Casual Friday Series

Endocrine Expertise: Grave's Mechanics

A Biogenetix Clinical Presentation

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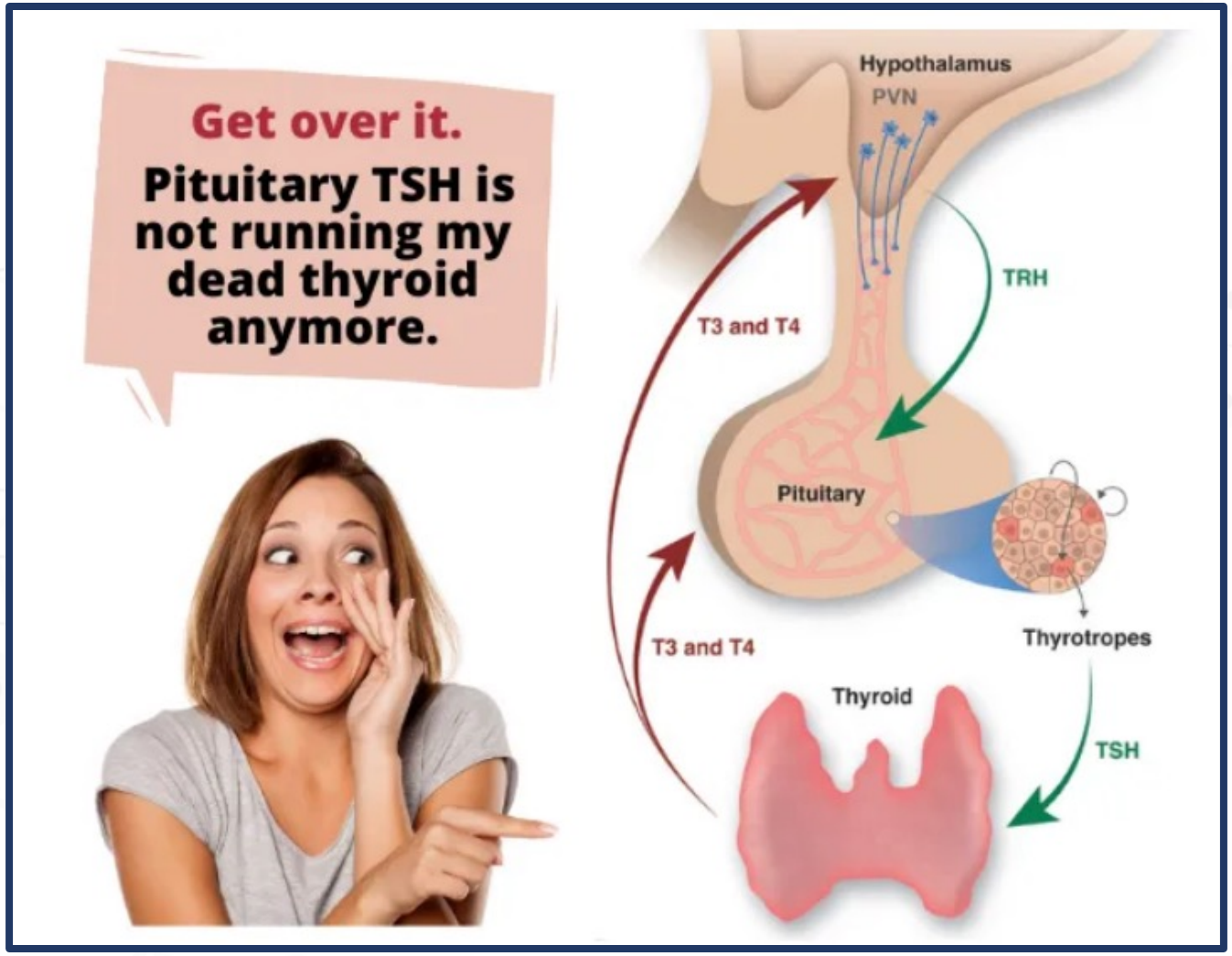
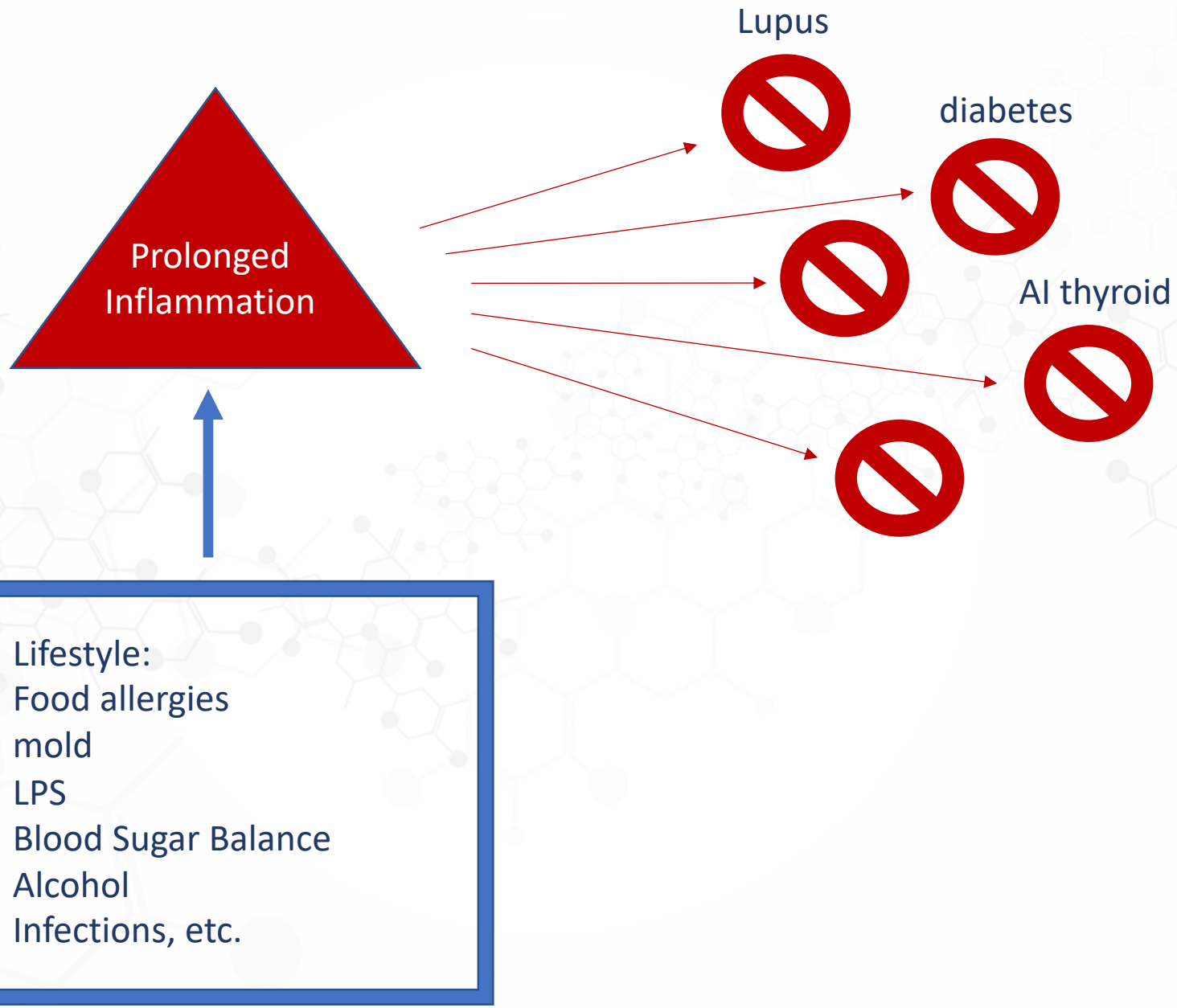
Disclaimer

- *Information in this presentation is not intended, in itself, 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.*

Lifestyle + Genetics = Chronic Health IMPROVEMENT



https://thyroidpatients.ca/2020/07/14/visual-bias-inflated-pituitary-hpt/


Lupus
diabetes
AI thyroid
Prolonged Inflammation
Lifestyle:
Food allergies
mold
LPS
Blood Sugar Balance
Alcohol
Infections, etc.

