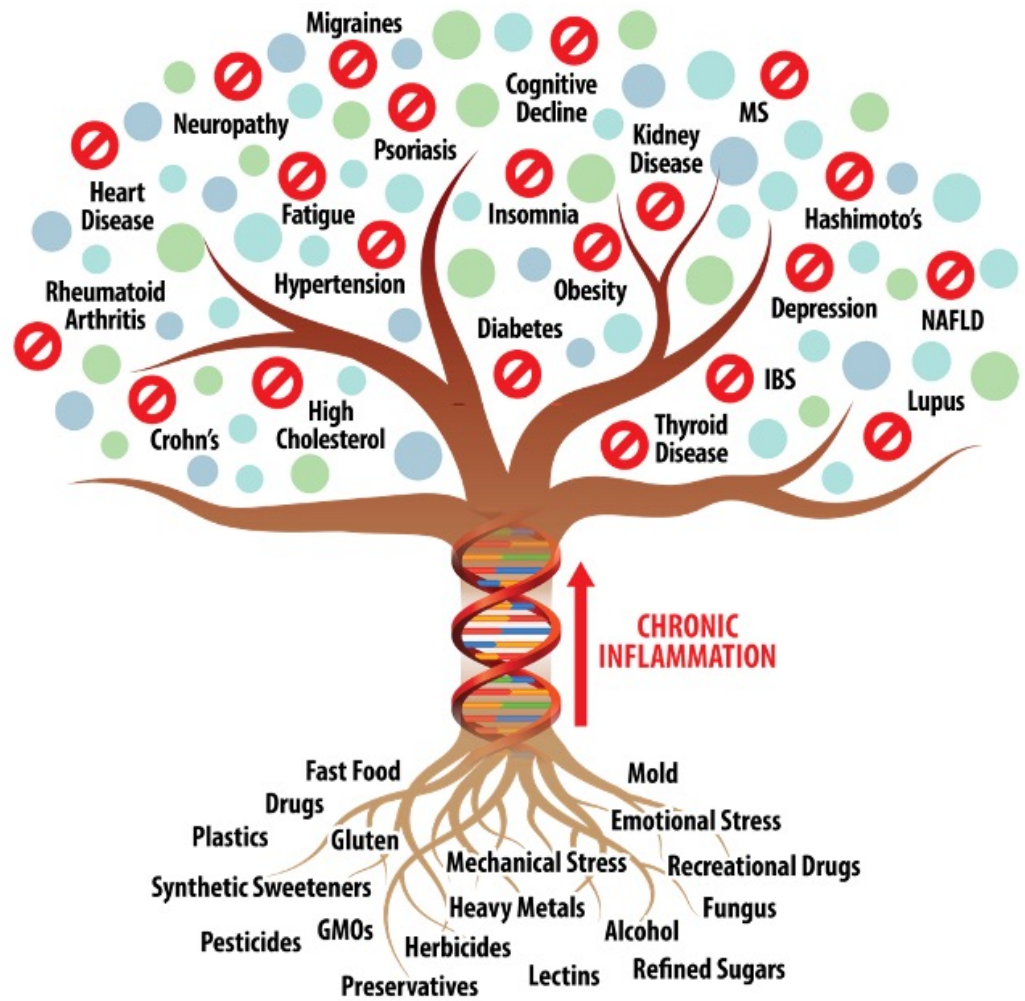
Autoimmunity

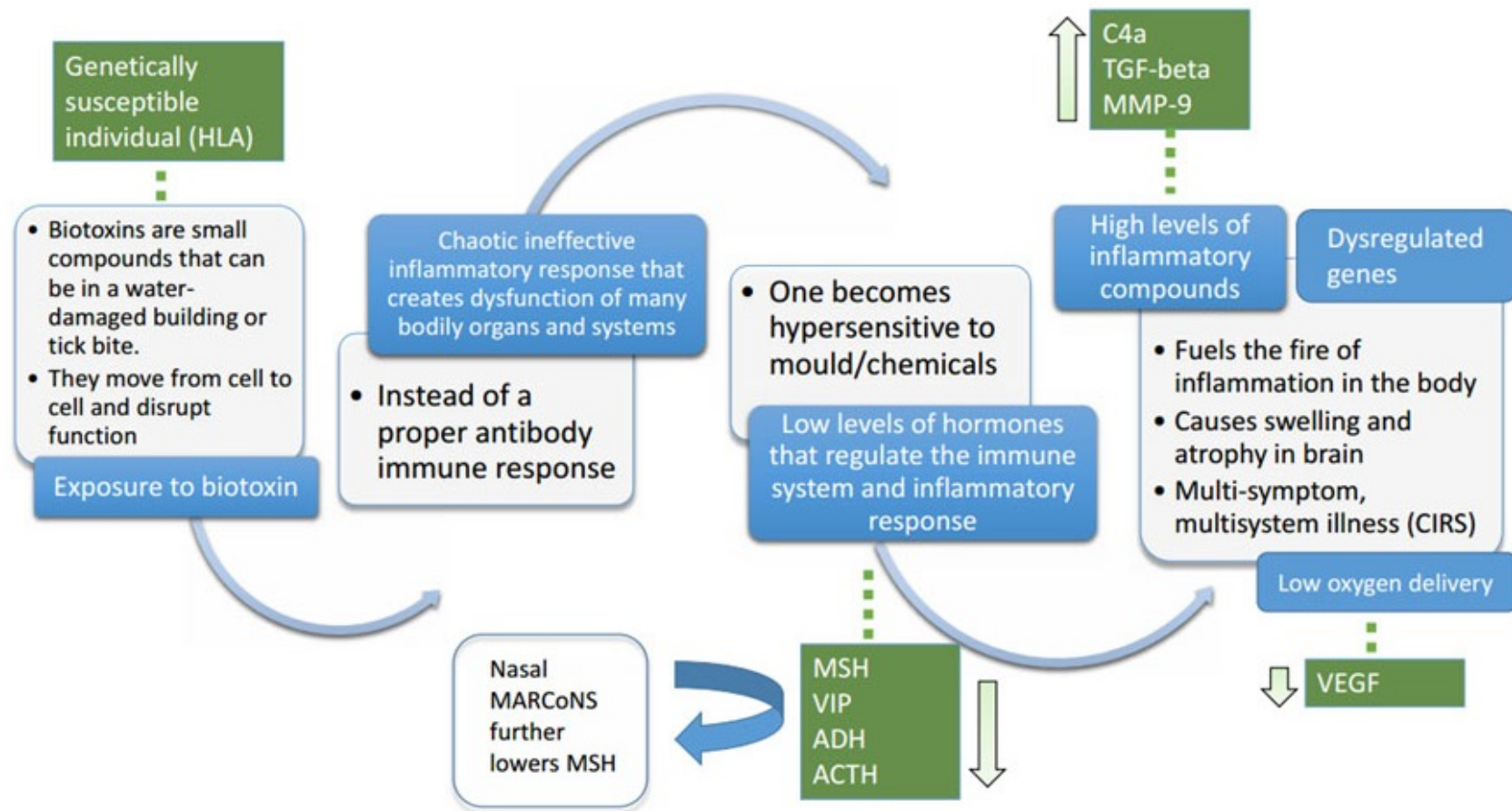
In Hashimoto's thyroiditis, large amounts of damaged immune cells invade the thyroid. These immune cells are called lymphocytes; this is where Hashimoto's other name—chronic lymphocytic thyroiditis—is derived from.



