

Casual Friday Series

# Functional Blood Chemistry Series

## Thyroid Case Review

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.*

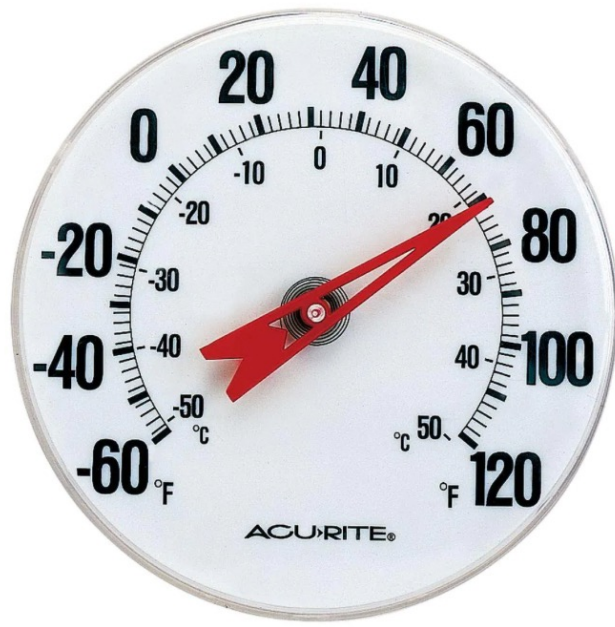
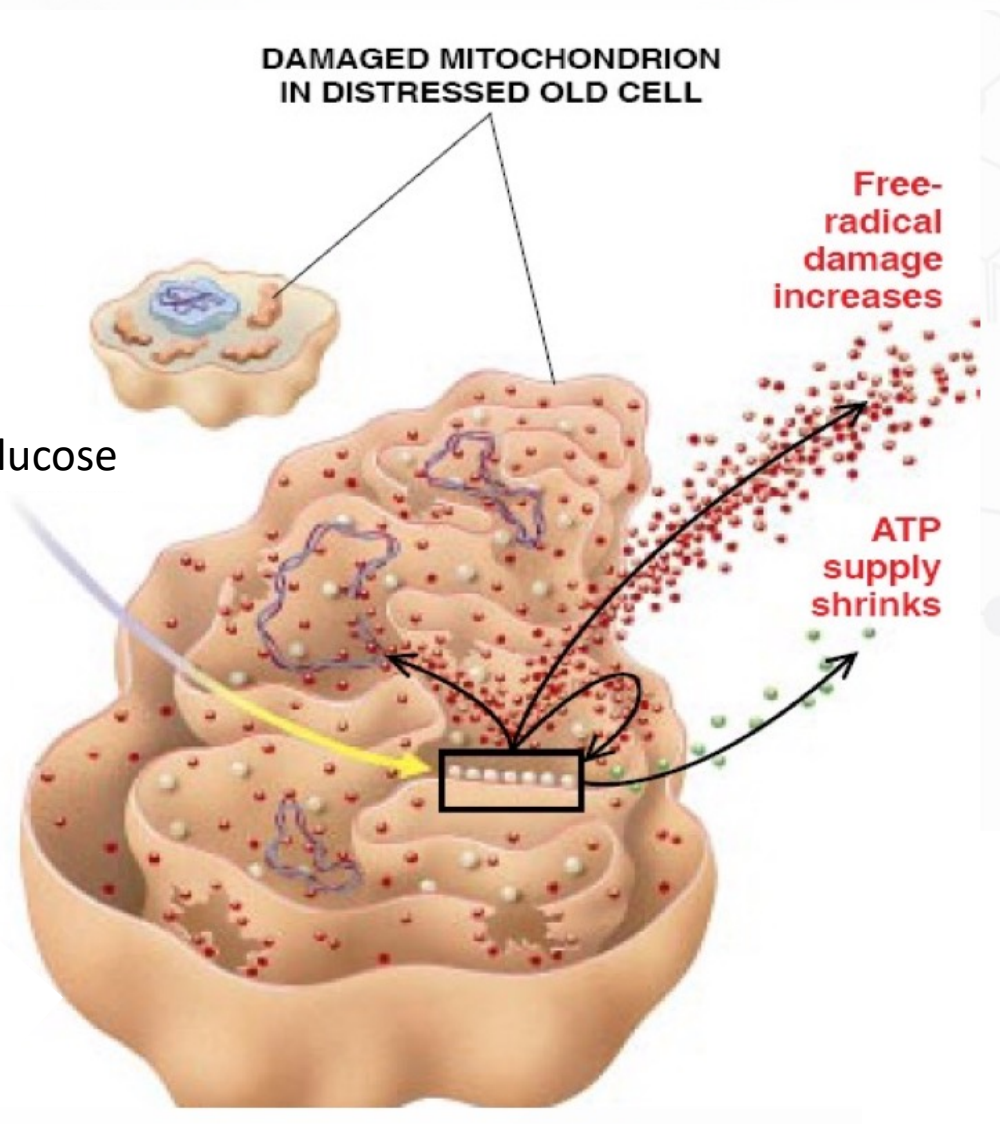