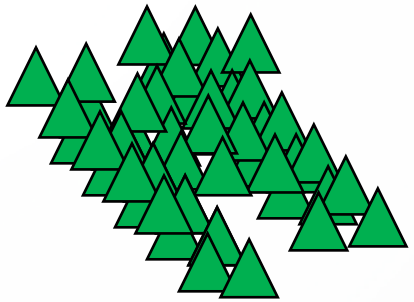
Pituitary

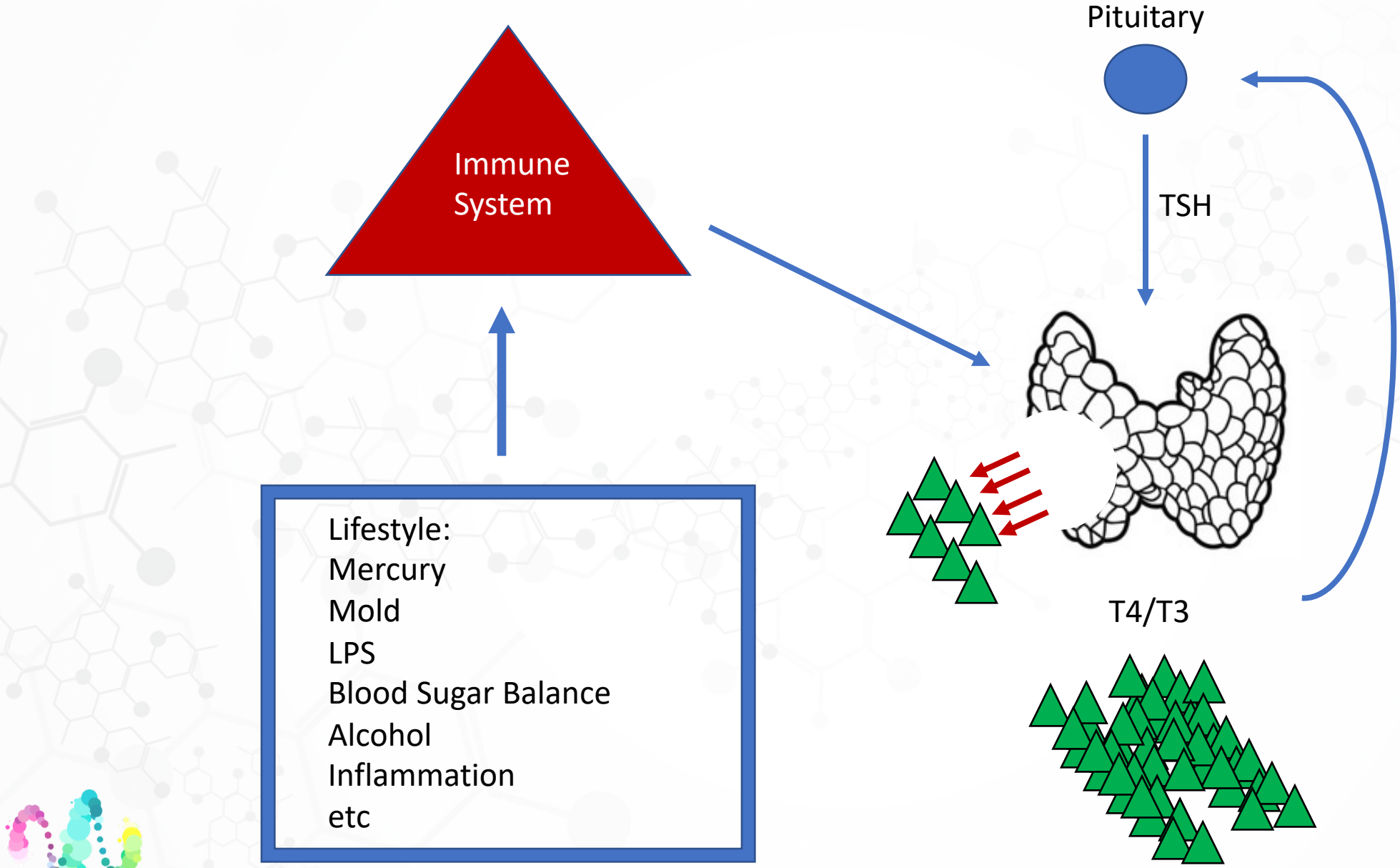
Immune System

TSH

Lifestyle:
Mercury
Mold
LPS
Blood Sugar Balance
Alcohol
Inflammation
etc

T4/T3

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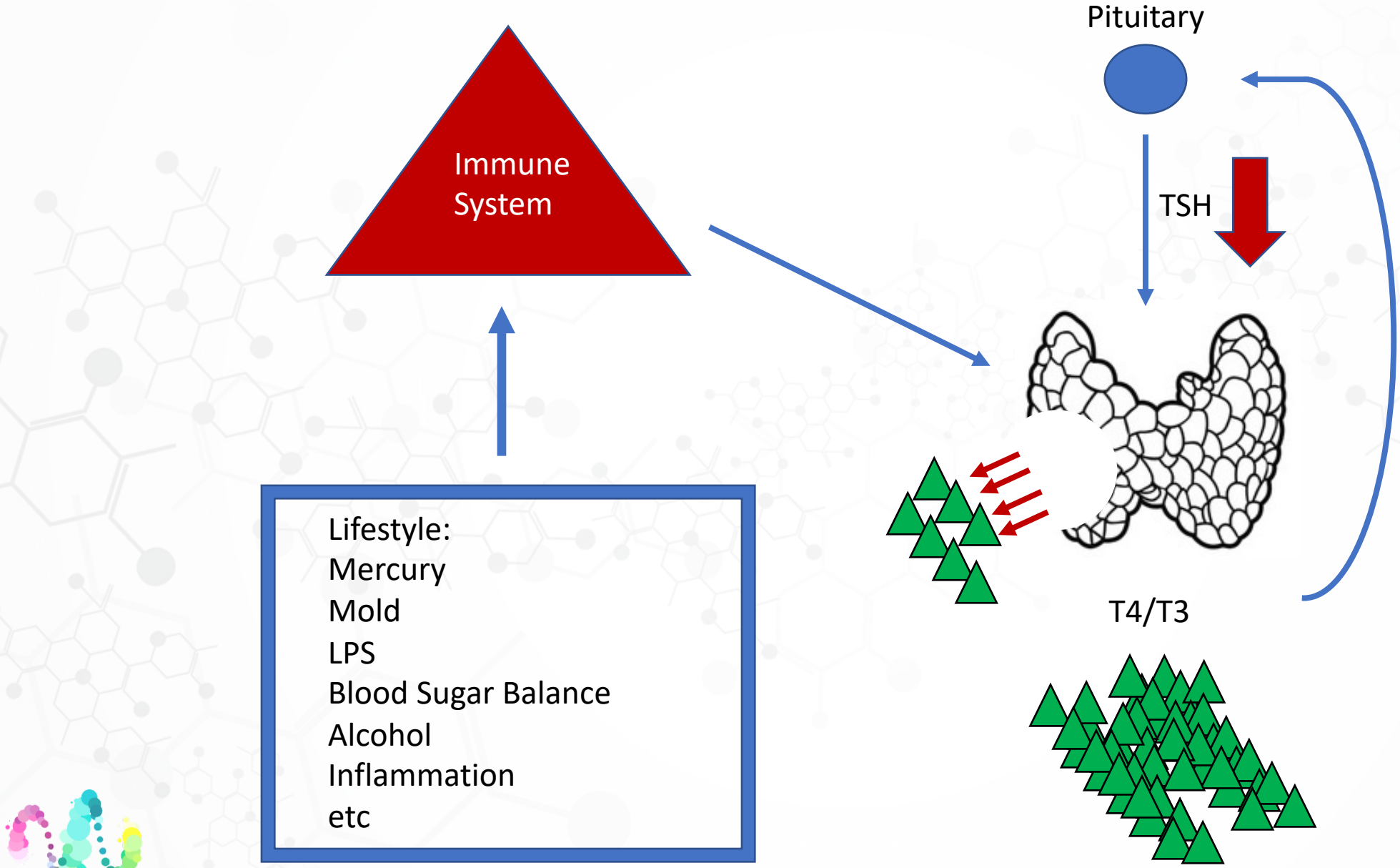
