

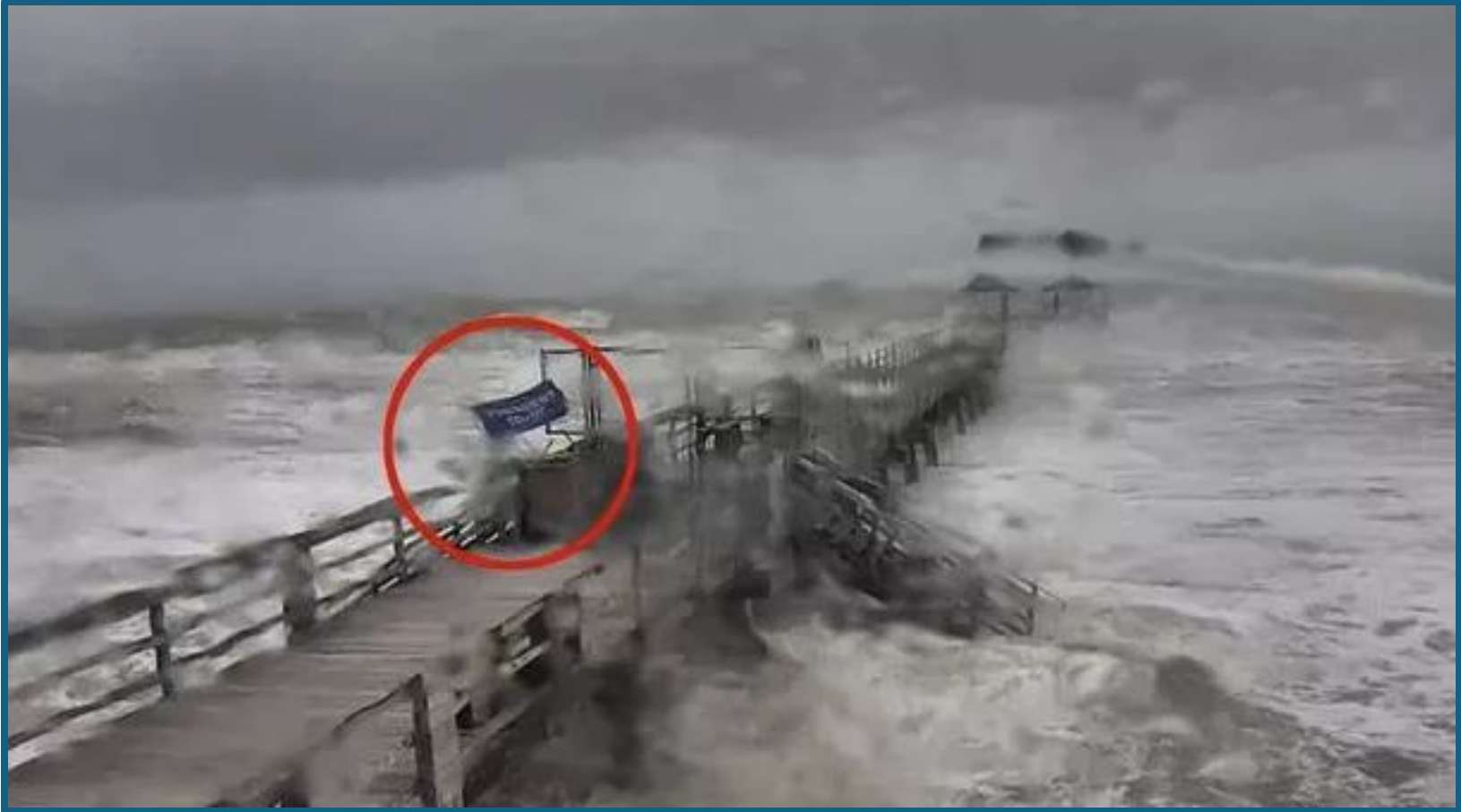
The Next Gen Clinician: **Plug-in Programs That Get Results**

A BIOGENETIX CLINICAL PRESENTATION
biogenetix.com











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2 types of providers:

▶ [Nutrients](#). 2019 Apr 1;11(4):766. doi: [10.3390/nu11040766](https://doi.org/10.3390/nu11040766) 

Reversing Type 2 Diabetes: A Narrative Review of the Evidence

[Sarah J Hallberg](#)^{1,2,3,*}, [Victoria M Gershuni](#)⁴, [Tamara L Hazbun](#)^{2,3}, [Shaminie J Athinarayanan](#)¹

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PMCID: PMC6520897 PMID: [30939855](https://pubmed.ncbi.nlm.nih.gov/30939855/)

Despite the growing evidence that reversal is possible, achieving reversal is not commonly encouraged by our healthcare system. In fact, reversal is not a goal in diabetes guidelines. Specific interventions aimed at reversal all have one thing in common: they are not first-line standard of care. This is important, because there is evidence suggesting that standard of care does not lead to diabetes reversal. This raises the question of whether standard of care is really the best practice. A large study by Kaiser Permanente found a diabetes remission rate of 0.23% with standard of care [10]. The status quo approach will not reverse the health crisis of diabetes.





Cardiovascular disease (CVD), where the heart and blood vessels are negatively impacted, is the number one cause of death in people living with diabetes, resulting in **2/3** of deaths in people with type 2 diabetes.



American Diabetes Association

<https://diabetes.org> > [about-diabetes](#) > [complications](#) > c...

[Cardiovascular Disease | American Diabetes Association](#)



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Meta-analytic data demonstrate a **56% increased risk for Alzheimer's disease dementia among individuals with type 2 diabetes** (22).



National Institutes of Health (NIH) (.gov)
<https://www.ncbi.nlm.nih.gov> > articles > PMC5111529

[Type 2 Diabetes, Cognition, and Dementia in Older Adults](#)



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A large American study estimated that **47%** of patients with diabetes have some peripheral neuropathy. Neuropathy is estimated to be present in 7.5% of patients at the time of diabetes diagnosis. More than half of cases are distal symmetric polyneuropathy.



Medscape
<https://emedicine.medscape.com/Endocrinology>

[Diabetic Neuropathy: Practice Essentials, Background, Anatomy](#)



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[Diabetic Neuropathy: Practice Essentials, Background, Anatomy](#)



According to a 2021 NCBI article, **68.6%** of amputations are performed on patients with diabetes, up from 61.1% in 2010 and 71.4% in 2019. The ADA says that 154,000 people with diabetes in the United States undergo amputations each year, which is about every 3 minutes and 30 seconds. 

Gut Centric Disease Onset:

1. Type 2 Diabetes
2. Obesity
3. Rheumatoid Arthritis
4. IBS/IBD
5. Cognitive Decline / Alzheimer's Disease
6. MS/Parkinson's
7. Lupus
8. Psoriasis
9. Hypothyroidism / Hashimoto's Thyroiditis
10. Heart Disease
11. etc. etc. etc.



1/400

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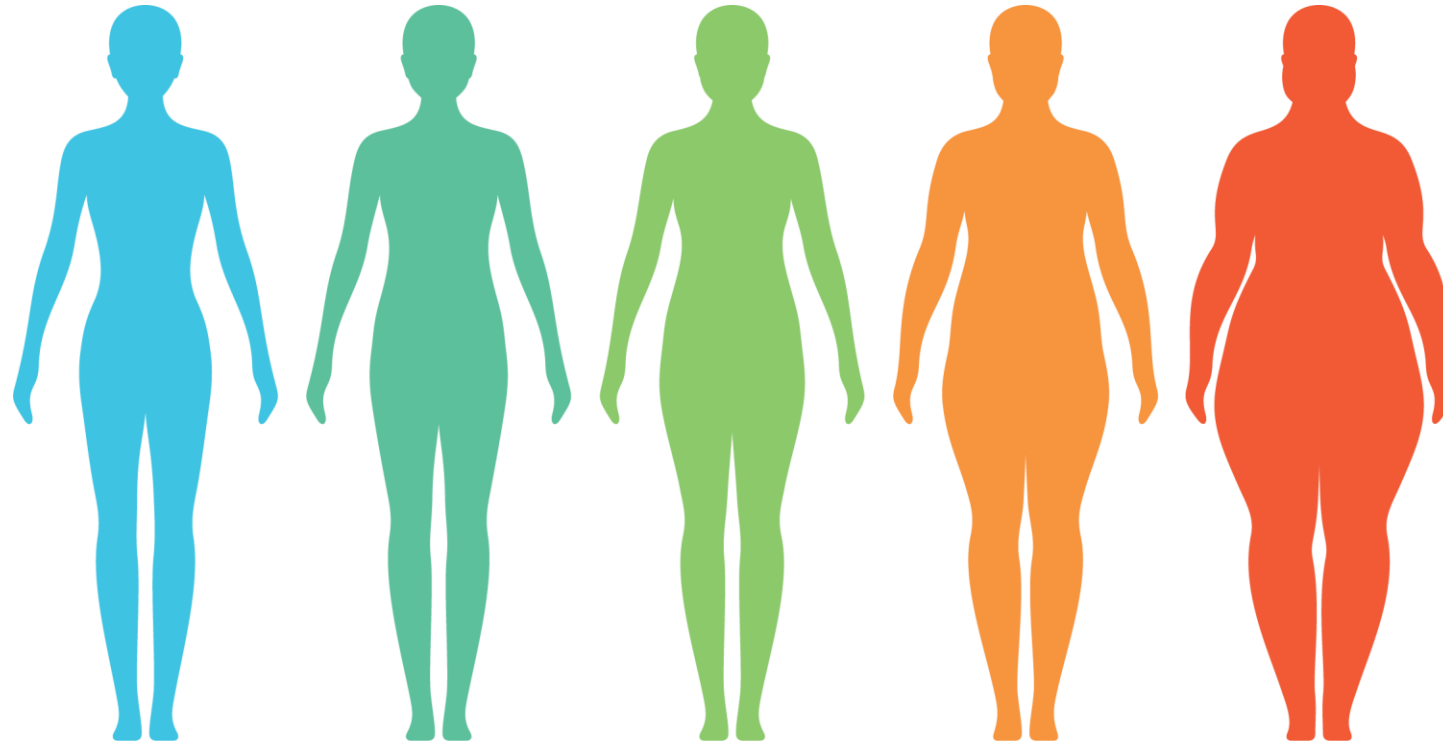
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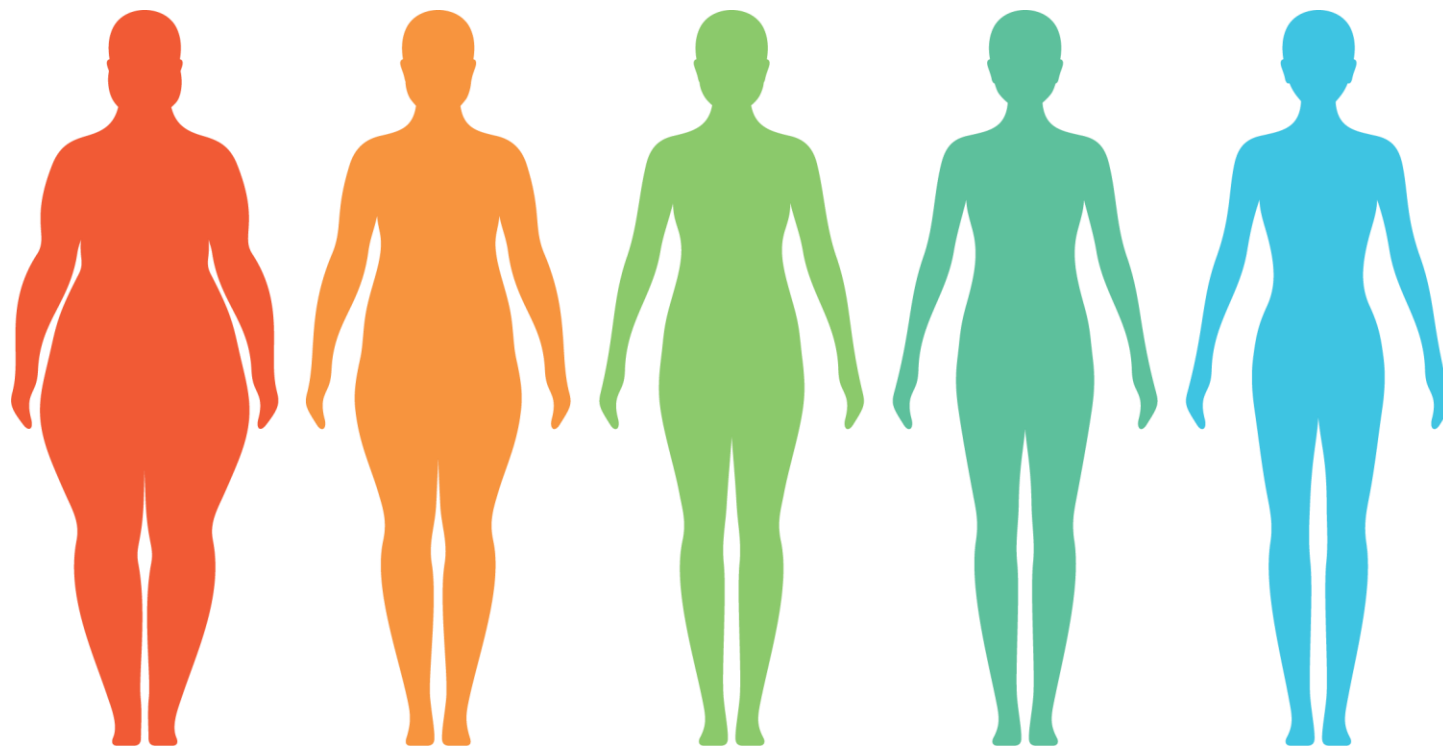
LIFESTYLE / ENVIRONMENT + GENETICS