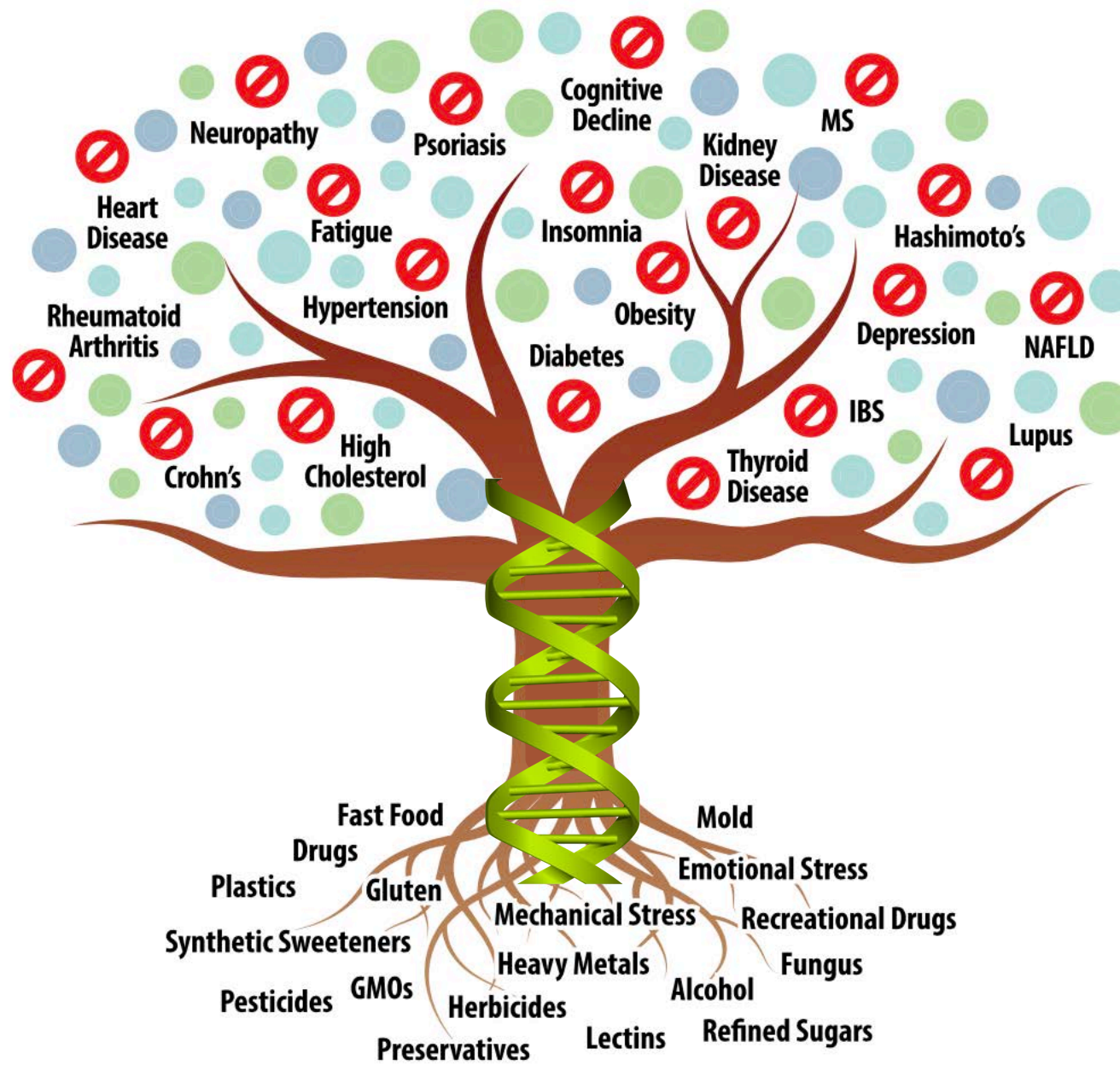
O<sub>2</sub>, Glucose

DAMAGED MITOCHONDRION  
IN DISTRESSED OLD CELL

Free-radical  
damage  
increases

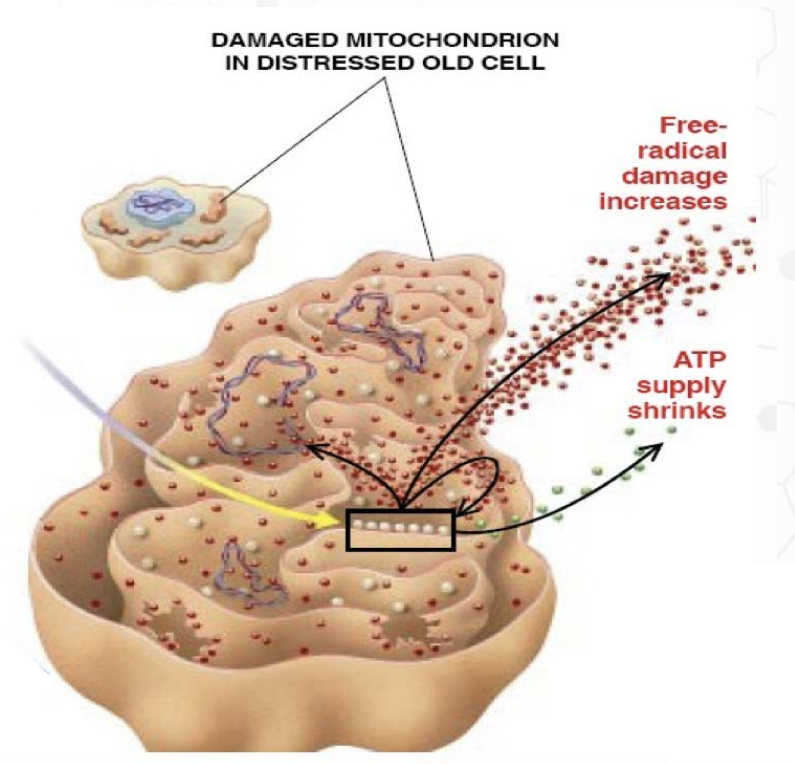
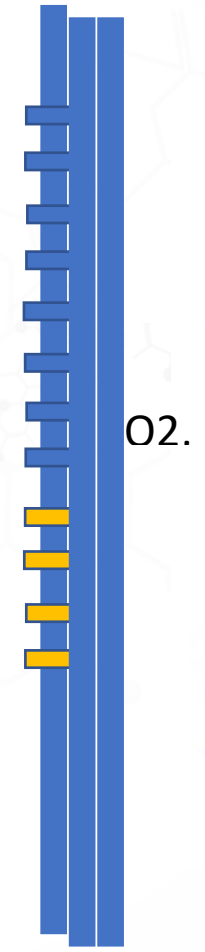
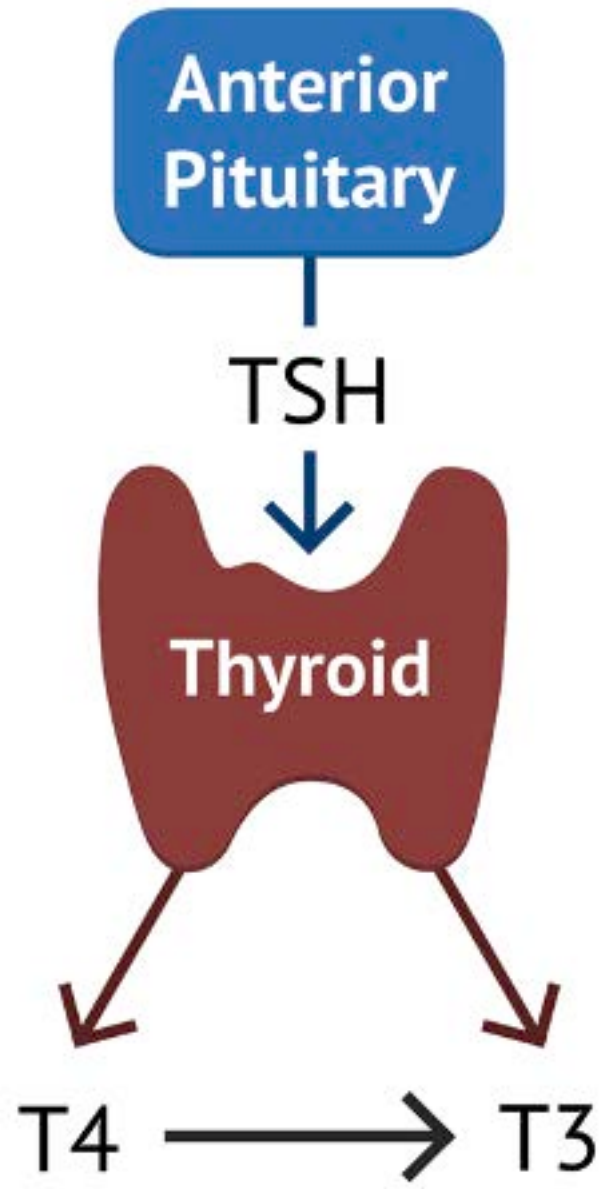
ATP  
supply  
shrinks





Who are the “Sporks” in your office?





# Case One...

- 58 yo Male
- Presents with...
  - Fatigue, No Energy, Numbness and tingling in both feet, hard to loose weight
  - DDX with Type 2 Diabetes and last known A1c was 6.5
    - No Diabetic medication
  - When asked what he thought the biggest contributor his answer is “Don’t know, thyroid is 12 I’m just not sure what is going on...”
  - Just prescribed Synthroid, taking for roughly a week



# Case One...

## Thyroid Panel With TSH

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▲ <b>TSH</b> <sup>01</sup>	<b>9.170</b> <b>High</b>		uIU/mL	0.450-4.500
Thyroxine (T4) <sup>01</sup>	8.0		ug/dL	4.5-12.0
T3 Uptake <sup>01</sup>	26		%	24-39
Free Thyroxine Index	2.1			1.2-4.9