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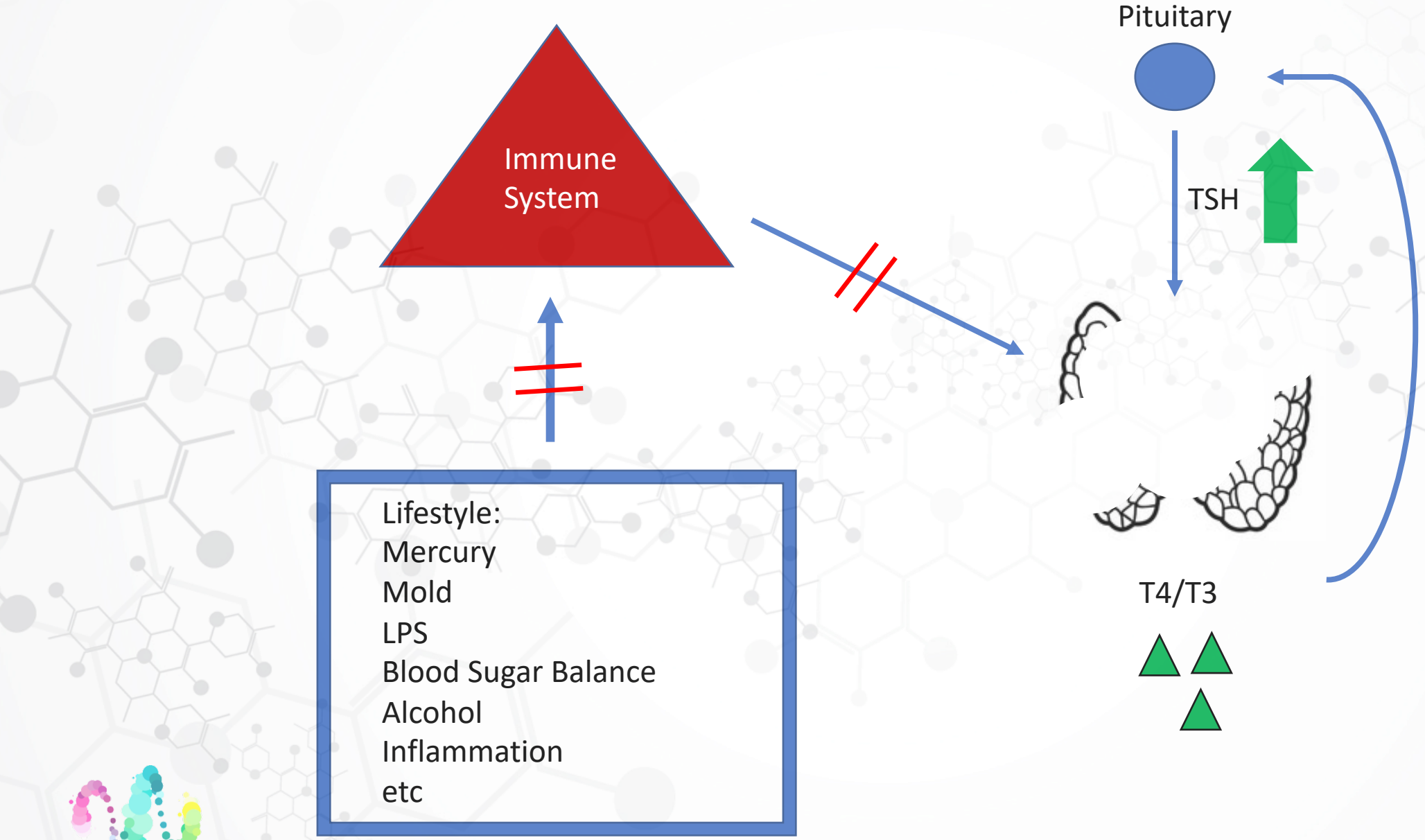
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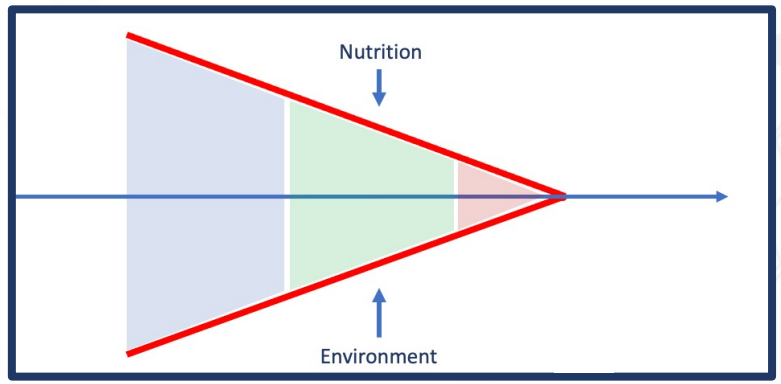
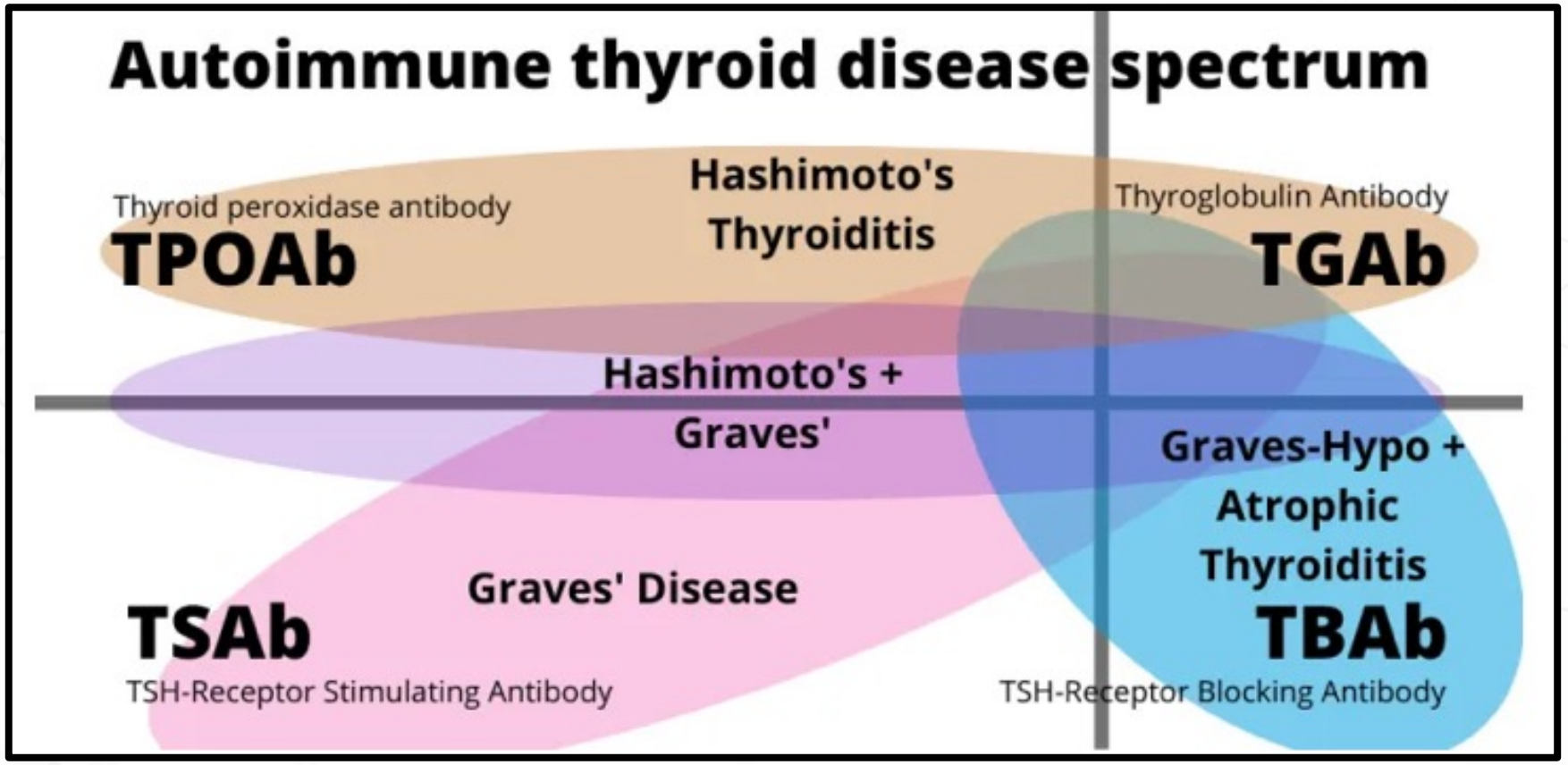




