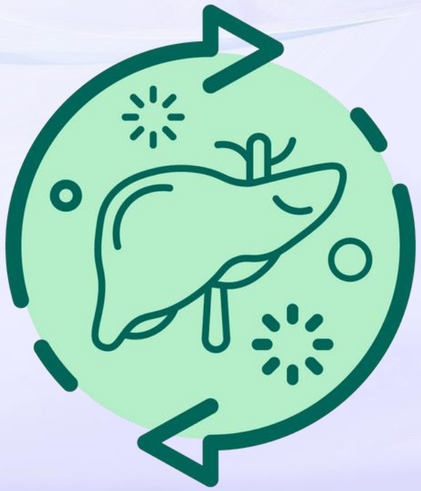
The Vibrant Longevity Summit

Restoring Balance

Toxins and Environmental Health



Session 1

Dr. Darshan Shah, MD

Session 2

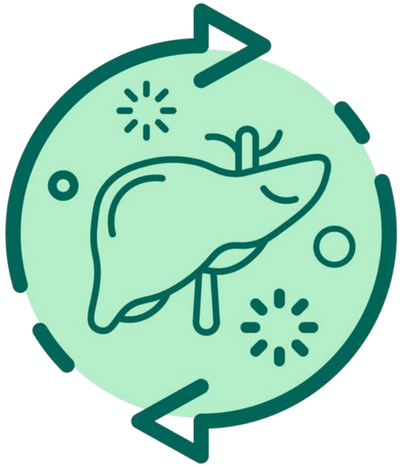
Dr. Charles Turnpaugh, DC, DACNB, AFMCP

Session 3

Ryan Bentley MD, PhD, DC, ABFM

Session 4

Dr. Elena Villanueva, DC



Restoring Balance

Toxins and Environmental Health

Session 1

Dr. Darshan Shah, MD

Meet Your Speaker

Dr. Darshan Shah, MD

The Vibrant Longevity Summit

Environmental Toxins

What to do in 2025

Darshan Shah, MD, CEO and Founder of Next Health

Scan to get slides

Health Optimization and Longevity Centers

West Hollywood, CA

Century City, CA

Studio City, CA

New York City, NY

Four Seasons Resort Maui, HI

Nashville The Gulch, TN

Dubai

Woodland Hills - Calabasas, CA

Miami Aventura, FL
*Coming Soon

Montecito, CA

Newport Beach, CA

Vancouver, CAN
*Coming Soon

Chicago Lincoln Park, IL

Roseville, CA
*Coming Soon

Nashville Green Hills, TN
*Coming Soon

Irvine, CA
*Coming Soon

Bellevue, WA
*Coming Soon

Chicago Oakbrook, IL
*Coming Soon

Tampa, FL
*Coming Soon

Henderson, NV
*Coming Soon

Peoria, AZ
*Coming Soon

Elk Grove, CA
*Coming Soon

Chestnut Hill, MA
*Coming Soon

Fort Lauderdale, FL
*Coming Soon