## Triiodothyronine (T3)

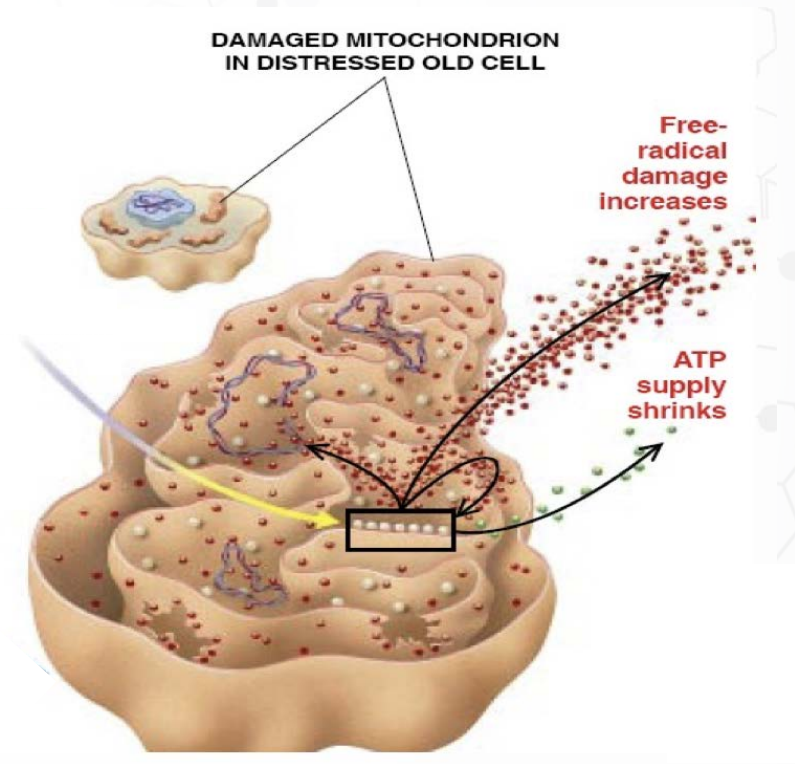
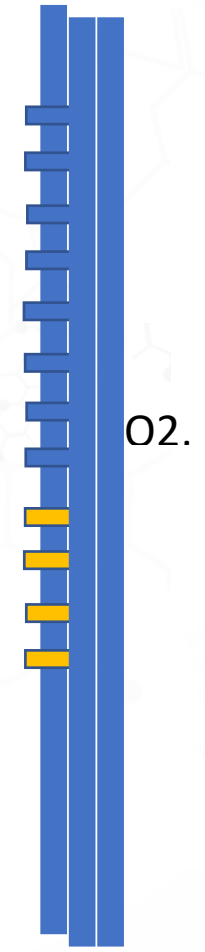
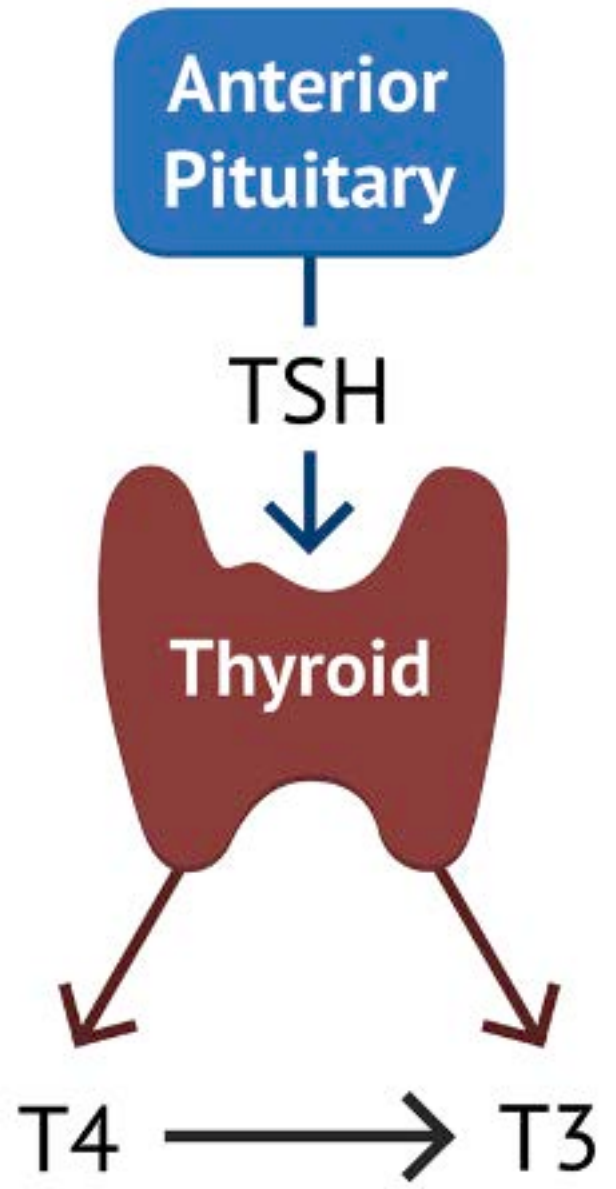
Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Triiodothyronine (T3) <sup>01</sup>	140		ng/dL	71-180

## Thyroid Antibodies

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▲ <b>Thyroid Peroxidase (TPO) Ab</b> <sup>01</sup>	<b>148</b> <b>High</b>		IU/mL	0-34
▲ <b>Thyroglobulin Antibody</b> <sup>01</sup>	<b>22.7</b> <b>High</b>		IU/mL	0.0-0.9

Thyroglobulin Antibody measured by Beckman Coulter Methodology





## Comp. Metabolic Panel (14)

# Case One...

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▲ <b>Glucose</b> <sup>01</sup>	<b>121</b> <b>High</b>		mg/dL	70-99
BUN <sup>01</sup>	17		mg/dL	6-24
Creatinine <sup>01</sup>	0.98		mg/dL	0.76-1.27
eGFR	89		mL/min/1.73	>59
BUN/Creatinine Ratio	17			9-20
Sodium <sup>01</sup>	142		mmol/L	134-144
Potassium <sup>01</sup>	4.3		mmol/L	3.5-5.2
Chloride <sup>01</sup>	102		mmol/L	96-106
Carbon Dioxide, Total <sup>01</sup>	22		mmol/L	20-29
Calcium <sup>01</sup>	9.4		mg/dL	8.7-10.2
Protein, Total <sup>01</sup>	7.0		g/dL	6.0-8.5
Albumin <sup>01</sup>	4.6		g/dL	3.8-4.9

## Comp. Metabolic Panel (14) (Cont.)

Globulin, Total	2.4		g/dL	1.5-4.5
A/G Ratio	1.9			1.2-2.2
Bilirubin, Total <sup>01</sup>	0.9		mg/dL	0.0-1.2
Alkaline Phosphatase <sup>01</sup>	115		IU/L	44-121
AST (SGOT) <sup>01</sup>	19		IU/L	0-40
ALT (SGPT) <sup>01</sup>	38		IU/L	0-44

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▲ <b>GGT</b> <sup>01</sup>	<b>75</b> <b>High</b>		IU/L	0-65