https://thyroidpatients.ca/2020/04/05/remissions-and-fluctuations-trab/

TSAb

Thyrotropin-receptor antibody is an autoantibody to the thyroid cell receptor for thyroid-stimulating hormone. It can be demonstrated in 90% of patients with Graves' disease, and is the cause of the hyperthyroidism of that condition. The characterization of TRA resolved much confusion about long-acting thyroid stimulator (LATS) and LATS protector, which are both, in fact, thyroid-stimulating autoantibodies which simply behaved differently in animal test systems. These antibodies are present in 50% of euthyroid Graves' disease as well as hyperthyroid patients. They play a major role in the pathogenesis of Graves' disease. Detection of these antibodies is useful in prediction of neonatal hyperthyroidism and prediction of relapse of hyperthyroidism.

https://www.labcorp.com/tests/010314/thyrotropin-receptor-antibody-serum

Synonyms

- LATS
- Long-acting Thyroid Stimulator
- TBIAb
- Thyrotropin-binding Inhibitory Immunoglobulin
- TRAb
- TSAb
- TSH Receptor Antibody
- TSH Receptor-binding Inhibitory Immunoglobulin

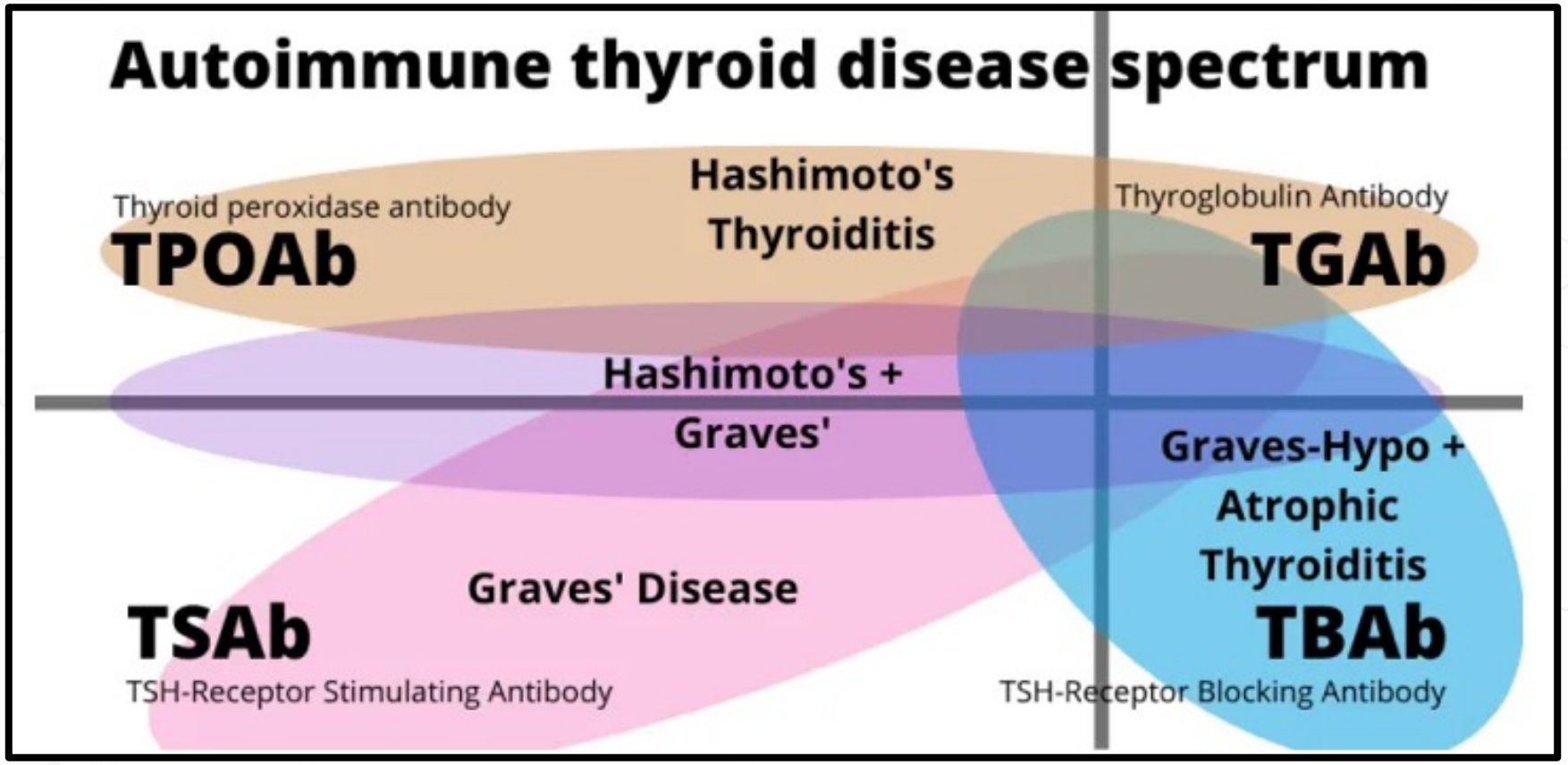
Article | PDF Available

Thyrotropin Receptor Blocking Antibodies

October 2018 · Hormone and Metabolic Research 50(12)

DOI:10.10

Autoantibodies (Ab) against the thyroid-stimulating hormone receptor (TSHR) are frequently found in autoimmune thyroid disease (AITD). Autoantibodies to the TSHR (anti-TSHR-Ab) may mimic or block the action of TSH or be functionally neutral. Measurement of anti-TSHR-Ab can be done either via competitive-binding immunoassays or with functional cell-based bioassays. Antibody-binding assays do not assess anti-TSHR-Ab functionality, but rather measure the concentration of total anti-TSHR binding activity. In contrast, functional cell-based bioassays indicate whether anti-TSHR-Ab have stimulatory or blocking activity. Historically bioassays for anti-TSHR-Ab were research tools and were used to study the pathophysiology of Graves' disease and Hashimoto's thyroiditis. In the past, bioassays for anti-TSHR-Abs were laborious and time-consuming and varied widely in performance from laboratory to laboratory. Recent advances in the development of cell-based assays, including the application of molecular engineering, have led to significant improvements that have enabled bioassays to be employed routinely in clinical laboratories. The prevalence and functional significance of TSHR blocking autoantibodies (TBAb) in autoimmune hypothyroidism has been less well investigated compared to TSHR stimulating Ab. There is an increasing body of data, however, that demonstrate the clinical utility and relevance of TBAb, and thus the importance of TBAb bioassays, in the diagnosis and management of patients with AITD. In the present review, we summarize the different methods used to measure TBAb, and discuss their prevalence and clinical relevance.