Drivers of AI Response



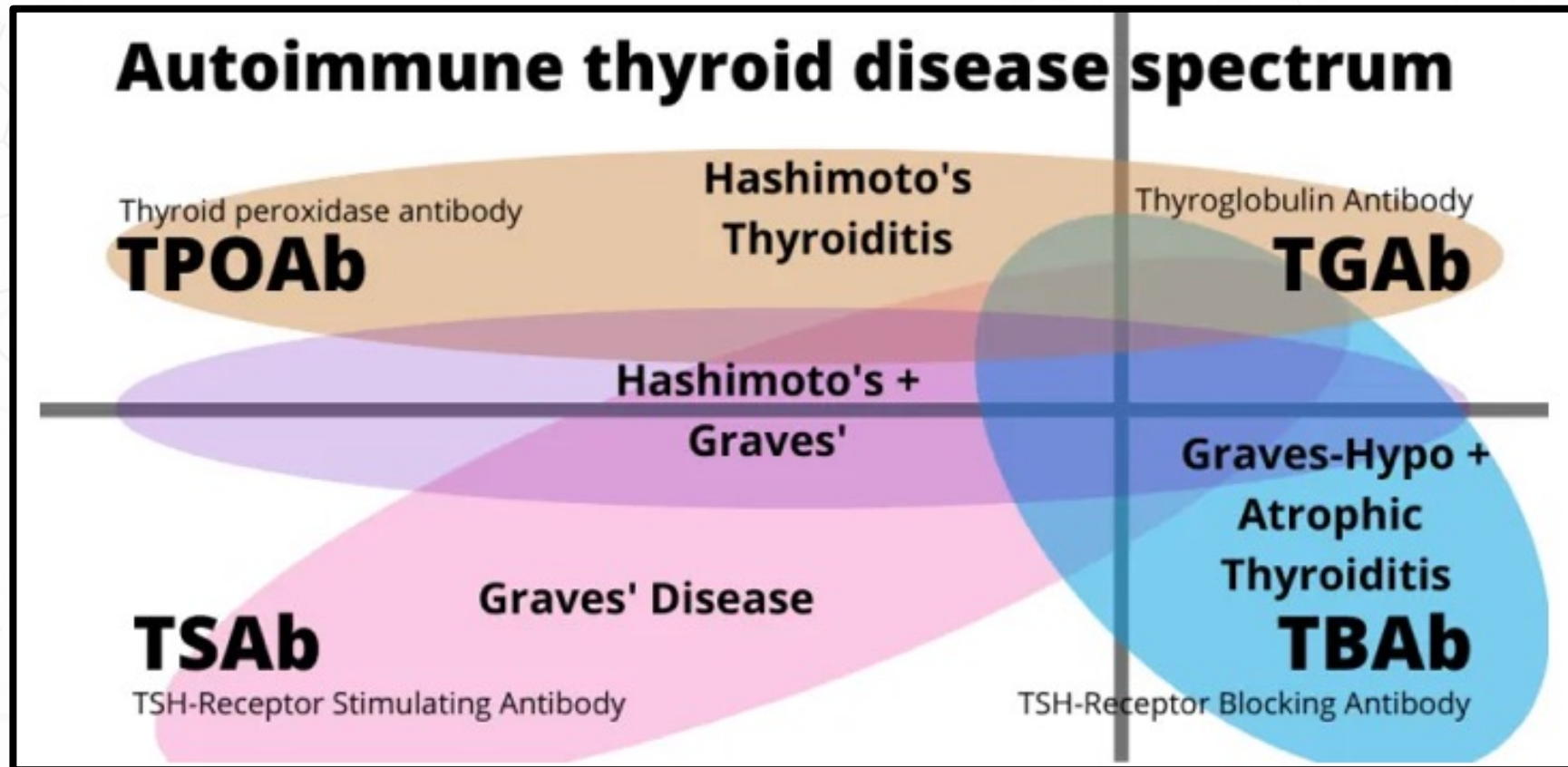


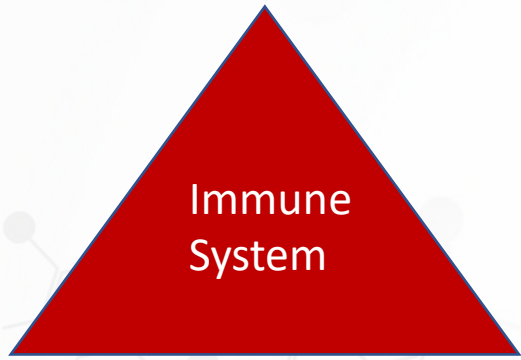


Adapted from The Biotoxin Pathway, © R.Shoemaker 2011

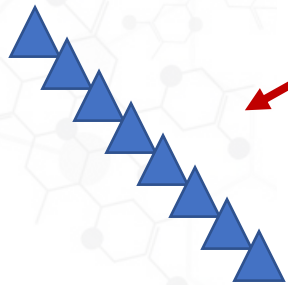


Autoimmunity

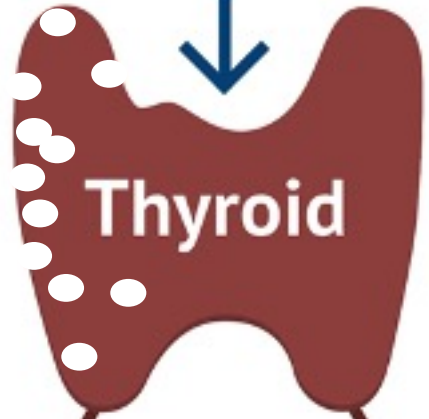




- Lifestyle + Environment:
- Nickel
- Mold
- LPS
- Blood Sugar Balance
- Inflammation
- Total Tox Panel