# Case One...



## C-Reactive Protein, Cardiac

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▲ C-Reactive Protein, Cardiac <sup>01</sup>	<b>4.59</b> <b>High</b>		mg/L	0.00-3.00
	Relative Risk for Future Cardiovascular Event			
		Low	<1.00	
		Average	1.00 - 3.00	
		High	>3.00	

## Homocyst(e)ine

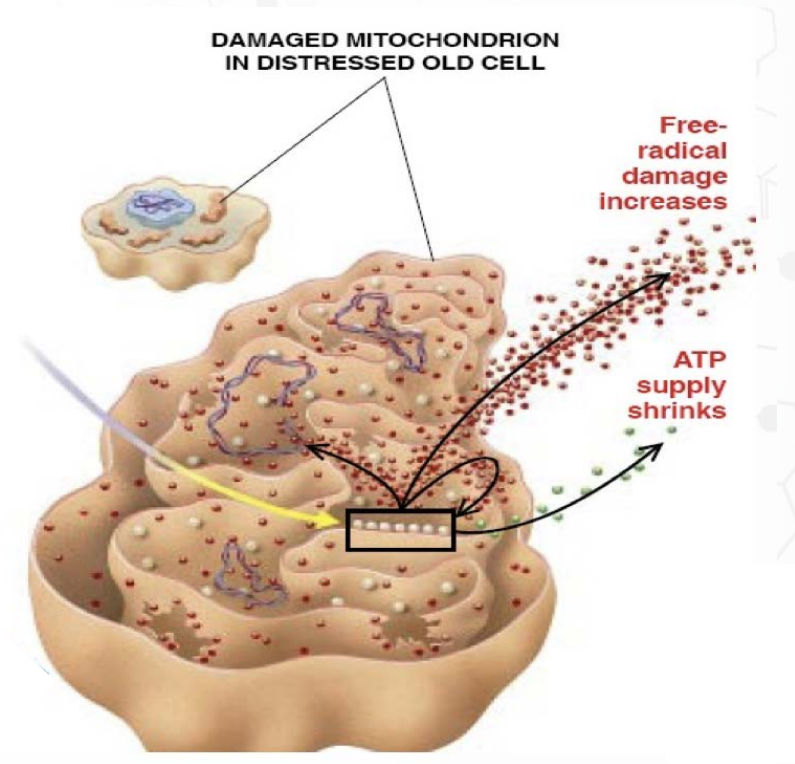
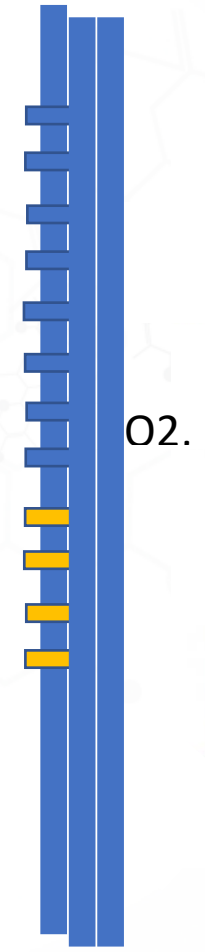
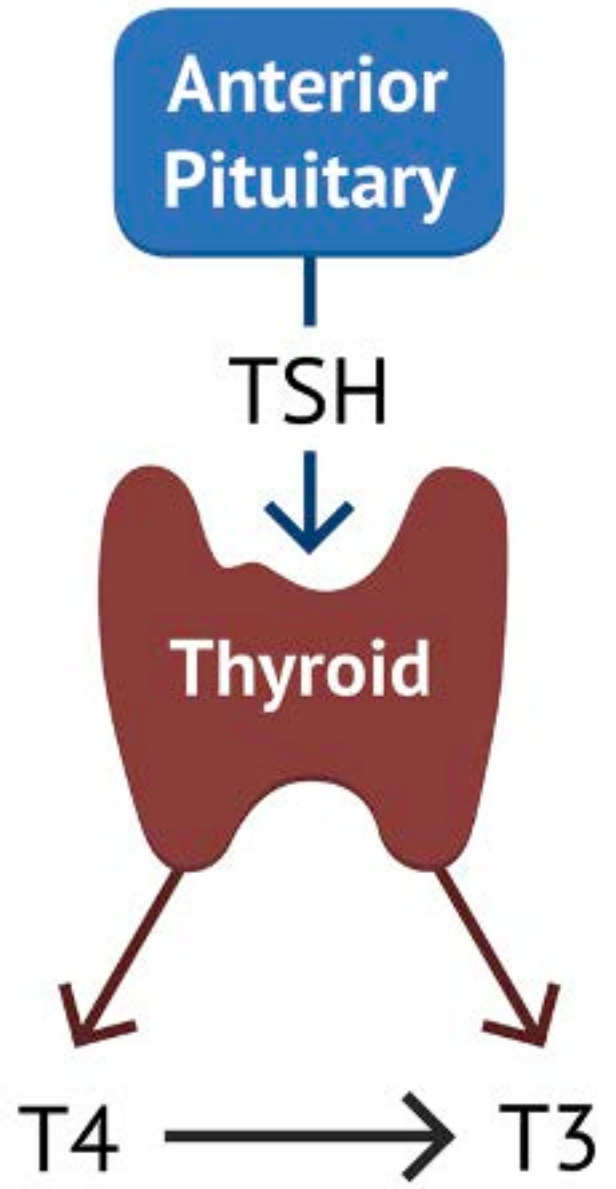
Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Homocyst(e)ine <sup>01</sup>	8.0		umol/L	0.0-14.5