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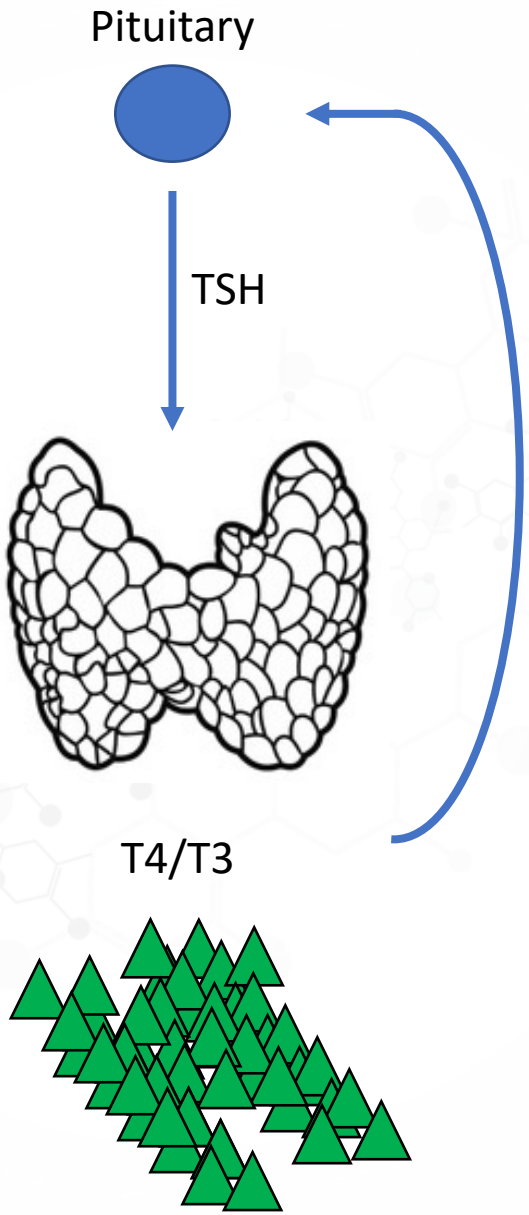
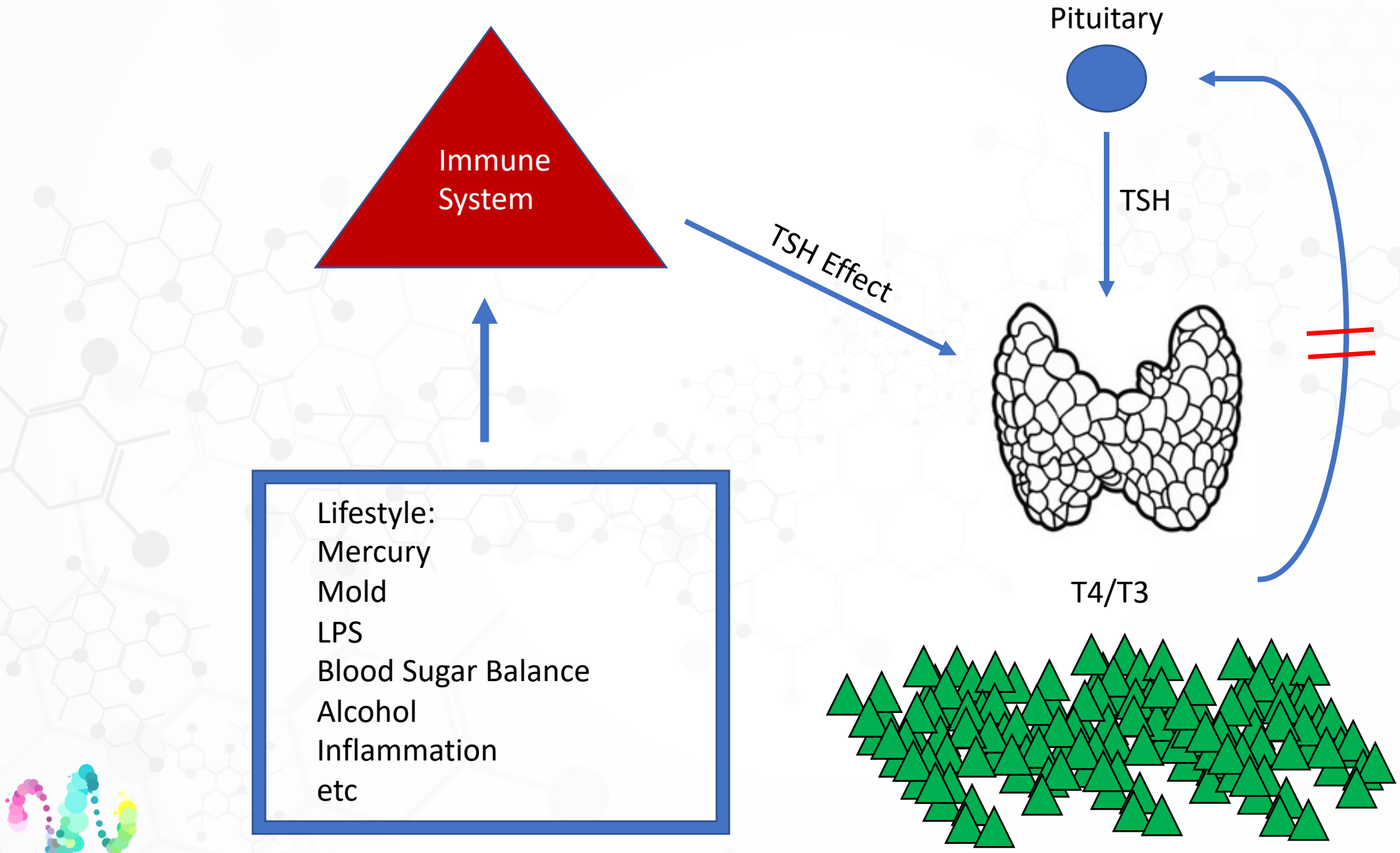
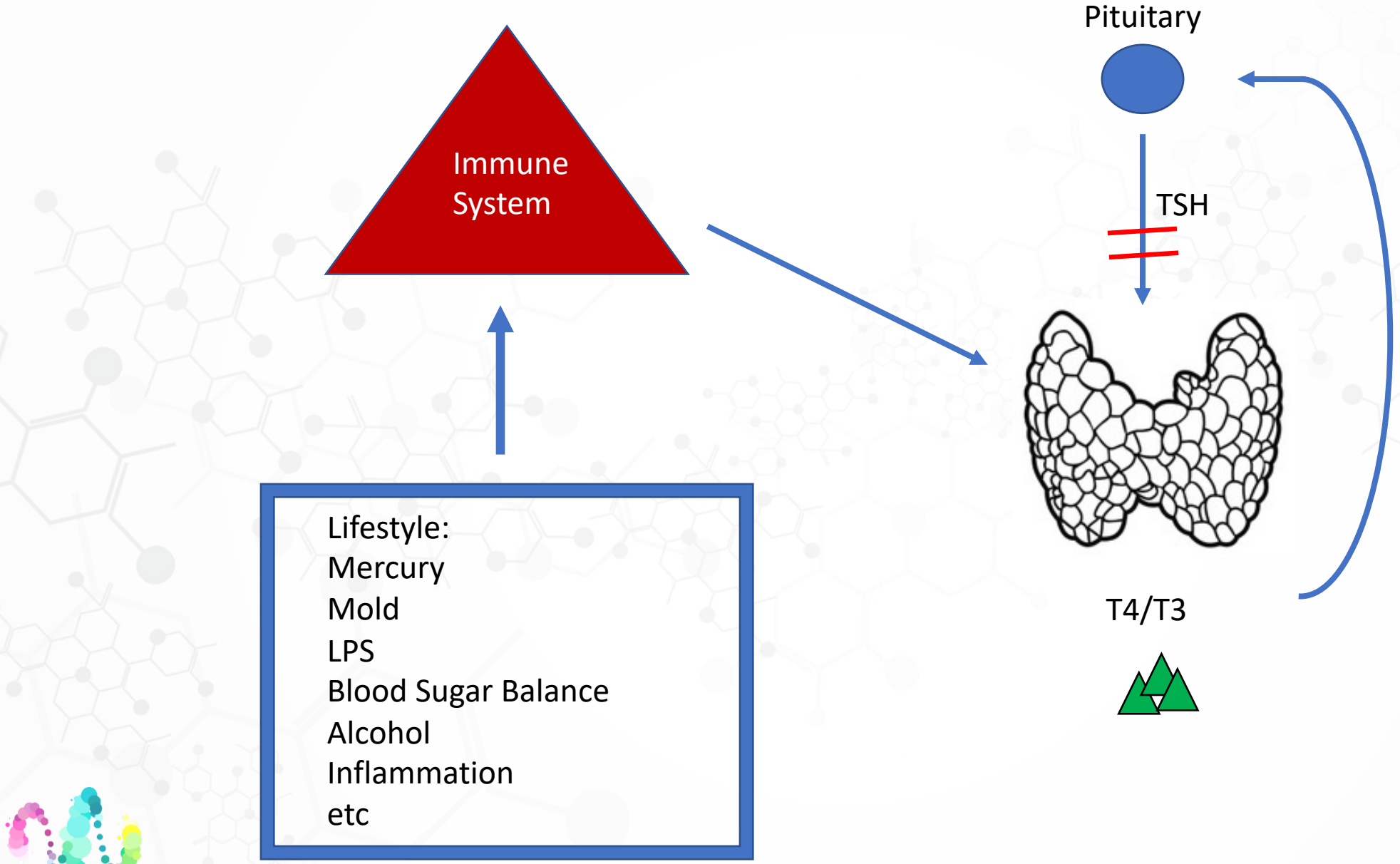
Normal