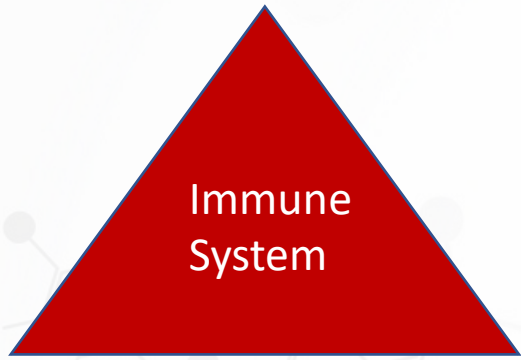


TSH



T4 → T3



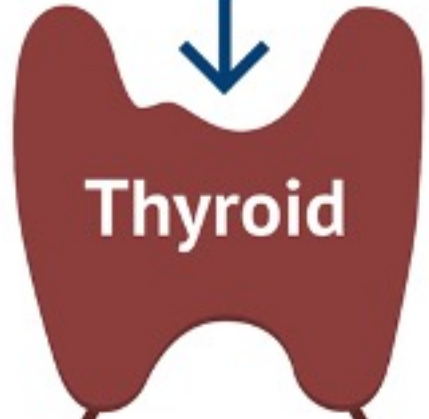


TSI (TSH Receptor Stimulating Ab)

- Lifestyle + Environment:
- Nickel
- Mold
- LPS
- Blood Sugar Balance
- Inflammation
- Total Tox Panel

Anterior Pituitary

TSH



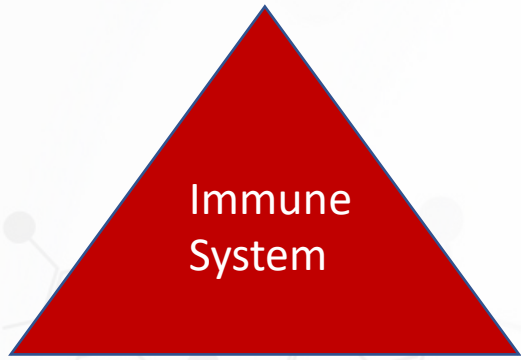
Thyroid

= ↓ TSH

T4 → T3

T4 T4 T4 T4
T4 T4 T4 T4

T3 T3 T3
T3 T3 T3

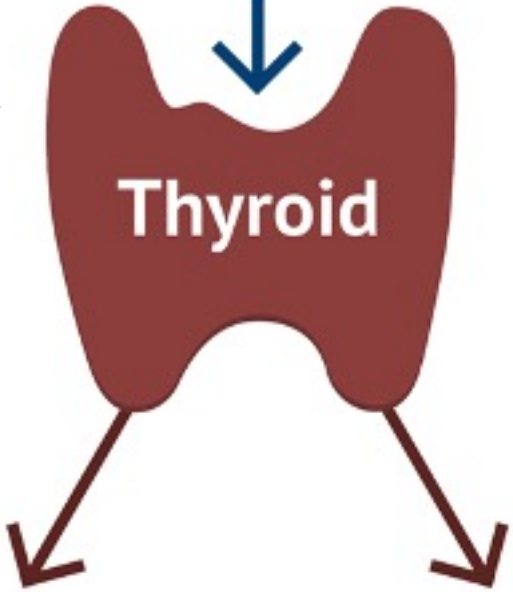


TBI (TSH Receptor Blocking Ab)

- Lifestyle + Environment:
- Nickel
- Mold
- LPS
- Blood Sugar Balance
- Inflammation
- Total Tox Panel

Anterior Pituitary

TSH



Thyroid

(Thyroid Atrophy)