## Fibrinogen Activity

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▲ Fibrinogen Activity <sup>01</sup>	<b>531</b> <b>High</b>		mg/dL	193-507

## Ferritin

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▲ Ferritin <sup>01</sup>	<b>597</b> <b>High</b>		ng/mL	30-400












# Case One...

## CBC With Differential/Platelet

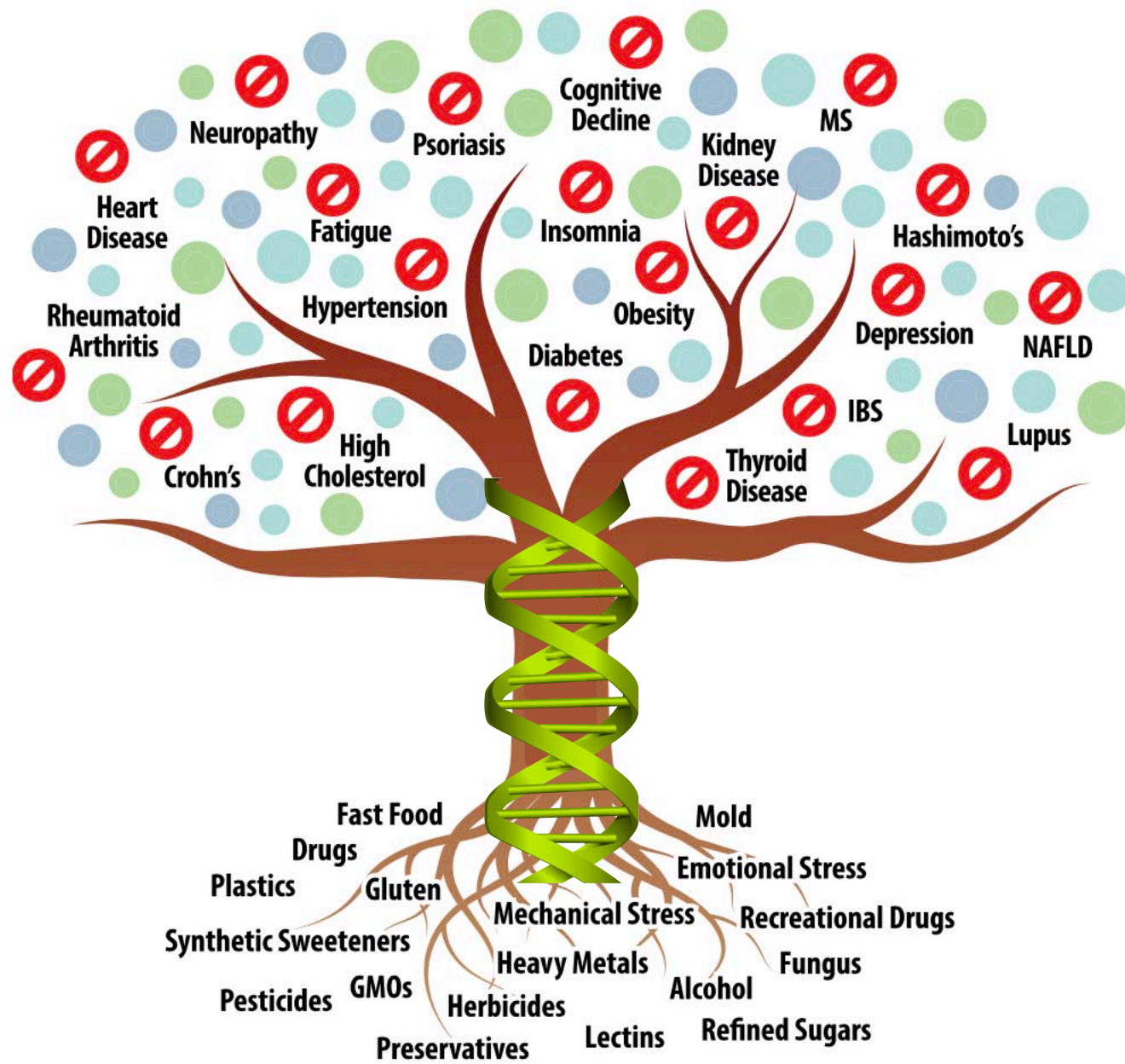
Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
WBC <sup>01</sup>	9.3		x10E3/uL	3.4-10.8
RBC <sup>01</sup>	5.03		x10E6/uL	4.14-5.80
Hemoglobin <sup>01</sup>	15.7		g/dL	13.0-17.7
Hematocrit <sup>01</sup>	48.0		%	37.5-51.0
MCV <sup>01</sup>	95		fL	79-97
MCH <sup>01</sup>	31.2		pg	26.6-33.0
MCHC <sup>01</sup>	32.7		g/dL	31.5-35.7
RDW <sup>01</sup>	13.1		%	11.6-15.4
Platelets <sup>01</sup>	302		x10E3/uL	150-450
Neutrophils <sup>01</sup>	55		%	Not Estab.
Lymphs <sup>01</sup>	35		%	Not Estab.
Monocytes <sup>01</sup>	6		%	Not Estab.
Eos <sup>01</sup>	3		%	Not Estab.
Basos <sup>01</sup>	1		%	Not Estab.
Neutrophils (Absolute) <sup>01</sup>	5.2		x10E3/uL	1.4-7.0
▲ <b>Lymphs (Absolute)<sup>01</sup></b>	<b>3.2</b>	<b>High</b>	x10E3/uL	0.7-3.1
Monocytes(Absolute) <sup>01</sup>	0.5		x10E3/uL	0.1-0.9
Eos (Absolute) <sup>01</sup>	0.3		x10E3/uL	0.0-0.4
Baso (Absolute) <sup>01</sup>	0.1		x10E3/uL	0.0-0.2