OVER TIME

= CHRONIC HEALTH CONDITION



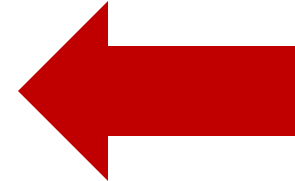
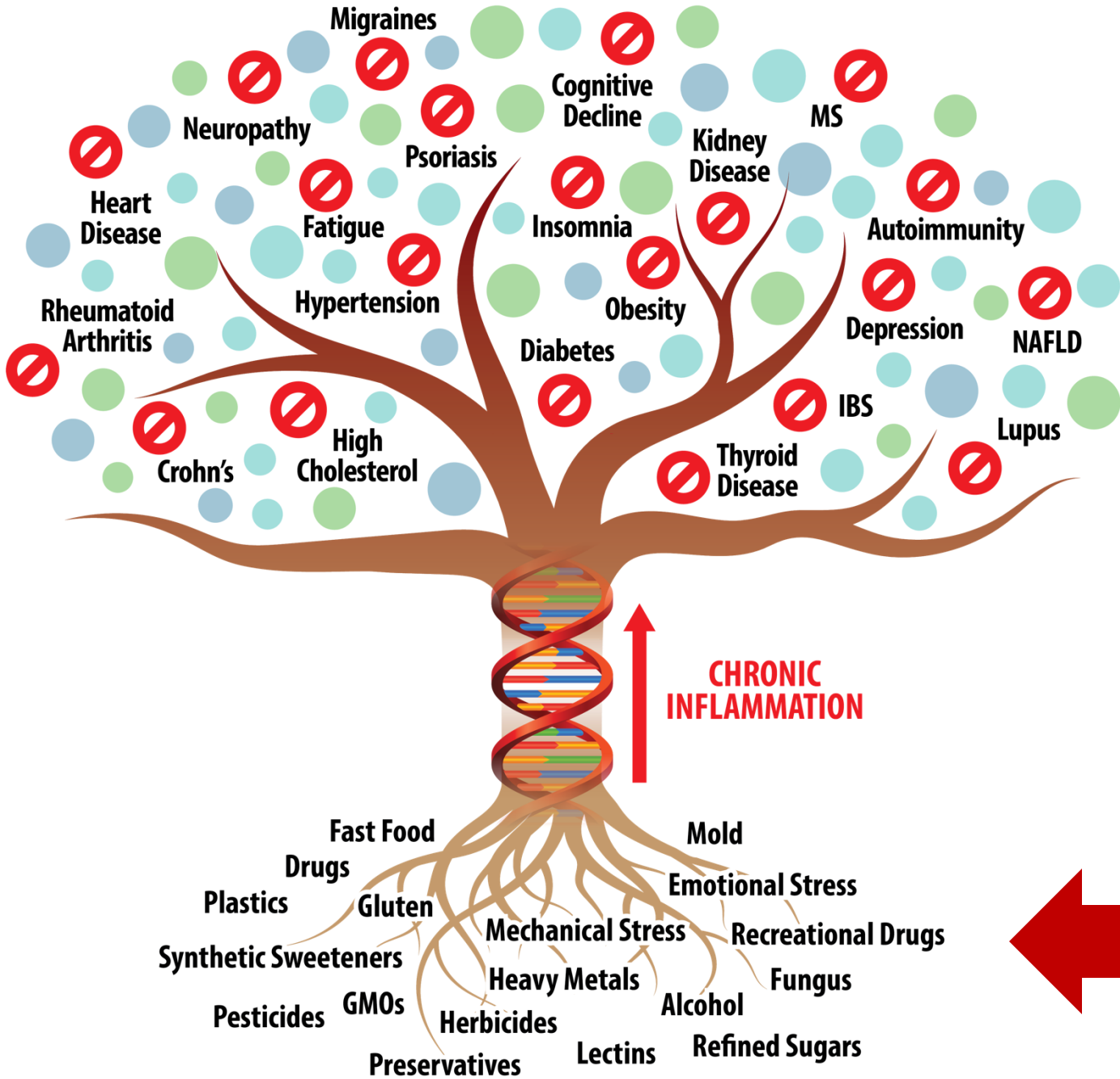
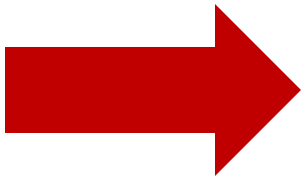
Biogenetix™



LIFESTYLE / ENVIRONMENT + GENETICS

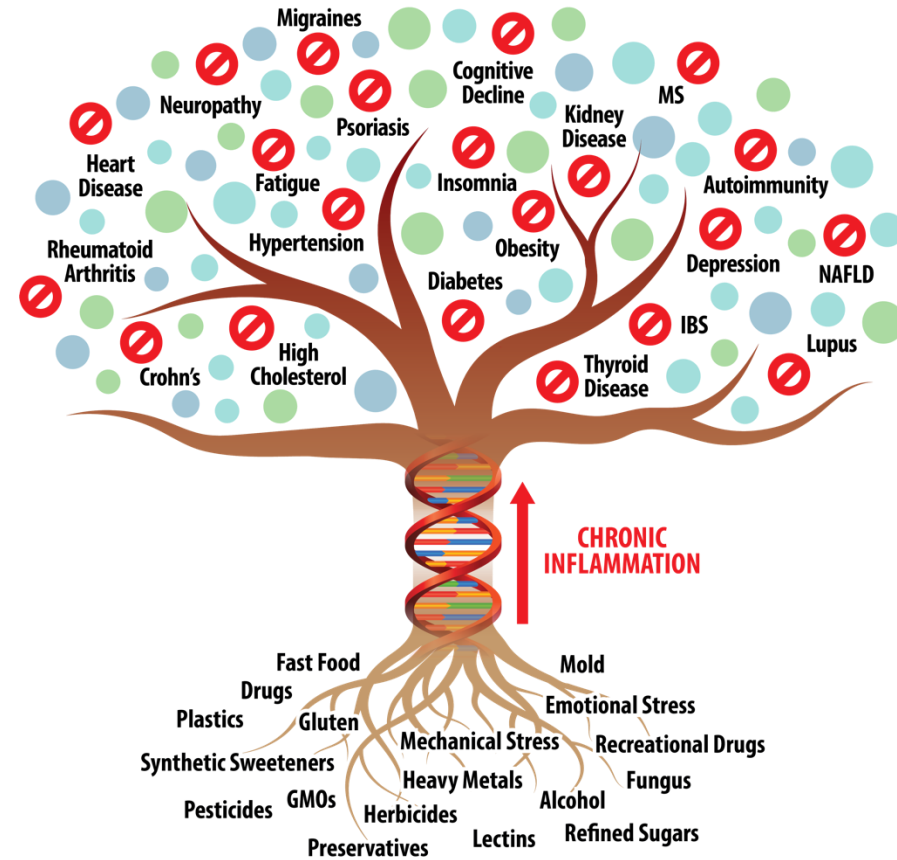
OVER TIME

= CHRONIC HEALTH *IMPROVEMENT*



Model:

1. A patient to help.
2. A problem to solve.
3. Root cause analysis.
4. Plug and Play Programming.



1. 53yo Male
- 5'9" 323lbs
- DM2
- HBP
- Hypercholesterolemia
- Diarrhea, Constipation
- Neuropathy
- Fatigue

2. Rx
- Metformin
- Glipizide
- Lantus
- Atenolol
- Atorvastatin
- Omeprazole

Test	Current Result and Flag		Previous Result and Date		Units	Reference Interval
▲ Glucose ⁰¹	116	High	184	05/10/2024	mg/dL	70-99
▲ BUN ⁰¹	27	High	27	05/10/2024	mg/dL	6-24
Creatinine ⁰¹	0.94		1.02	05/10/2024	mg/dL	0.76-1.27
eGFR	97		88	05/10/2024	mL/min/1.73	>59
▲ BUN/Creatinine Ratio	29	High	26	05/10/2024		9-20
Sodium ⁰¹	140		135	05/10/2024	mmol/L	134-144
Potassium ⁰¹	4.9		4.9	05/10/2024	mmol/L	3.5-5.2
Chloride ⁰¹	104		98	05/10/2024	mmol/L	96-106
Carbon Dioxide, Total ⁰¹	22		24	05/10/2024	mmol/L	20-29
Calcium ⁰¹	9.5		9.6	05/10/2024	mg/dL	8.7-10.2
Protein, Total ⁰¹	6.5		7.3	05/10/2024	g/dL	6.0-8.5