= ↑ TSH

Example Thyroid Variables:

- TSH
- T3
- T4
- Proteins
- Inflammation (T cells)
- ROS
- Enzymes
- Building blocks
- cofactors



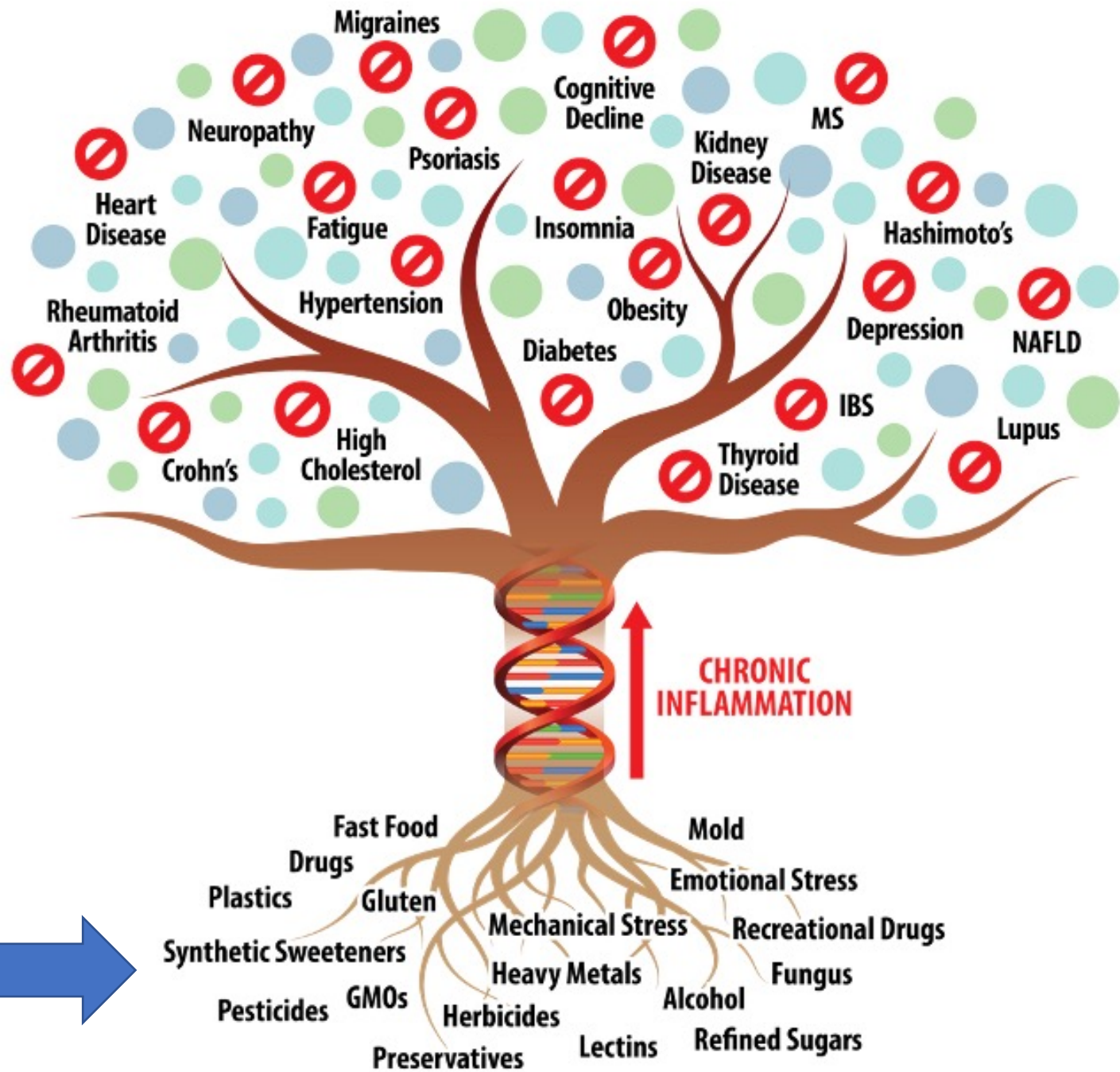
Note: Patient's symptoms improved...