# Case One...

High (>95th percentile)					
TEST NAME	CURRENT RESULT	PREVIOUS RESULT	CURRENT RESULT	PREVIOUS RESULT	REFERENCE
 Bisphenol A (BPA)	11.38		0.01 2.12 5.09		≤5.09 ug/g
 Dimethyldithiophosphate (DMDTP)	11.85		0.01 0.67 6.12		≤6.12 ug/g
 mono-2-ethylhexyl phthalate (MEHP)	27.01		0.01 2.73 8.47		≤8.47 ug/g

Moderate (75th-95th percentile)					
TEST NAME	CURRENT RESULT	PREVIOUS RESULT	CURRENT RESULT	PREVIOUS RESULT	REFERENCE
 Patulin	10.26		0.05 6.53 11.6		≤11.6 ng/g
 Beryllium	0.46		0.1 0.2 0.76		≤0.76 ug/g
 Bismuth	1.03		0.1 0.58 2.53		≤2.53 ug/g
 2-Hydroxyisobutyric Acid (2HIB)	949.88		0.01 795 1215		≤1215.72 ug/g
 2,2-bis(4-Chlorophenyl) acetic acid (DDA)	11.98		0.01 7.9 19		≤19 ug/g
 4-Nonylphenol	1.67		0.01 0.42 2.06		≤2.06 ug/g





# Case Two...

- 81 year old female
- Presents with...
  - Anemia, Dry Skin, Low Stomach Acid, Fatigue, Lack of Balance, Lack of Strength, Soft Tissue Damage
  - Feels the biggest impact was a bad fall and untreated pneumonia





# Case Two...

## Thyroid Panel With TSH

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
TSH <sup>01</sup>	1.850		uIU/mL	0.450-4.500
Thyroxine (T4) <sup>01</sup>	6.6		ug/dL	4.5-12.0
T3 Uptake <sup>01</sup>	25		%	24-39
Free Thyroxine Index	1.7			1.2-4.9

## Triiodothyronine (T3)

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Triiodothyronine (T3) <sup>01</sup>	138		ng/dL	71-180

## Thyroid Antibodies

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
<b>Thyroid Peroxidase (TPO)</b> ▲ <b>Ab</b> <sup>01</sup>	<b>90</b> <b>High</b>		IU/mL	0-34
Thyroglobulin Antibody <sup>01</sup>	Will Follow			

# Case Two...

## Comp. Metabolic Panel (14) (Cont.)

Sodium <sup>01</sup>	136	mmol/L	134-144
Potassium <sup>01</sup>	5.0	mmol/L	3.5-5.2
Chloride <sup>01</sup>	102	mmol/L	96-106
Carbon Dioxide, Total <sup>01</sup>	25	mmol/L	20-29
Calcium <sup>01</sup>	9.3	mg/dL	8.7-10.3
Protein, Total <sup>01</sup>	6.8	g/dL	6.0-8.5
Albumin <sup>01</sup>	4.6	g/dL	3.6-4.6
Globulin, Total	2.2	g/dL	1.5-4.5
A/G Ratio	2.1		1.2-2.2
Bilirubin, Total <sup>01</sup>	<0.2	mg/dL	0.0-1.2
Alkaline Phosphatase <sup>01</sup>	118	IU/L	44-121
AST (SGOT) <sup>01</sup>	20	IU/L	0-40
ALT (SGPT) <sup>01</sup>	14	IU/L	0-32



# Case Two...

## GGT

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
GGT <sup>01</sup>	47		IU/L	0-60

## C-Reactive Protein, Cardiac

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
C-Reactive Protein, Cardiac <sup>01</sup>	1.24		mg/L	0.00-3.00
Relative Risk for Future Cardiovascular Event				
Low <1.00				
Average 1.00 - 3.00				
High >3.00				

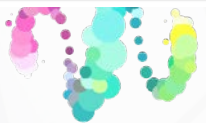
## Homocyst(e)ine

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Homocyst(e)ine <sup>01</sup>	18.0		umol/L	0.0-21.3

# Case Two...

## CBC With Differential/Platelet

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
WBC <sup>01</sup>	3.4		x10E3/uL	3.4-10.8
▼ RBC <sup>01</sup>	<b>3.61</b> <b>Low</b>		x10E6/uL	3.77-5.28
▼ Hemoglobin <sup>01</sup>	<b>9.6</b> <b>Low</b>		g/dL	11.1-15.9
▼ Hematocrit <sup>01</sup>	<b>29.3</b> <b>Low</b>		%	34.0-46.6
MCV <sup>01</sup>	81		fL	79-97
MCH <sup>01</sup>	26.6		pg	26.6-33.0
MCHC <sup>01</sup>	32.8		g/dL	31.5-35.7
▲ RDW <sup>01</sup>	<b>17.0</b> <b>High</b>		%	11.7-15.4
Platelets <sup>01</sup>	252		x10E3/uL	150-450
Neutrophils <sup>01</sup>	55		%	Not Estab.
Lymphs <sup>01</sup>	33		%	Not Estab.
Monocytes <sup>01</sup>	9		%	Not Estab.
Eos <sup>01</sup>	3		%	Not Estab.
Basos <sup>01</sup>	0		%	Not Estab.