LP+Chol/HDL+LDL/HDL+CHD Risk

Test	Current Result and Flag		Previous Result and Date		Units	Reference Interval
Lipids ⁰¹						
▲ Cholesterol, Total ⁰¹	201	High	317	05/10/2024	mg/dL	100-199
Triglycerides ⁰¹	94		147	05/10/2024	mg/dL	0-149
HDL Cholesterol ⁰¹	41		34	05/10/2024	mg/dL	>39
VLDL Cholesterol Cal	17		28	05/10/2024	mg/dL	5-40
▲ LDL Chol Calc (NIH)	143	High	255	05/10/2024	mg/dL	0-99
T. Chol/HDL Ratio	4.9		9.3	05/10/2024	ratio	0.0-5.0

Homocyst(e)ine

Test	Current Result and Flag		Previous Result and Date		Units	Reference Interval
Homocyst(e)ine ⁰¹	11.1		19.0	05/10/2024	umol/L	0.0-14.5

Hemoglobin A1c

Test	Current Result and Flag		Previous Result and Date		Units	Reference Interval
Hemoglobin A1c ⁰¹	5.6		8.9	05/10/2024	%	4.8-5.6

Please Note:⁰¹

Prediabetes: 5.7 - 6.4

Diabetes: >6.4

Glycemic control for adults with diabetes: <7.0

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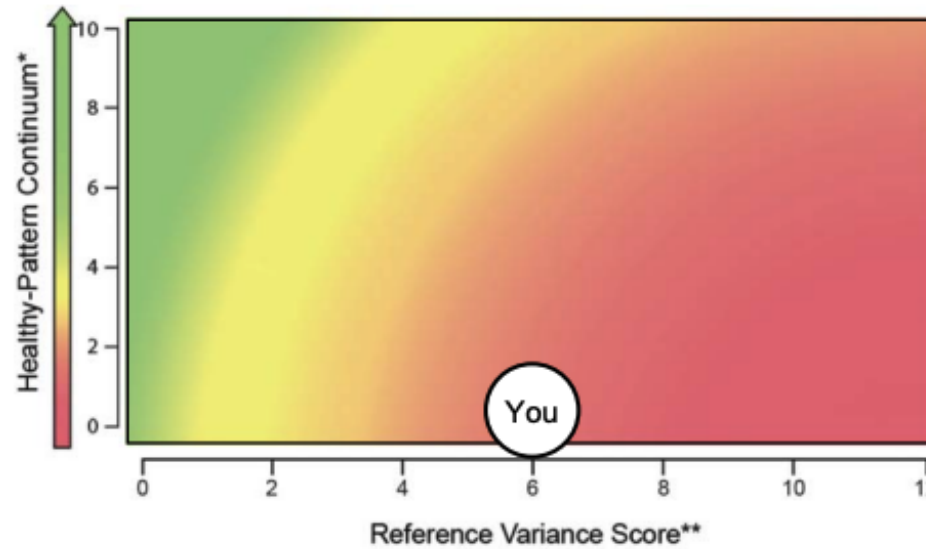
CBC With Differential/Platelet

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
WBC ⁰¹	7.1	8.1 05/10/2024	x10E3/uL	3.4-10.8
RBC ⁰¹	5.10	5.93 05/10/2024	x10E6/uL	4.14-5.80
Hemoglobin ⁰¹	15.2	17.8 05/10/2024	g/dL	13.0-17.7
Hematocrit ⁰¹	47.7	53.7 05/10/2024	%	37.5-51.0
MCV ⁰¹	94	91 05/10/2024	fL	79-97
MCH ⁰¹	29.8	30.0 05/10/2024	pg	26.6-33.0
MCHC ⁰¹	31.9	33.1 05/10/2024	g/dL	31.5-35.7
RDW ⁰¹	12.9	13.4 05/10/2024	%	11.6-15.4
Platelets ⁰¹	168	154 05/10/2024	x10E3/uL	150-450
Neutrophils ⁰¹	72	67 05/10/2024	%	Not Estab.
Lymphs ⁰¹	17	23 05/10/2024	%	Not Estab.
Monocytes ⁰¹	9	7 05/10/2024	%	Not Estab.
Eos ⁰¹	1	1 05/10/2024	%	Not Estab.
Basos ⁰¹	1	1 05/10/2024	%	Not Estab.
Neutrophils (Absolute) ⁰¹	5.1	5.4 05/10/2024	x10E3/uL	1.4-7.0
Lymphs (Absolute) ⁰¹	1.2	1.9 05/10/2024	x10E3/uL	0.7-3.1
Monocytes(Absolute) ⁰¹	0.6	0.6 05/10/2024	x10E3/uL	0.1-0.9
Eos (Absolute) ⁰¹	0.1	0.1 05/10/2024	x10E3/uL	0.0-0.4
Baso (Absolute) ⁰¹	0.1	0.1 05/10/2024	x10E3/uL	0.0-0.2
Immature Granulocytes ⁰¹	0	1 05/10/2024	%	Not Estab.
Immature Grans (Abs) ⁰¹	0.0	0.1 05/10/2024	x10E3/uL	0.0-0.1

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Commensal Balance

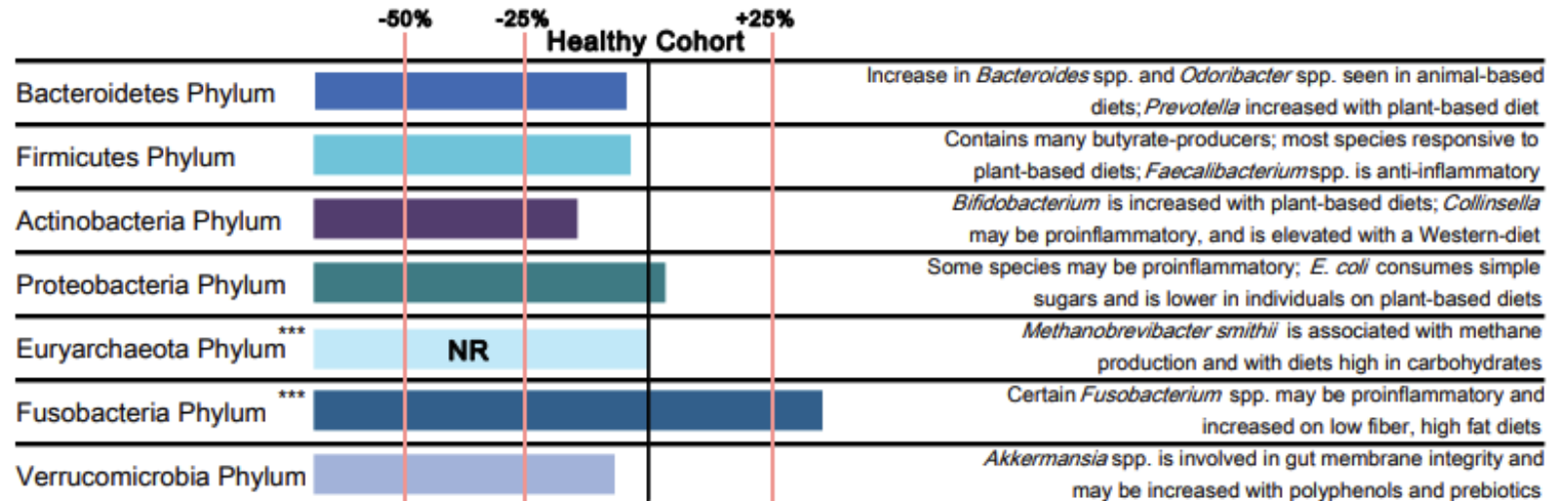


Balanced	Represents 95% of healthy individuals
Borderline	Represents 5% of healthy individuals
Imbalanced	Represents 60% of unhealthy individuals

*A progressive ranking scale based on a Genova proprietary algorithm that differentiates healthy and unhealthy commensal patterns.

**The total number of commensal bacteria (qPCR) that are out of balance for this individual on a scale of 0 to >12.

Relative Commensal Abundance



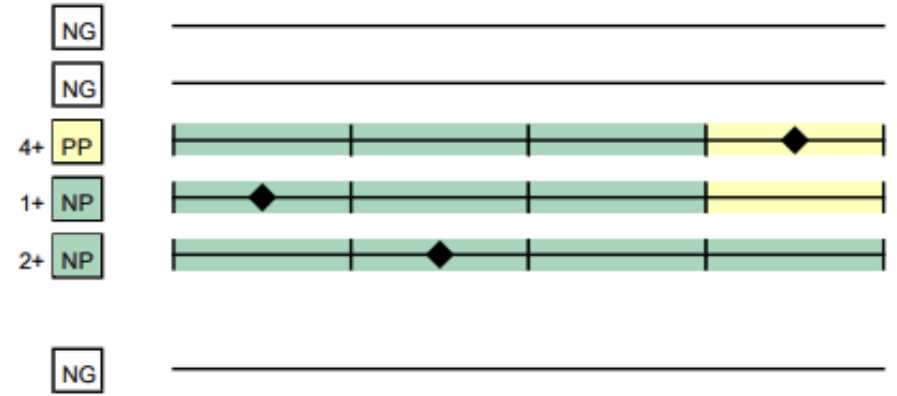
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Additional Bacteria


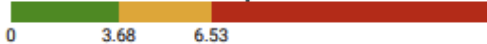






- Salmonella spp.*
- Shigella spp.*
- Citrobacter braakii*
- Bacillus species*
- gamma haemolytic Streptococcus*

Mycology (Culture)



