TSH Receptor Stimulating Ab



TSH Receptor Blocking Ab



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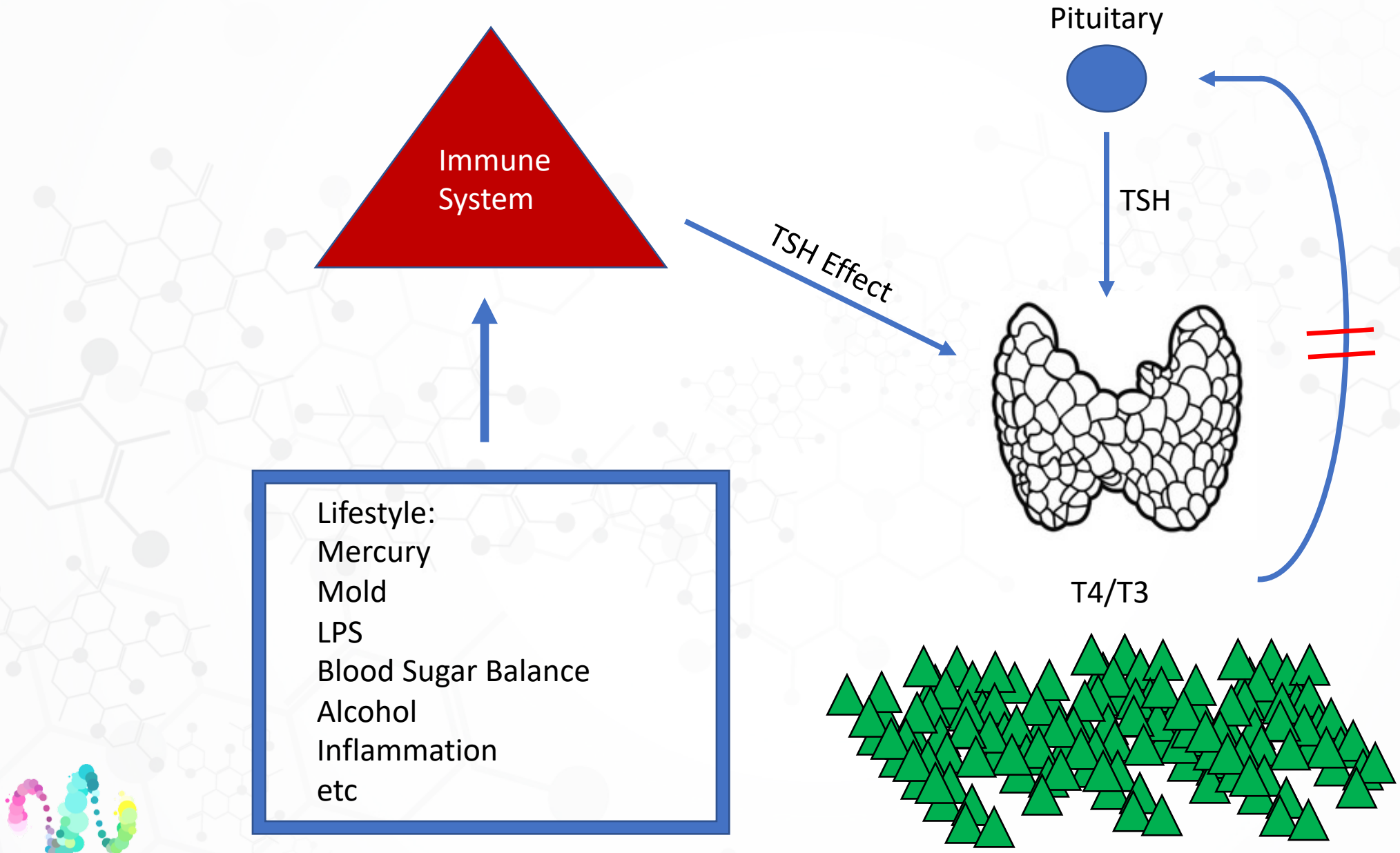

Case Study: 49 Yo male. DX with Grave's

CBC With Differential/Platelet				
WBC	4.4		x10E3/uL	3.4-10.8
RBC	4.65		x10E6/uL	4.14-5.80
Hemoglobin	13.7		g/dL	13.0-17.7
Hematocrit	41.6		%	37.5-51.0
MCV	90		fL	79-97
MCH	29.5		pg	26.6-33.0
MCHC	32.9		g/dL	31.5-35.7
RDW	**15.7**	**High**	%	11.6-15.4
Platelets	**132**	**Low**	x10E3/uL	150-450
Neutrophils	43		%	Not Estab.
Lymphs	47		%	Not Estab.
Monocytes	6		%	Not Estab.
Eos	3		%	Not Estab.
Basos	1		%	Not Estab.
Neutrophils (Absolute)	1.9		x10E3/uL	1.4-7.0
Lymphs (Absolute)	2.1		x10E3/uL	0.7-3.1
Monocytes(Absolute)	0.3		x10E3/uL	0.1-0.9
Eos (Absolute)	0.2		x10E3/uL	0.0-0.4
Baso (Absolute)	0.0		x10E3/uL	0.0-0.2
Immature Granulocytes	0		%	Not Estab.
Immature Grans (Abs)	0.0		x10E3/uL	0.0-0.1

Case Study: 49 Yo male. DX with Grave's

eGFR If Africn Am	69		mL/min/1.73	>59
BUN/Creatinine Ratio	**6**	**Low**		9-20
Sodium	143		mmol/L	134-144
Potassium	3.6		mmol/L	3.5-5.2
Chloride	102		mmol/L	96-106
Carbon Dioxide, Total	27		mmol/L	20-29
Calcium	9.4		mg/dL	8.7-10.2
Protein, Total	7.0		g/dL	6.0-8.5
Albumin	4.9		g/dL	4.0-5.0
Globulin, Total	2.1		g/dL	1.5-4.5
A/G Ratio	**2.3**	**High**		1.2-2.2
Bilirubin, Total	0.5		mg/dL	0.0-1.2
Alkaline Phosphatase	**134**	**High**	IU/L	39-117
AST (SGOT)	31		IU/L	0-40
ALT (SGPT)	40		IU/L	0-44