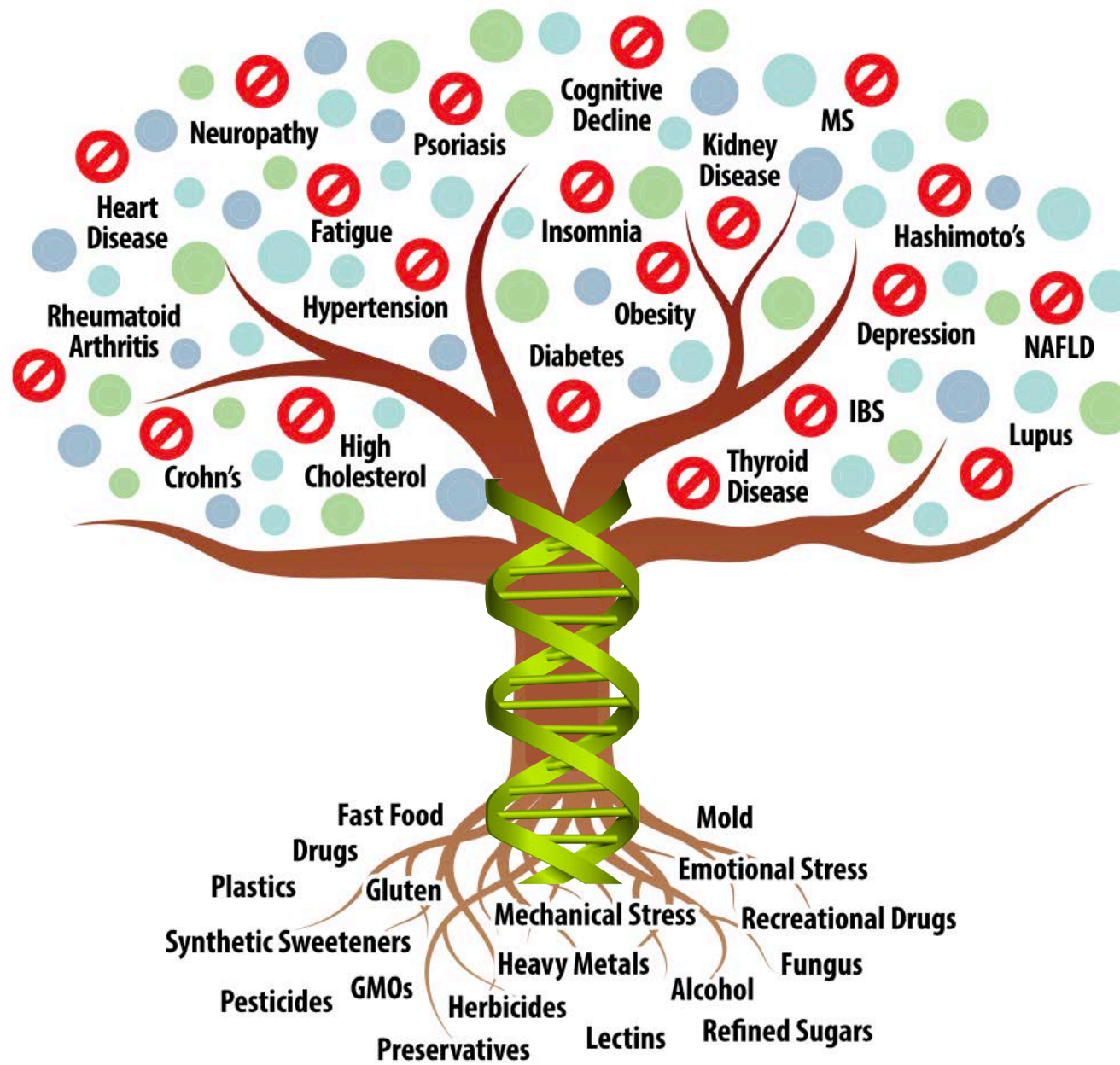
# Case Two...

- 81 year old female
- Presents with...
  - Anemia, Dry Skin, Low Stomach Acid, Fatigue, Lack of Balance, Lack of Strength, Soft Tissue Damage
  - Feels the biggest impact was a bad fall and untreated pneumonia

## Interesting Facts in Her History

- Tonsillectomy 1951
- Gallbladder removed in 2010
- Cataracts removed 2012
- 5 children
- DVT 2019 and 2020
- Basal Cell Carcinoma





## Diagnostics

- Blood + Ab
- Dutch
- Stool
- Total Tox

## Intervention

- Building Blocks
- Drivers
- Detoxifiers

## Results

- Subjective
- Objective
- Predictable
- Sustainable



# Pathological Patterns





## TSH

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
TSH <sup>01</sup>	0.481		uIU/mL	0.450-4.500

## Thyroxine (T4)

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Thyroxine (T4) <sup>01</sup>	6.4		ug/dL	4.5-12.0

## T3 Uptake

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▼ T3 Uptake <sup>01</sup>	<b>21</b> <b>Low</b>		%	24-39
Free Thyroxine Index	1.3			1.2-4.9

## Triiodothyronine (T3)

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Triiodothyronine (T3) <sup>01</sup>	95		ng/dL	71-180

## Thyroid Antibodies

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
<b>Thyroid Peroxidase (TPO)</b>				
▲ Ab <sup>01</sup>	<b>171</b> <b>High</b>		IU/mL	0-34
▲ Thyroglobulin Antibody <sup>01</sup>	<b>69.6</b> <b>High</b>		IU/mL	0.0-0.9

Thyroglobulin Antibody measured by Beckman Coulter Methodology

## Thyroid Stim Immunoglobulin

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
<b>Thyroid Stim</b>				
▲ Immunoglobulin <sup>03</sup>	<b>0.73</b> <b>High</b>		IU/L	0.00-0.55