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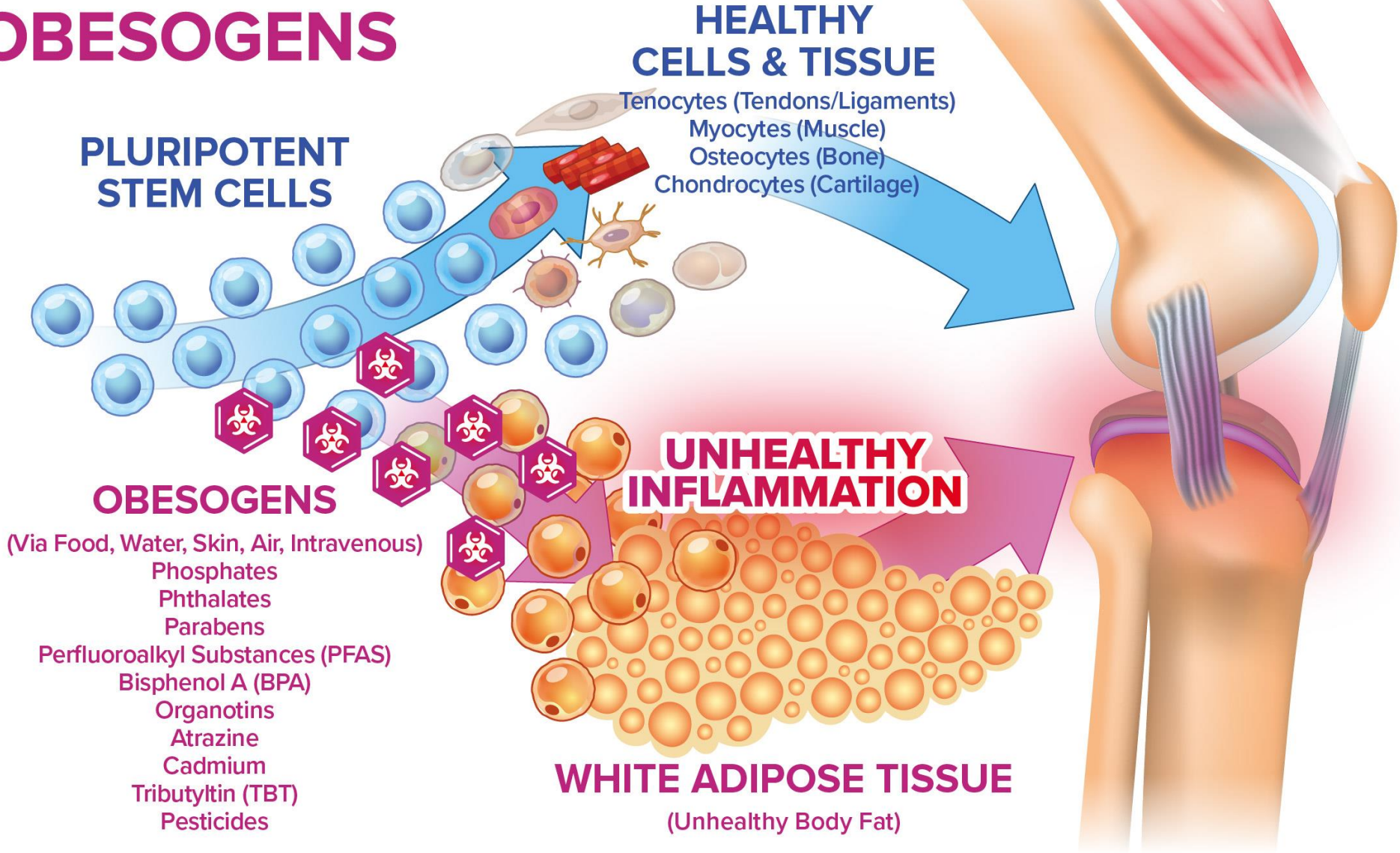
High (>95th percentile)					
TEST NAME	CURRENT RESULT	PREVIOUS RESULT	CURRENT RESULT	PREVIOUS RESULT	REFERENCE
 Aflatoxin G1	7.41				≤6.53 ng/g
 Diacetoxyscirpenol (DAS)	7.48				≤4.27 ng/g
 Ochratoxin A (OTA)	8.22				≤6.8 ng/g
 Bisphenol A (BPA)*	7.08				≤5.09 ug/g

* Indicates NHANES population data reference ranges.

Moderate (75th-95th percentile)					
TEST NAME	CURRENT RESULT	PREVIOUS RESULT	CURRENT RESULT	PREVIOUS RESULT	REFERENCE
 Citrinin (CTN)	7.22				≤12.53 ng/g
 Fumonisin B3	8.04				≤10.8 ng/g
 Nivalenol (NIV)	2.76				≤3.2 ng/g
 Zearalenone (ZEN)	0.55				≤0.67 ng/g
 Aluminum	20.06				≤45.15 ug/g
 2,2-bis(4-Chlorophenyl) acetic acid (DDA)	14.25				≤19 ug/g
 Butylparaben*	0.44				≤4.39 ug/g
 Dimethyl phosphate (DMP)*	16.84				≤33.6 ug/g

* Indicates NHANES population data reference ranges.

THE IMPACT OF OBESOGENS



**PLURIPOTENT
STEM CELLS**

**HEALTHY
CELLS & TISSUE**

Tenocytes (Tendons/Ligaments)
Myocytes (Muscle)
Osteocytes (Bone)
Chondrocytes (Cartilage)

OBESOGENS

(Via Food, Water, Skin, Air, Intravenous)

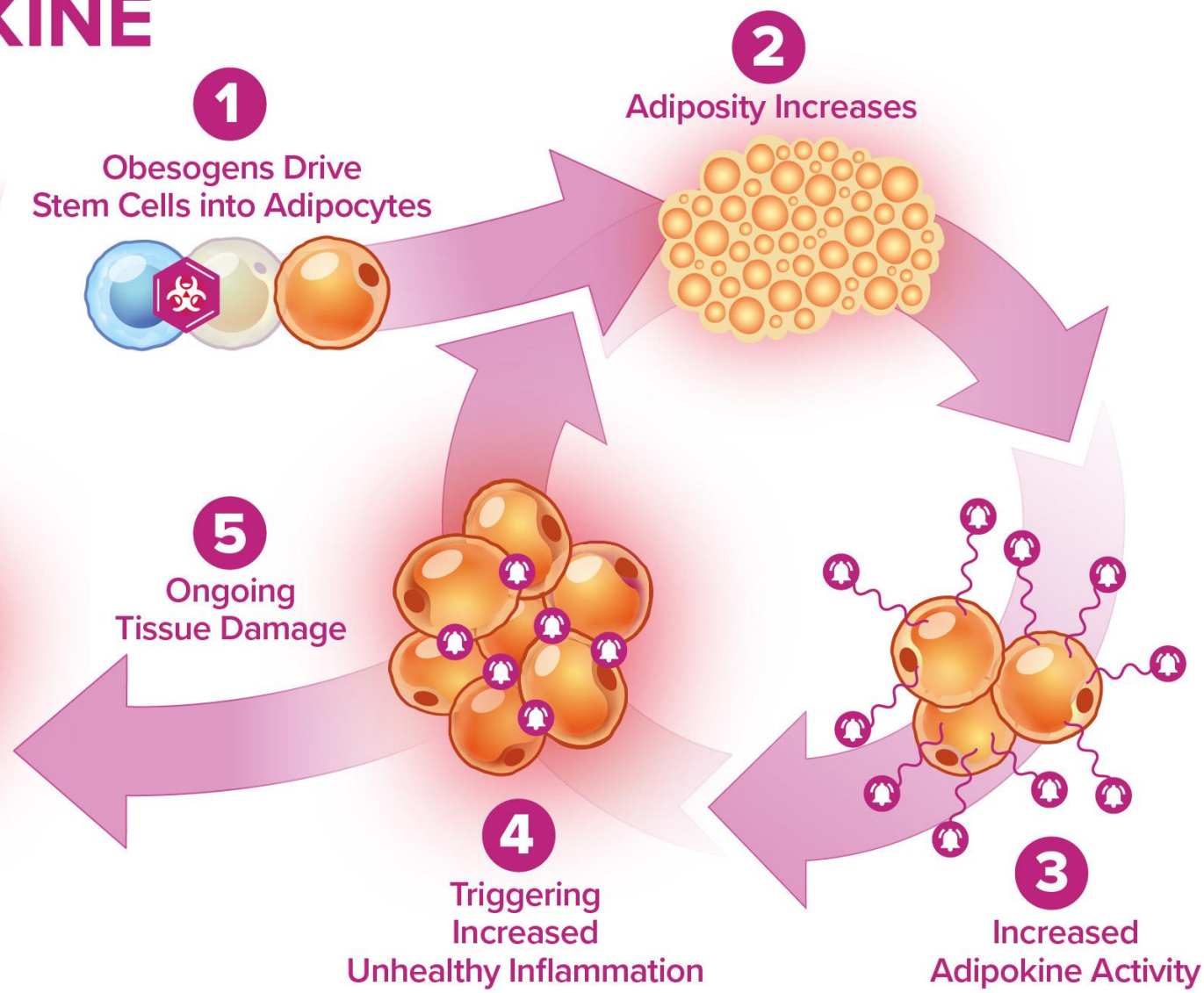
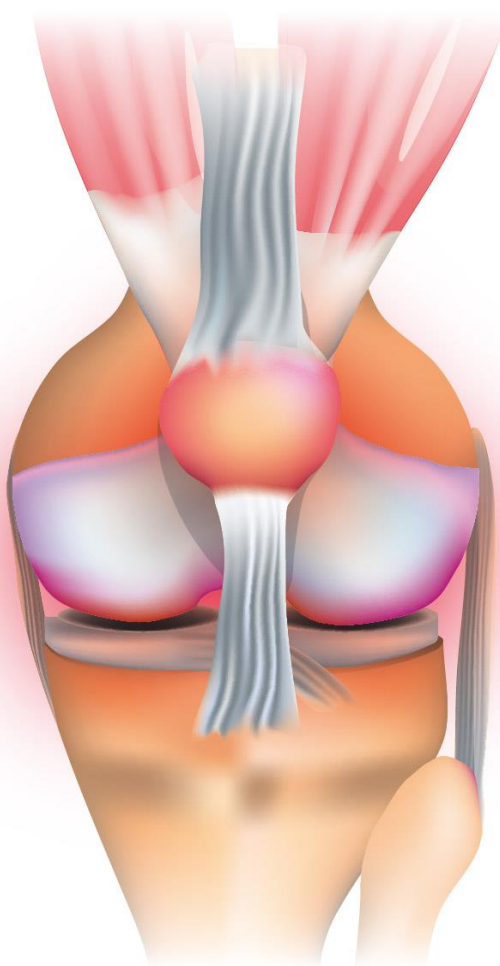
- Phosphates
- Phthalates
- Parabens
- Perfluoroalkyl Substances (PFAS)
- Bisphenol A (BPA)
- Organotins
- Atrazine
- Cadmium
- Tributyltin (TBT)
- Pesticides