Lipid Panel				
Cholesterol, Total	**288**	**High**	mg/dL	100-199
Triglycerides	69		mg/dL	0-149
HDL Cholesterol	73		mg/dL	>39
VLDL Cholesterol Cal	11		mg/dL	5-40
LDL Chol Calc (NIH)	**204**	**High**	mg/dL	0-99

Case Study: 49 Yo male. DX with Grave's

Hemoglobin A1c				
Hemoglobin A1c	**4.5**	**Low**	%	4.8-5.6
Please Note:				
TSH	**81.400**	**High**	uIU/mL	0.450-4.500
Estradiol	18.0		pg/mL	7.6-42.6
Roche ECLIA methodology				
Thyrotropin Receptor Ab, Serum	**3.66**	**High**	IU/L	0.00-1.75

Case Study: 49 Yo male. DX with Grave's

Thyroid Stim Immunoglobulin	**2.16**	**High**	IU/L	0.00-0.55
Testosterone, Free, Direct				
Free Testosterone(Direct)	**6.7**	**Low**	pg/mL	6.8-21.5
Homocyst(e)ine	12.7		umol/L	0.0-14.5
GGT	30		IU/L	0-65
Thyroxine (T4)	***1.1***	***Alert***	ug/dL	4.5-12.0
T3 Uptake				
T3 Uptake	**13**	**Low**	%	24-39
Free Thyroxine Index	**0.1**	**Low**		1.2-4.9
Triiodothyronine (T3)	**45**	**Low**	ng/dL	71-180
Thyroglobulin Antibody	**5.6**	**High**	IU/mL	0.0-0.9
Thyroglobulin Antibody measured by Beckman Coulter Methodology				
Magnesium	2.2		mg/dL	1.6-2.3
Ferritin, Serum	211		ng/mL	30-400
Thyroid Peroxidase (TPO) Ab	**438**	**High**	IU/mL	0-34
Sex Horm Binding Glob, Serum	**60.5**	**High**	nmol/L	16.5-55.9

Case Study: 49 Yo male. DX with Grave's

Patient is on Methimizole – a med that prevents the thyroid from producing too much thyroid hormone.

Case Study: 49 Yo male. DX with Grave's

CBC With Differential/Platelet				
WBC	4.0		x10E3/uL	3.4-10.8
RBC	4.26		x10E6/uL	4.14-5.80
Hemoglobin	**12.7**	**Low**	g/dL	13.0-17.7
Hematocrit	**37.1**	**Low**	%	37.5-51.0
MCV	87		fL	79-97
MCH	29.8		pg	26.6-33.0
MCHC	34.2		g/dL	31.5-35.7
RDW	11.9		%	11.6-15.4
Platelets	**133**	**Low**	x10E3/uL	150-450
Neutrophils	52		%	Not Estab.
Lymphs	35		%	Not Estab.
Monocytes	9		%	Not Estab.
Eos	3		%	Not Estab.
Basos	1		%	Not Estab.
Neutrophils (Absolute)	2.1		x10E3/uL	1.4-7.0
Lymphs (Absolute)	1.4		x10E3/uL	0.7-3.1
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Baso (Absolute)	0.0		x10E3/uL	0.0-0.2
Immature Granulocytes	0		%	Not Estab.
Immature Grans (Abs)	0.0		x10E3/uL	0.0-0.1

Case Study: 49 Yo male. DX with Grave's

Testosterone, Serum	709		ng/dL	264-916

Adult male reference interval is based on a population of healthy nonobese males (BMI <30) between 19 and 39 years old.
Travison, et.al. JCEM 2017,102;1161-1173. PMID: 28324103.

TSH	**0.009**	**Low**	uIU/mL	0.450-4.500
Estradiol	25.1		pg/mL	7.6-42.6

Roche ECLIA methodology

Thyrotropin Receptor Ab, Serum	**1.87**	**High**	IU/L	0.00-1.75
Vitamin D, 25-Hydroxy	49.6		ng/mL	30.0-100.0

Vitamin D deficiency has been defined by the Institute of Medicine and an Endocrine Society practice guideline as a level of serum 25-OH vitamin D less than 20 ng/mL (1,2).
The Endocrine Society went on to further define vitamin D insufficiency as a level between 21 and 29 ng/mL (2).

1. IOM (Institute of Medicine). 2010. Dietary reference intakes for calcium and D. Washington DC: The National Academies Press.
2. Holick MF, Binkley NC, Bischoff-Ferrari HA, et al. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline. JCEM. 2011 Jul; 96(7):1911-30.

C-Reactive Protein, Cardiac	0.83		mg/L	0.00-3.00

Relative Risk for Future Cardiovascular Event

Low	<1.00
Average	1.00 - 3.00
High	>3.00

Thyroid Stim Immunoglobulin	**1.26**	**High**	IU/L	0.00-0.55

Case Study: 49 Yo male. DX with Grave's

eGFR If Africn Am	82		mL/min/1.73	>59
BUN/Creatinine Ratio	**8**	**Low**		9-20
Sodium	144		mmol/L	134-144
Potassium	3.9		mmol/L	3.5-5.2
Chloride	106		mmol/L	96-106
Carbon Dioxide, Total	27		mmol/L	20-29
Calcium	9.6		mg/dL	8.7-10.2
Protein, Total	6.2		g/dL	6.0-8.5
Albumin	4.6		g/dL	4.0-5.0
Globulin, Total	1.6		g/dL	1.5-4.5
A/G Ratio	**2.9**	**High**		1.2-2.2
Bilirubin, Total	0.8		mg/dL	0.0-1.2
Alkaline Phosphatase	**122**	**High**	IU/L	39-117
AST (SGOT)	20		IU/L	0-40
ALT (SGPT)	33		IU/L	0-44

Case Study: 49 Yo male. DX with Grave's

Hemoglobin A1c				
Hemoglobin A1c	**4.2**	**Low**	%	4.8-5.6
Please Note:				
Lipid Panel				
Cholesterol, Total	157		mg/dL	100-199
Triglycerides	43		mg/dL	0-149
HDL Cholesterol	50		mg/dL	>39
VLDL Cholesterol Cal	9		mg/dL	5-40
LDL Chol Calc (NIH)	98		mg/dL	0-99

Case Study: 49 Yo male. DX with Grave's

GGT	20		IU/L	0-65
Thyroxine (T4)	10.8		ug/dL	4.5-12.0
T3 Uptake				
T3 Uptake	29		%	24-39
Free Thyroxine Index	3.1			1.2-4.9
Triiodothyronine (T3)	158		ng/dL	71-180
Thyroglobulin Antibody	**31.0**	**High**	IU/mL	0.0-0.9
Thyroglobulin Antibody measured by Beckman Coulter Methodology				
Magnesium	2.3		mg/dL	1.6-2.3
Ferritin, Serum	188		ng/mL	30-400
Thyroid Peroxidase (TPO) Ab	**367**	**High**	IU/mL	0-34
Sex Horm Binding Glob, Serum	**70.9**	**High**	nmol/L	16.5-55.9