Thyroid Panel With TSH

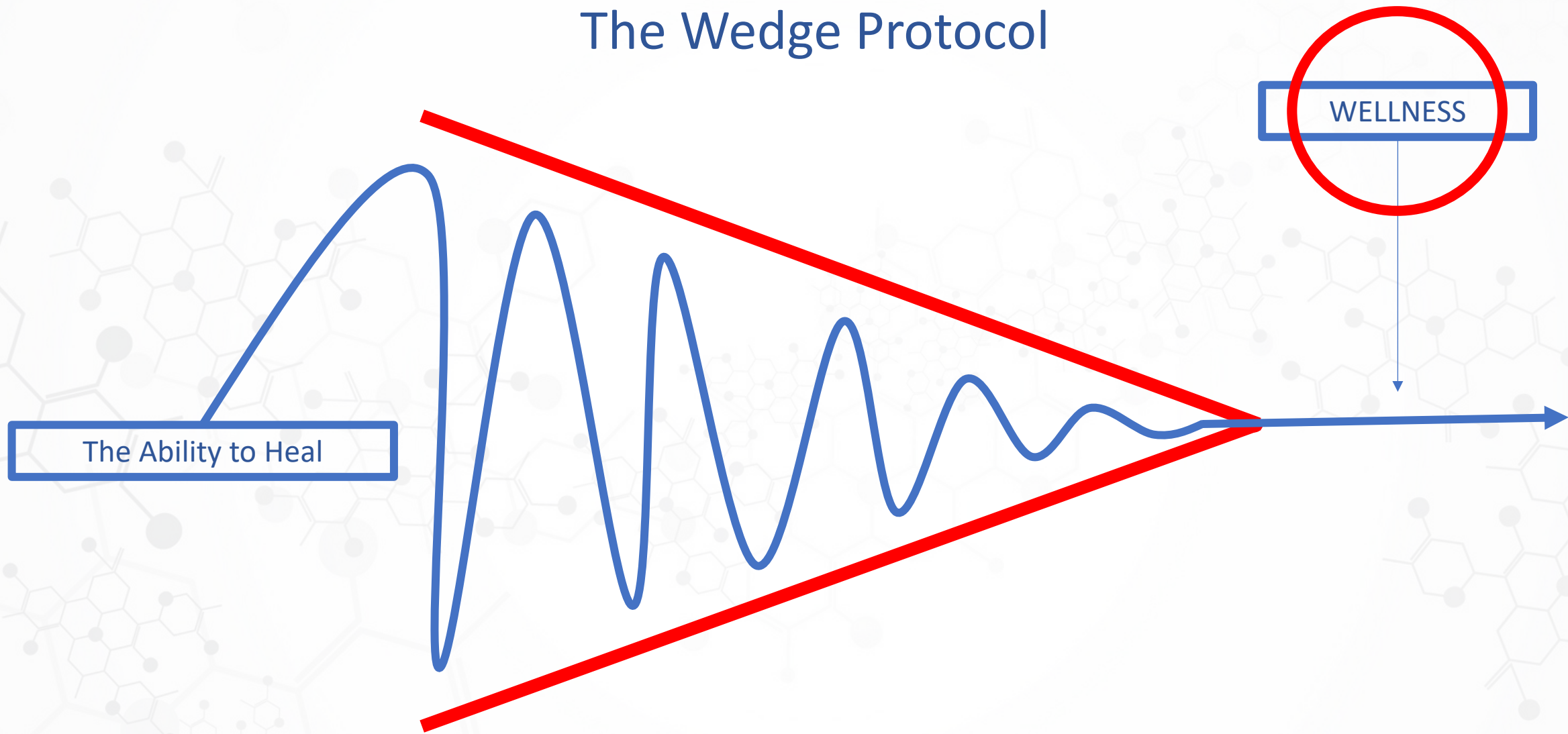
Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▲ TSH ⁰¹	19.900 High	6.260 02/13/2023	uIU/mL	0.450-4.500
Thyroxine (T4) ⁰¹	6.2	5.3 02/13/2023	ug/dL	4.5-12.0
T3 Uptake ⁰¹	27	30 02/13/2023	%	24-39
Free Thyroxine Index	1.7	1.6 02/13/2023		1.2-4.9

Iron and TIBC





The Wedge Protocol



The Ability to Heal

WELLNESS