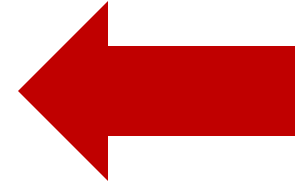
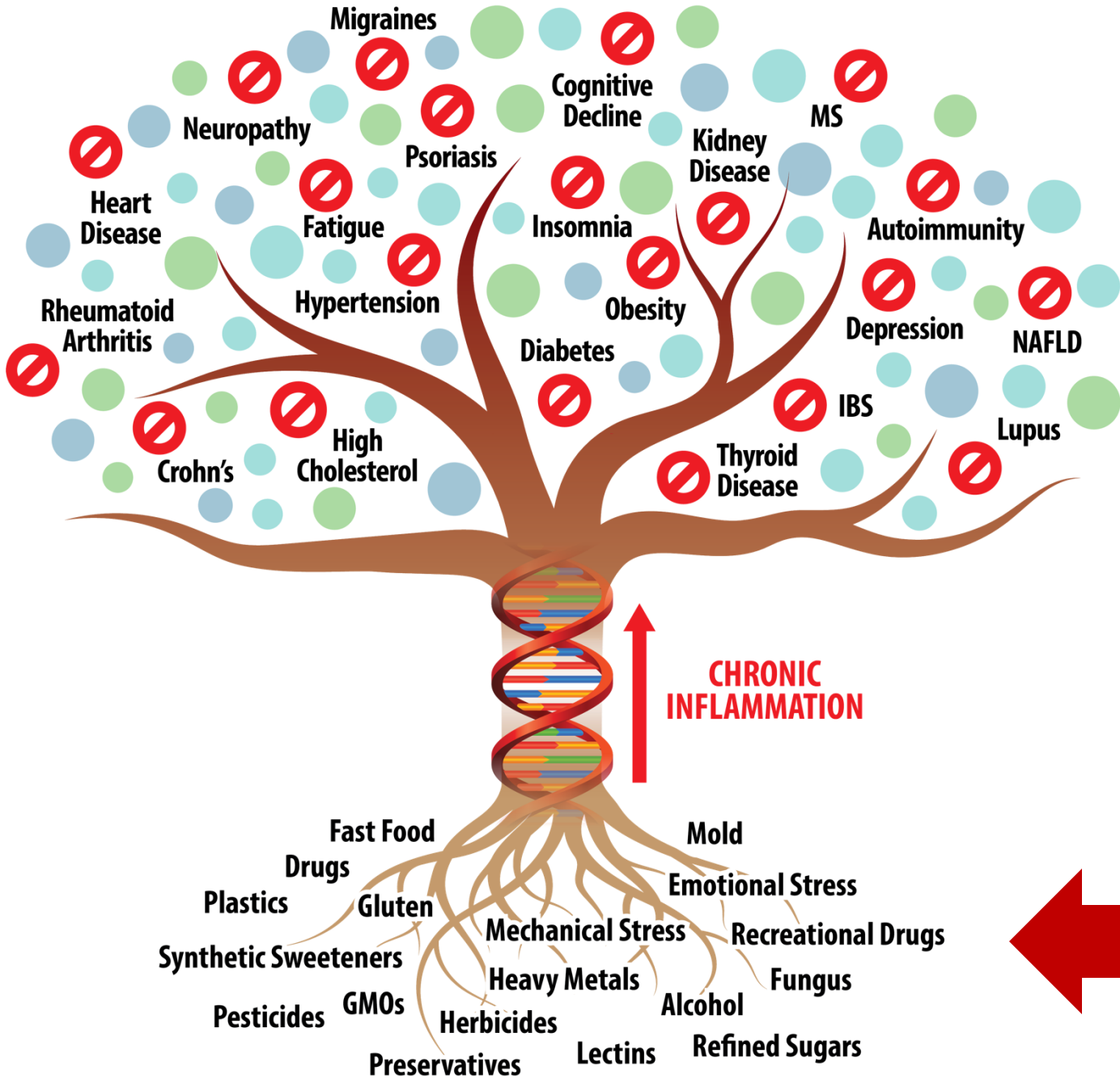
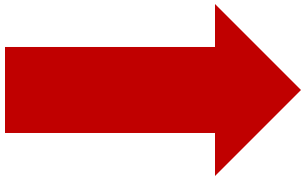
**UNHEALTHY
INFLAMMATION**

WHITE ADIPOSE TISSUE

(Unhealthy Body Fat)

THE ADIPOKINE SPIRAL





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Calcium ⁰¹	9.5		9.6	05/10/2024	mg/dL	8.7-10.2
Protein, Total ⁰¹	6.5		7.3	05/10/2024	g/dL	6.0-8.5

LP+Chol/HDL+LDL/HDL+CHD Risk

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Test	Current Result and Flag		Previous Result and Date		Units	Reference Interval
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Please Note:⁰¹

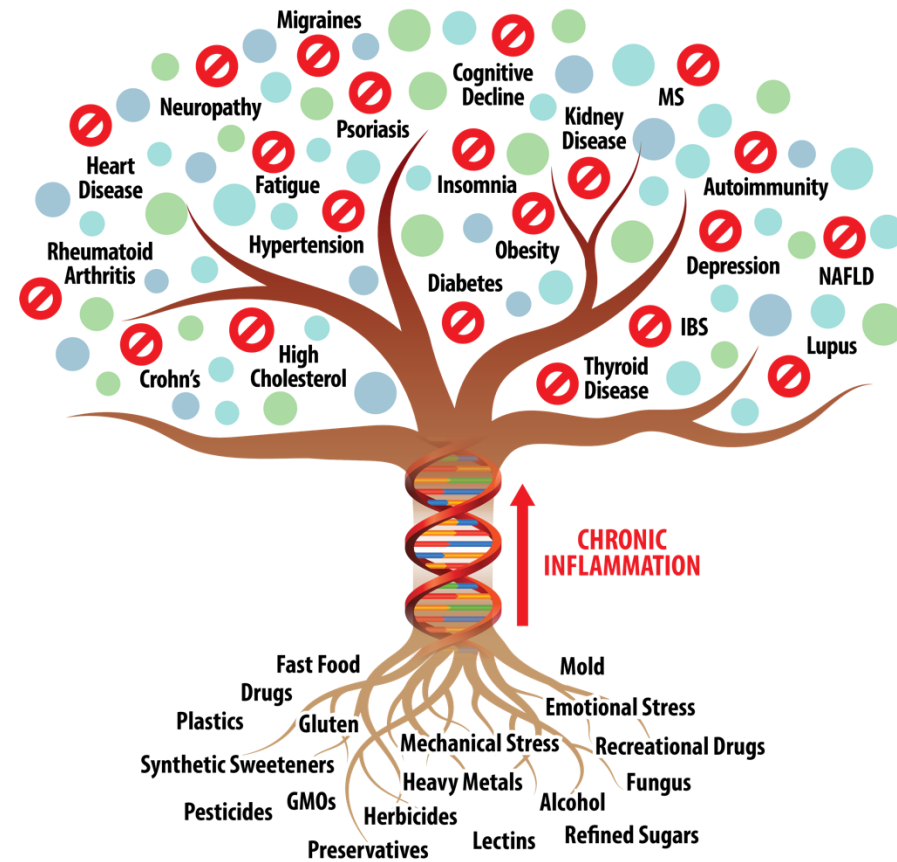
Prediabetes: 5.7 - 6.4

Diabetes: ≥6.4

Glycemic control for adults with diabetes: <7.0

Model:

1. A patient to work on.
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3. Root cause analysis.
4. Plug and Play Programming.



1. 66 yo Female

- 5'2" 227lbs
- HBP
- Hypercholesterolemia
- Constipation
- Hypothyroidism
- Fibromyalgia
- Fatigue

2. Rx

- Levo
- Carvedilol
- Tramadol
- Trazadone
- Gabapentin
- Rosuvastatin

Fe+TIBC+Fer

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Iron Bind.Cap.(TIBC)	283		ug/dL	250-450
UIBC ⁰¹	242		ug/dL	118-369
Iron ⁰¹	41		ug/dL	27-139
▼ Iron Saturation	14 Low		%	15-55
▲ Ferritin⁰¹	167 High		ng/mL	15-150

CBC With Differential/Platelet

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
WBC ⁰¹	4.1		x10E3/uL	3.4-10.8
▼ RBC⁰¹	3.62 Low		x10E6/uL	3.77-5.28
▼ Hemoglobin⁰¹	10.3 Low		g/dL	11.1-15.9
▼ Hematocrit⁰¹	32.4 Low		%	34.0-46.6
MCV ⁰¹	90		fL	79-97
MCH ⁰¹	28.5		pg	26.6-33.0
MCHC ⁰¹	31.8		g/dL	31.5-35.7
RDW ⁰¹	14.7		%	11.7-15.4
Platelets ⁰¹	235		x10E3/uL	150-450
Neutrophils ⁰¹	51		%	Not Estab.
Lymphs ⁰¹	29		%	Not Estab.
Monocytes ⁰¹	18		%	Not Estab.
Eos ⁰¹	1		%	Not Estab.
Basos ⁰¹	1		%	Not Estab.

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Comp. Metabolic Panel (14) (Cont.)

▼ eGFR	56	Low	mL/min/1.73	>59
BUN/Creatinine Ratio	14			12-28
Sodium ⁰¹	139		mmol/L	134-144
Potassium ⁰¹	4.4		mmol/L	3.5-5.2
Chloride ⁰¹	101		mmol/L	96-106
Carbon Dioxide, Total ⁰¹	24		mmol/L	20-29
Calcium ⁰¹	9.7		mg/dL	8.7-10.3
Protein, Total ⁰¹	6.4		g/dL	6.0-8.5
Albumin ⁰¹	4.0		g/dL	3.8-4.8
Globulin, Total	2.4		g/dL	1.5-4.5
A/G Ratio	1.7			1.2-2.2
Bilirubin, Total ⁰¹	<0.2		mg/dL	0.0-1.2
Alkaline Phosphatase ⁰¹	70		IU/L	44-121
AST (SGOT) ⁰¹	15		IU/L	0-40
ALT (SGPT) ⁰¹	8		IU/L	0-32

HLA DRB1,3,4,5,DQB1 (IR)

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
DRB1 ⁰²		DRB1*13:03:01G		
DRB1 ⁰²		DRB1*15:03:01G		
	The following alleles could not be ruled out:			
	DRB1* 13:03:01:01/13:03:01:02/13:03:01:03/13:03:01:04 /13:03:01:05/13:03:07/13:03:08/13:03:09/13:03:10 /13:03:12/13:227/13:253/13:319N/13:329N			
	DRB1* 15:03:01:01/15:03:01:02/15:03:01:03/15:03:01:04 /15:03:03/15:03:04/15:163N/15:178/15:185/15:217N			
DRB3 ⁰²		DRB3*02:02:01G		

1. 66 yo Female

- 5'2" 227lbs
- HBP
- Hypercholesterolemia
- Constipation
- Hypothyroidism
- Fibromyalgia
- Fatigue

2. Rx

- Levo
- Carvedilol
- Tramadol
- Trazadone
- Gabapentin
- Rosuvastatin

Thyroid Panel With TSH

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▲ TSH ⁰¹	8.780 High		uIU/mL	0.450-4.500
Thyroxine (T4) ⁰¹	6.2		ug/dL	4.5-12.0
T3 Uptake ⁰¹	24		%	24-39
Free Thyroxine Index	1.5			1.2-4.9