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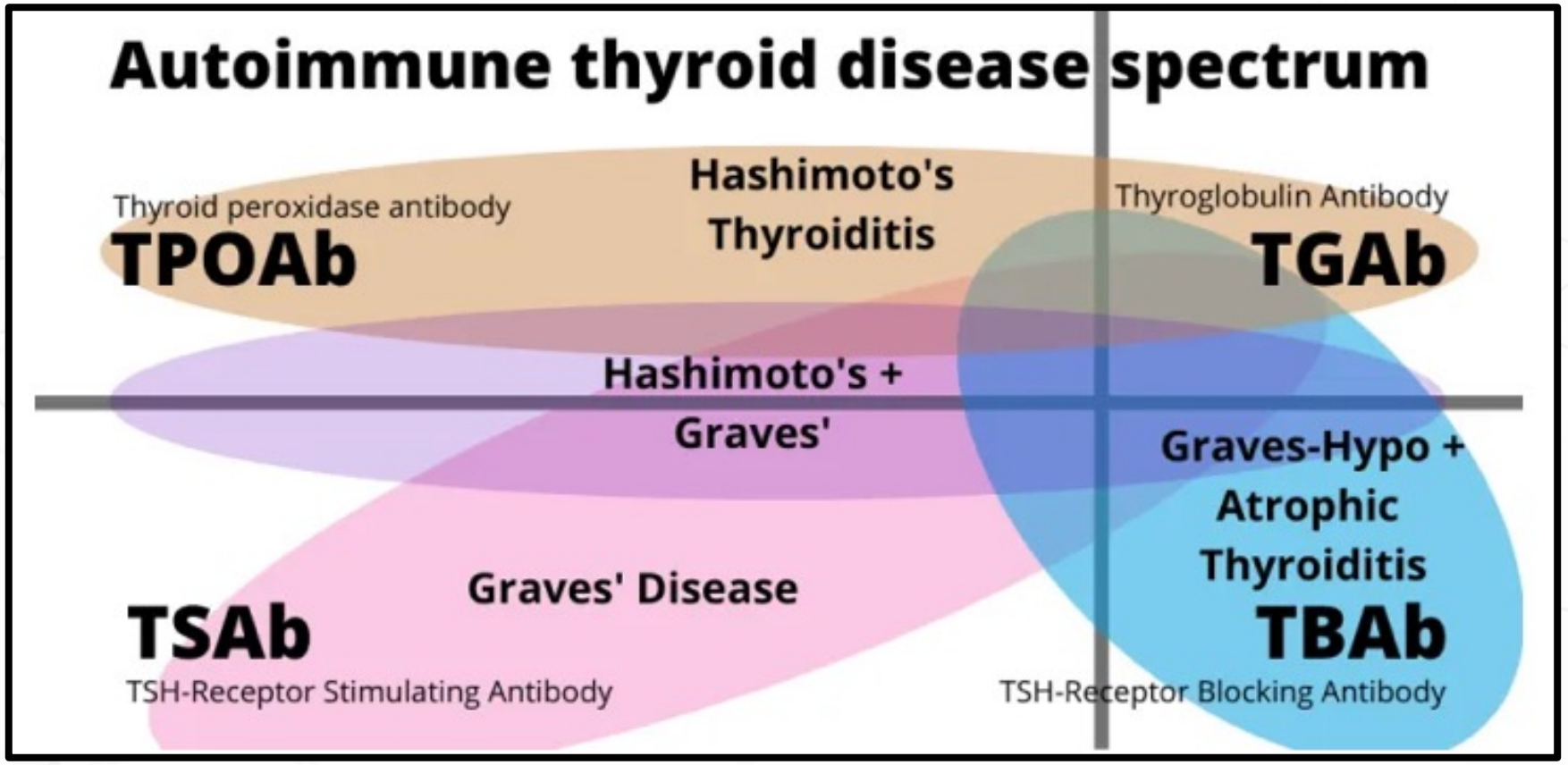

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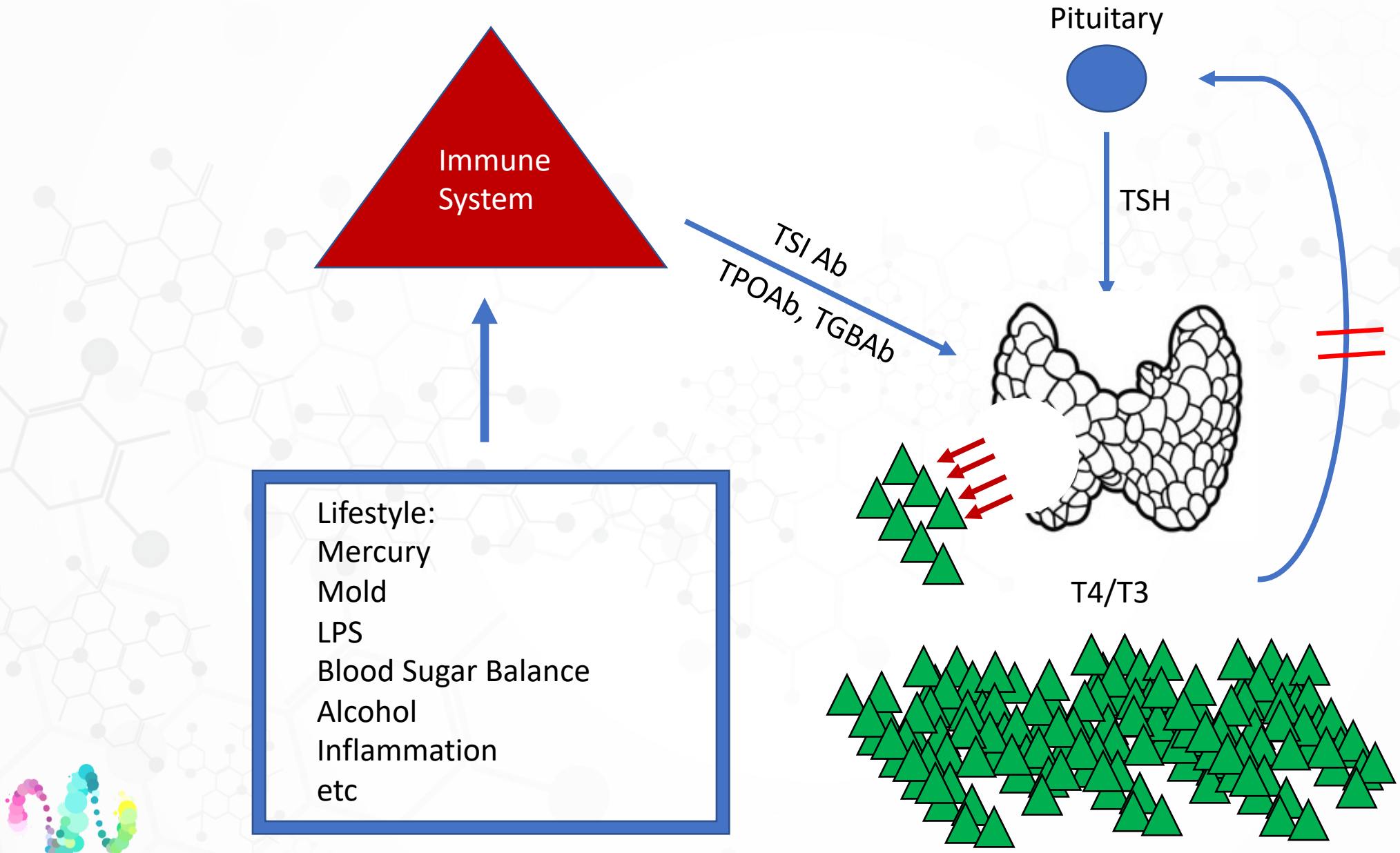

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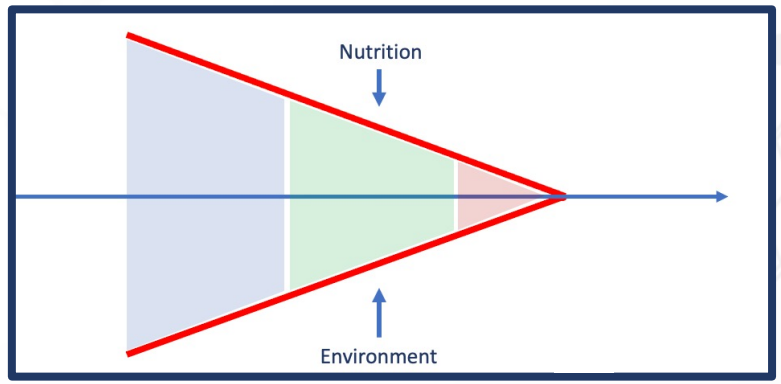

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