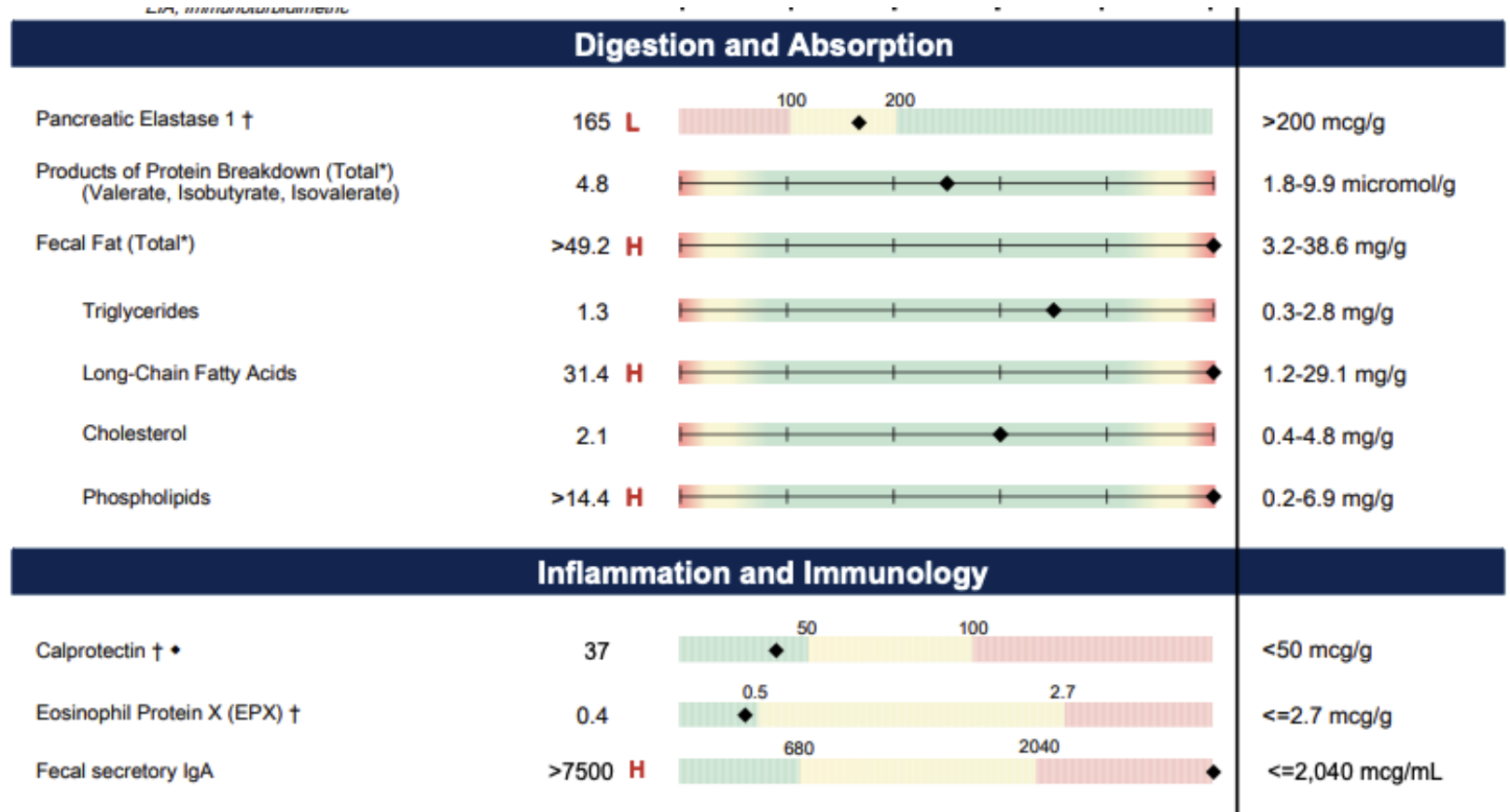
Thyroid Antibodies

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Thyroid Peroxidase (TPO) ▲ Ab ⁰¹	66 High		IU/mL	0-34
Thyroglobulin Antibody ⁰¹	<1.0		IU/mL	0.0-0.9

Thyroglobulin Antibody measured by Beckman Coulter Methodology
It should be noted that the presence of thyroglobulin antibodies may not be pathogenic nor diagnostic, especially at very low levels. The assay manufacturer has found that four percent of individuals without evidence of thyroid disease or autoimmunity will have positive TgAb levels up to 4 IU/mL.

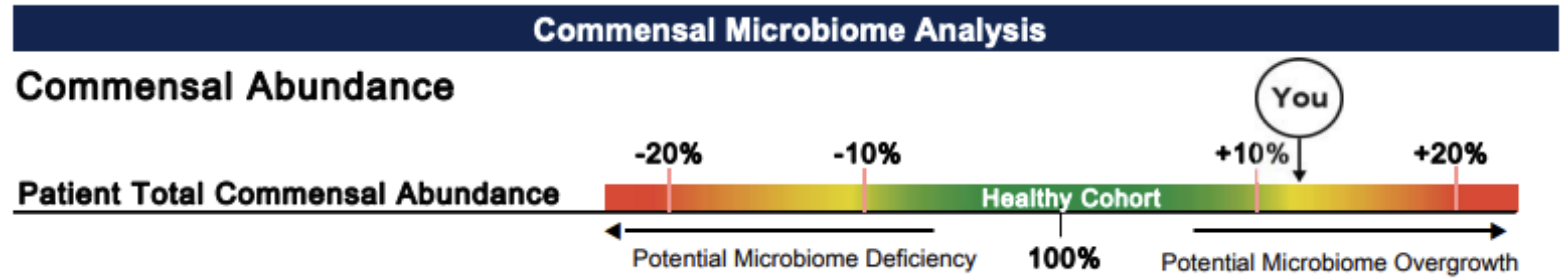
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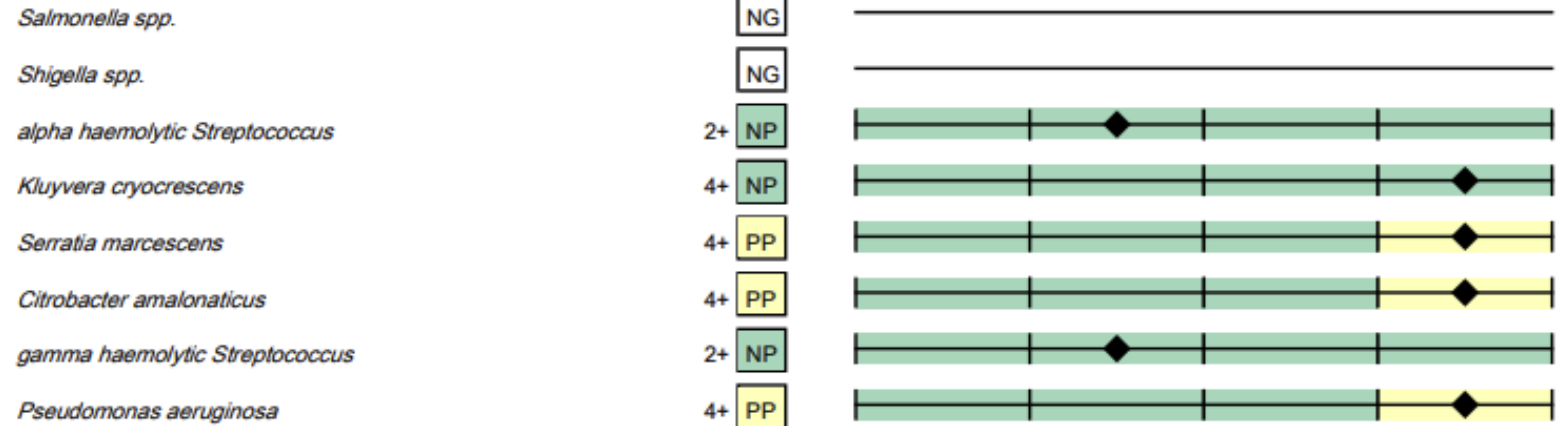


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Additional Bacteria



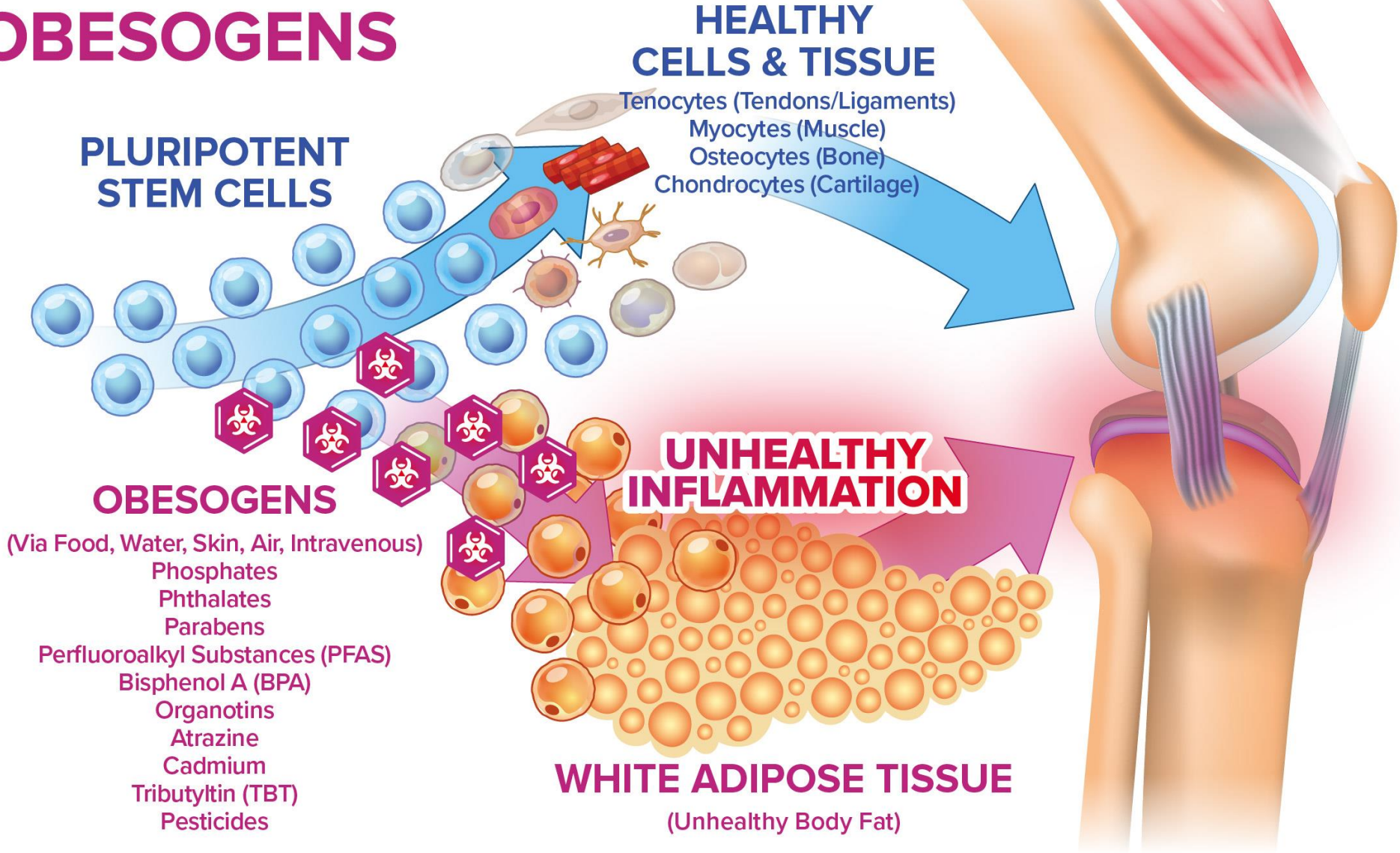
1. 66 yo Female
 - 5'2" 227lbs
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 - Hypercholesterolemia
 - Constipation
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 - Fibromyalgia
 - Fatigue

2. Rx
 - Levo
 - Carvedilol
 - Tramadol
 - Trazadone
 - Gabapentin
 - Rosuvastatin

Moderate (75th-95th percentile)							
		Mycotoxins		Heavy Metals		Environmental Toxins	
TEST NAME	CURRENT RESULT	PREVIOUS RESULT	CURRENT RESULT	PREVIOUS RESULT	REFERENCE		
 Fumonisin B1	5.54				≤6.13 ng/g		
 Fumonisin B2	5.18				≤7.2 ng/g		
 Zearalenone (ZEN)	0.59				≤0.67 ng/g		
 Beryllium*	0.21				≤0.76 ug/g		
 Triclosan (TCS)*	32.51				≤358 ug/g		

* Indicates NHANES population data reference ranges.

THE IMPACT OF OBESOGENS



**PLURIPOTENT
STEM CELLS**

**HEALTHY
CELLS & TISSUE**

Tenocytes (Tendons/Ligaments)
Myocytes (Muscle)
Osteocytes (Bone)
Chondrocytes (Cartilage)

OBESOGENS

(Via Food, Water, Skin, Air, Intravenous)

- Phosphates
- Phthalates
- Parabens
- Perfluoroalkyl Substances (PFAS)
- Bisphenol A (BPA)
- Organotins
- Atrazine
- Cadmium
- Tributyltin (TBT)
- Pesticides

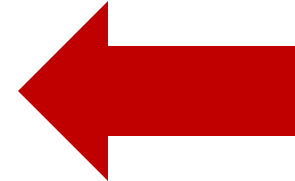
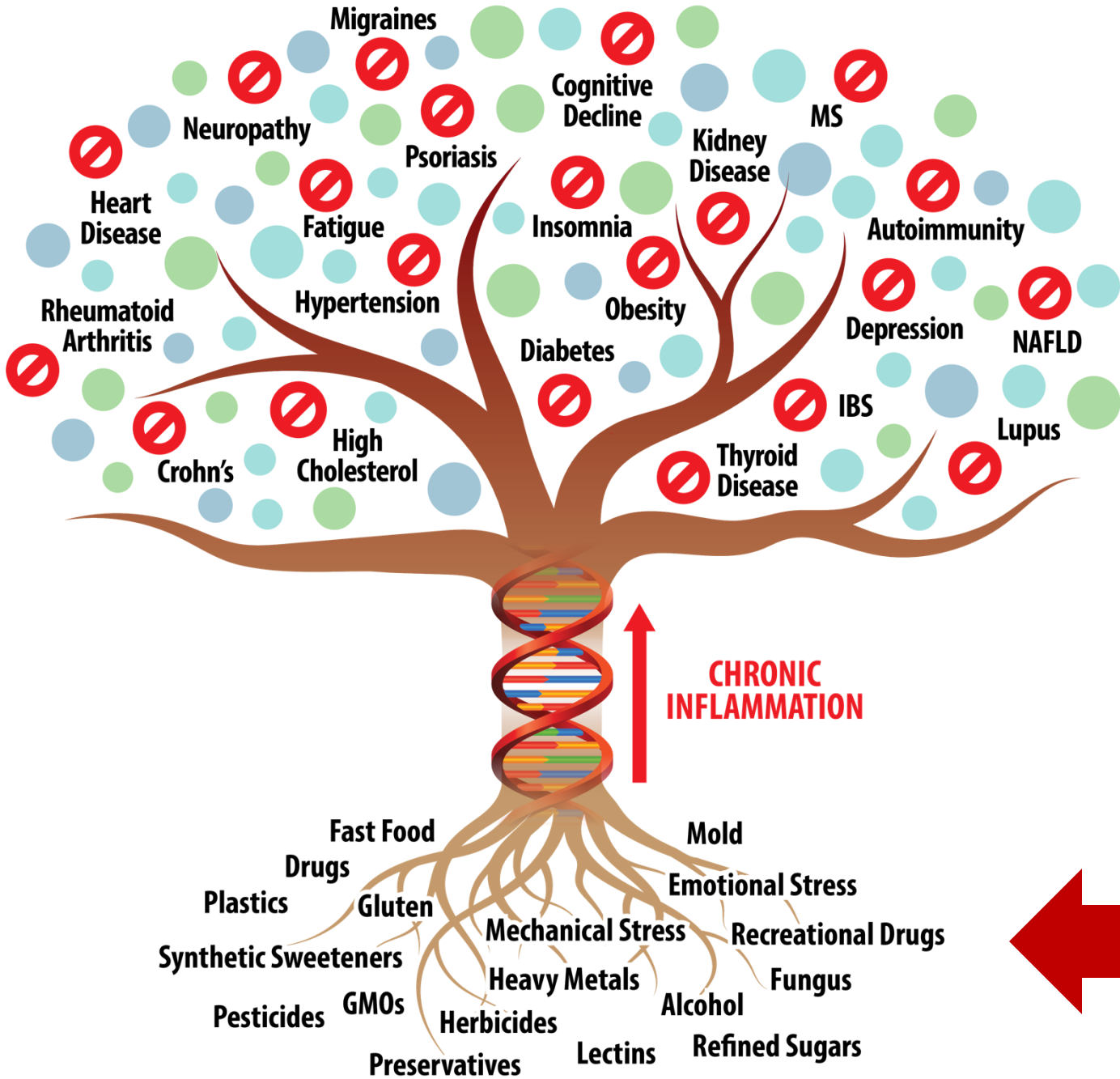
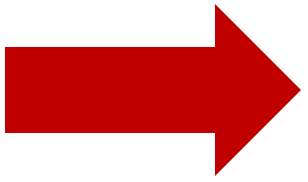
**UNHEALTHY
INFLAMMATION**

WHITE ADIPOSE TISSUE

(Unhealthy Body Fat)

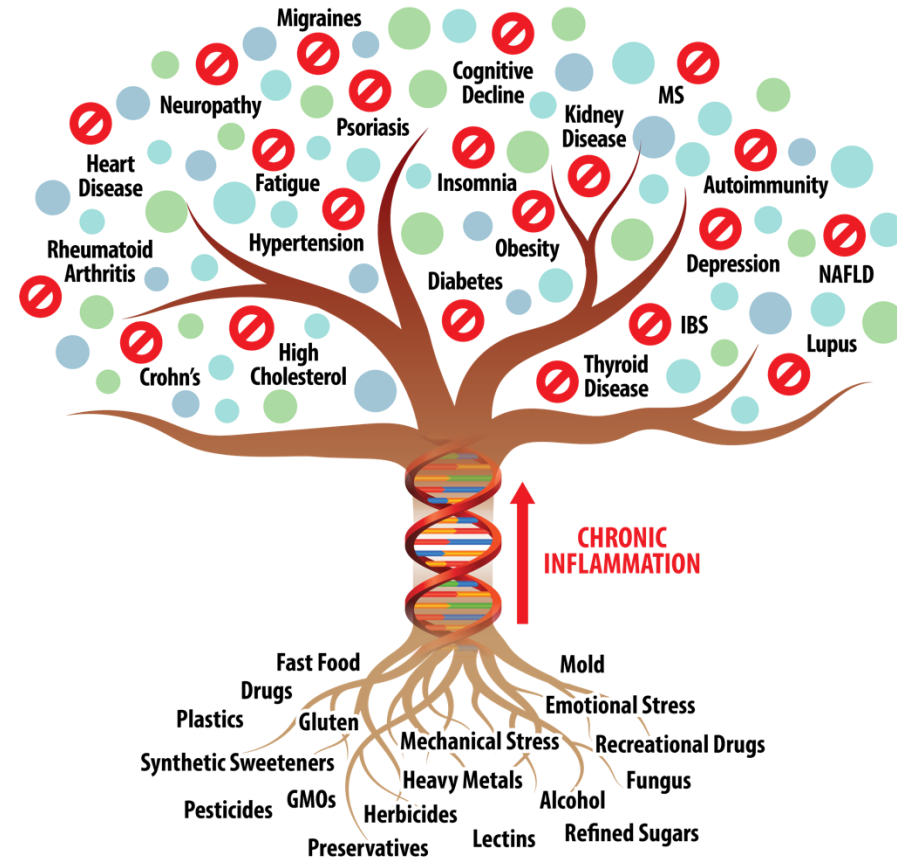


Biogenetix™



Model:

1. A patient to help.
2. A problem to solve.
3. Root cause analysis.
4. Plug and Play Programming.



1. 26 yo Female

- 5'7" 147lbs
- RA
- IBD
- POTS
- Anxiety
- Repeat Miscarriage

2. Rx

- Zoloft
- Xanax
- Methotrexate

Fe+TIBC+Fer

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Iron Bind.Cap.(TIBC)	417		ug/dL	250-450
UIBC ⁰¹	349		ug/dL	131-425
Iron ⁰¹	68		ug/dL	27-159
Iron Saturation	16		%	15-55
Ferritin ⁰¹	19		ng/mL	15-150

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
WBC ⁰¹	4.7		x10E3/uL	3.4-10.8
RBC ⁰¹	3.93		x10E6/uL	3.77-5.28
▼ Hemoglobin ⁰¹	10.8 Low		g/dL	11.1-15.9
Hematocrit ⁰¹	35.7		%	34.0-46.6
MCV ⁰¹	91		fL	79-97
MCH ⁰¹	27.5		pg	26.6-33.0
▼ MCHC ⁰¹	30.3 Low		g/dL	31.5-35.7
RDW ⁰¹	13.0		%	11.7-15.4
Platelets ⁰¹	311		x10E3/uL	150-450
Neutrophils ⁰¹	52		%	Not Estab.
Lymphs ⁰¹	35		%	Not Estab.
Monocytes ⁰¹	8		%	Not Estab.
Eos ⁰¹	3		%	Not Estab.
Basos ⁰¹	1		%	Not Estab.

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Comp. Metabolic Panel (14) (Cont.)

eGFR	100		mL/min/1.73	>59
BUN/Creatinine Ratio	18			9-23
Sodium ⁰¹	138		mmol/L	134-144
Potassium ⁰¹	4.7		mmol/L	3.5-5.2
Chloride ⁰¹	103		mmol/L	96-106
Carbon Dioxide, Total ⁰¹	21		mmol/L	20-29
Calcium ⁰¹	9.3		mg/dL	8.7-10.2
Protein, Total ⁰¹	6.9		g/dL	6.0-8.5
Albumin ⁰¹	4.3		g/dL	3.9-4.9
Globulin, Total	2.6		g/dL	1.5-4.5
Bilirubin, Total ⁰¹	<0.2		mg/dL	0.0-1.2
Alkaline Phosphatase ⁰¹	101		IU/L	44-121
AST (SGOT) ⁰¹	26		IU/L	0-40
▲ ALT (SGPT) ⁰¹	42	High	IU/L	0-32

HLA DRB1,3,4,5,DQB1 (IR)

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
DRB1 ⁰²				
		DRB1*07:01:01G		

HLA DRB1,3,4,5,DQB1 (IR) (Cont.)

DRB1 ⁰²				
		DRB1*11:01:01G		
DRB3 ⁰²				
		DRB3*02:02:01G		

Hgb A1c with eAG Estimation

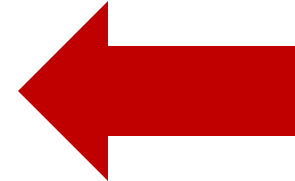
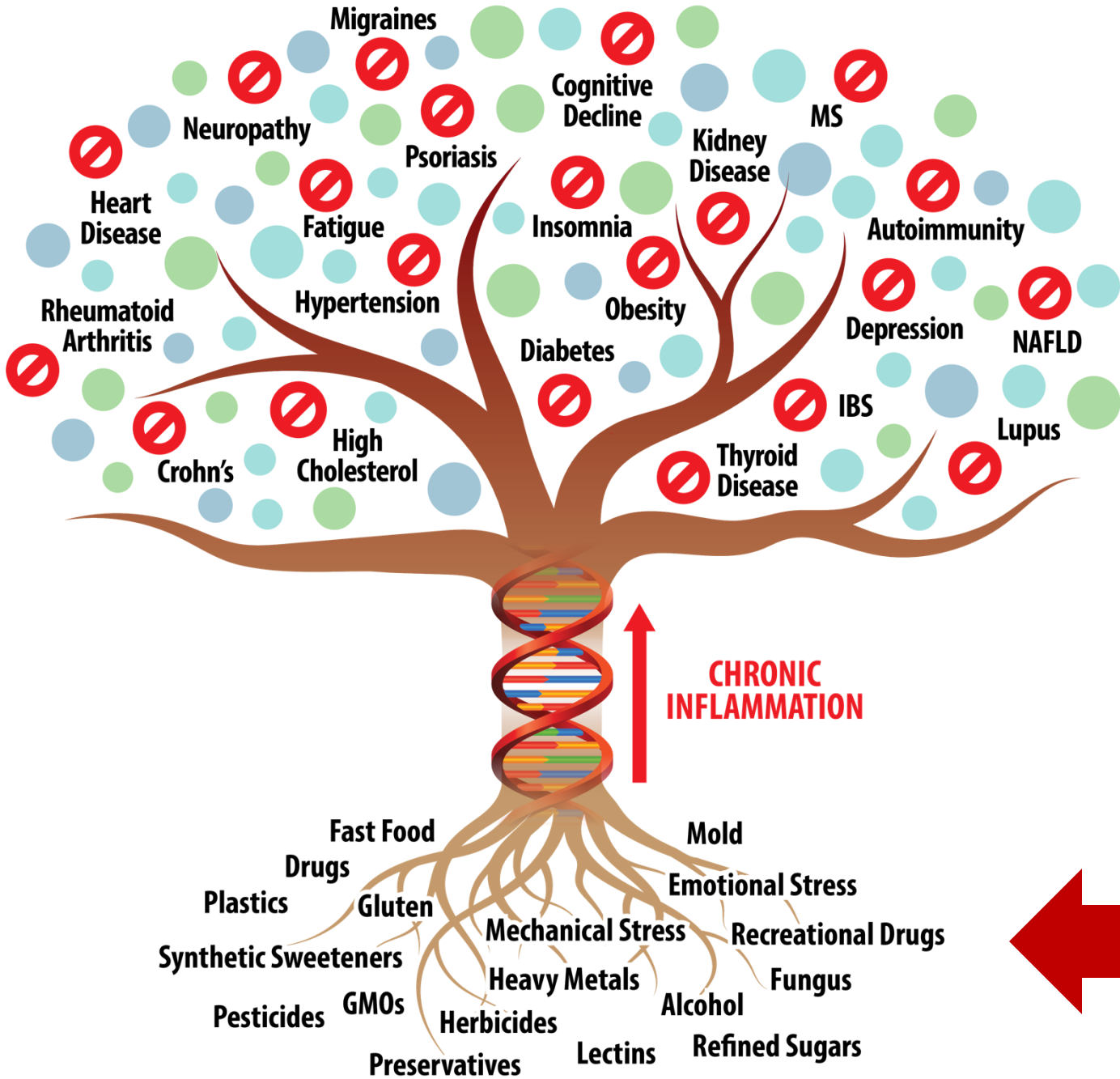
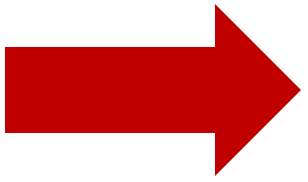
Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▼ Hemoglobin A1c ⁰¹	4.5	Low	%	4.8-5.6
Please Note: ⁰¹	Prediabetes: 5.7 - 6.4 Diabetes: >6.4 Glycemic control for adults with diabetes: <7.0			
Estim. Avg Glu (eAG)	82		mg/dL	

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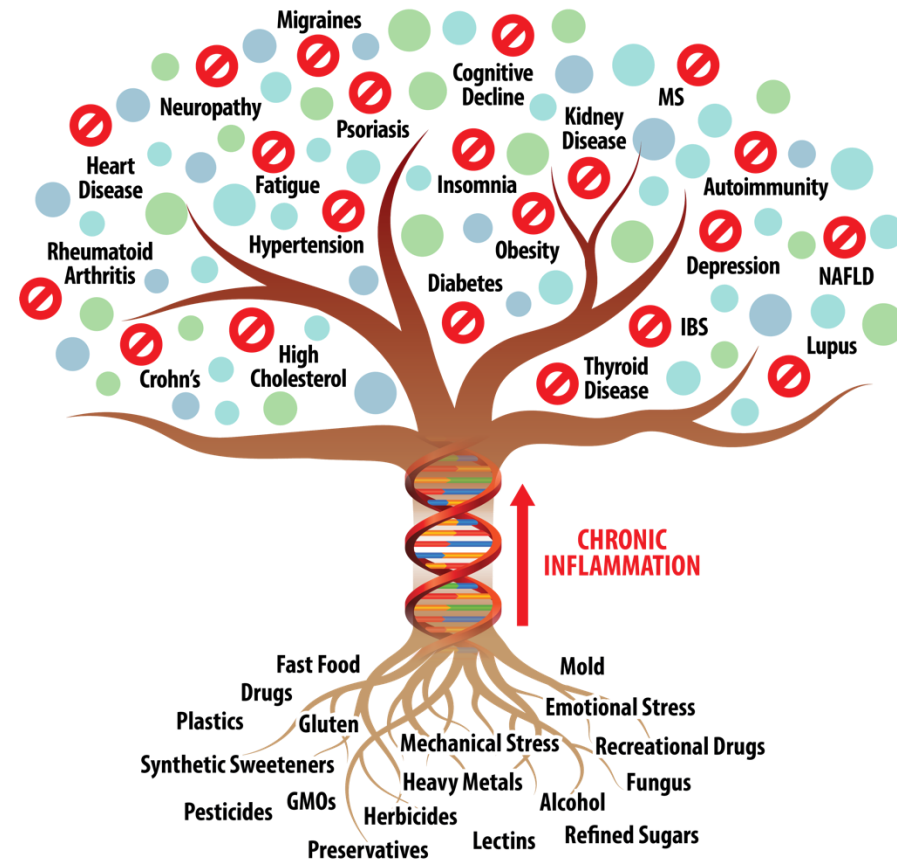
High					
			Mycotoxins		Environmental Toxins
Test Name	Current	Previous	Result		Reference
			75th	95th	
Atrazine mercapturate ^A (ug/g)	0.17		0.02	0.05	≤0.05
Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP) ^A (ug/g)	37.17		8.99	23.4	≤23.4
Gliotoxin (ng/g)	216.50		116.93	207.87	≤207.87
Roridin A (ng/g)	8.18		4.28	7.6	≤7.6
T-2 Toxin (ng/g)	0.38		0.1	0.18	≤0.18
Zearalenone (ZEN) (ng/g)	0.77		0.38	0.67	≤0.67

Suboptimal					
			Mycotoxins	Heavy Metals	Environmental Toxins
Test Name	Current	Previous	Result		Reference
			75th	95th	
Bisphenol A (BPA) ^A (ug/g)	2.37		2.12	5.09	≤5.09
Mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP) ^A (ug/g)	16.13		14.1	37.7	≤37.7
Tiglylglycine (TG) (ug/g)	0.11		0.09	3.24	≤3.24
Cadmium ^A (ug/g)	0.32		0.29	0.8	≤0.8
Tungsten ^A (ug/g)	0.13		0.12	0.33	≤0.33
Citrinin (CTN) (ng/g)	11.18		7.05	12.53	≤12.53
Deoxynivalenol(DON) (ng/g)	55.16		37.95	67.47	≤67.47
Diacetoxyscirpenol (DAS) (ng/g)	3.76		2.4	4.27	≤4.27
Verrucaric acid (ng/g)	5.84		5.18	9.2	≤9.2



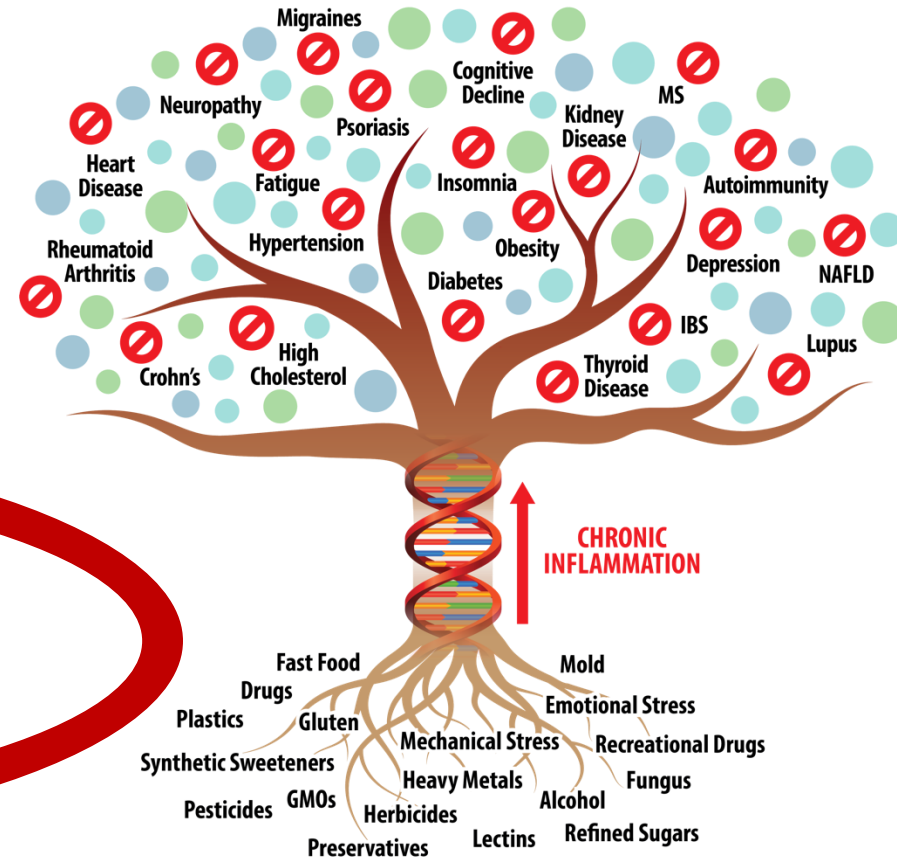
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>5000