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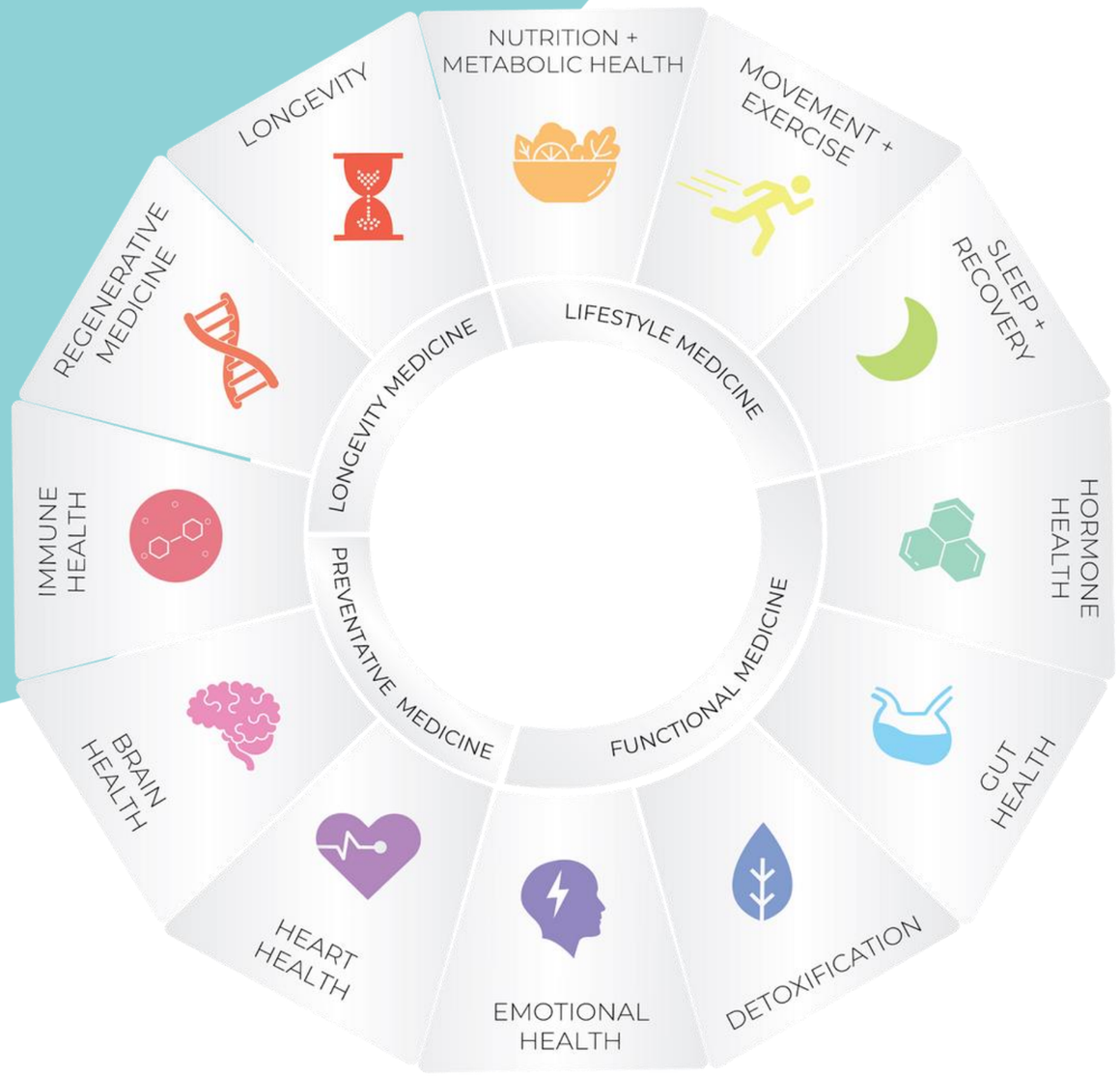
Wellness Wheel



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Mold

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Testing

Vibrant Urine Tests

Aflatoxins-cancer cuasing toxins in Aspergillus

Trichothecenes- toxins from Fusarium species that effect stored grains

"other"- other mold toxins that can have negative health effects

Mycotoxins

VibrantWellness

Vibrant Wellness | 1360 Bayport Ave, San Carlos, CA 94070

1(866) 364-0963 | support@vibrant-america/.com | www.vibrant-wellness.com

LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE

Aflatoxin					
	75th / 95th			75th / 95th	
	0.74			2.99	≤8.13 ng/g
Aflatoxin G1	2.48	≤6.53 ng/g	Aflatoxin G2	1.94	≤10.8 ng/g
	1.86				

Other					
	75th / 95th			75th / 95th	
	15.94			2.98	≤12.53 ng/g
Dihydrocitrinone	1.33	≤16.53 ng/g	Enniatin B1(ENN B1)	0.13	≤0.22 ng/g
	0.06			2.17	≤7.2 ng/g
Fumonisins B3	1.4	≤10.8 ng/g	Gliotoxin	45.26	≤207.87 ng/g
	2.06	≤6.4 ng/g		0.53	≤6.8 ng/g
Patulin	1.63	≤11.6 ng/g	Sterigmatocystin (STC)	0.18	≤0.53 ng/g
	0.2	≤0.67 ng/g			

Trichothecenes					
	75th / 95th			75th / 95th	
	28.49			1.12	≤4.27 ng/g
Nivalenol (NIV)	0.58	≤3.2 ng/g	Roridin A	2.72	≤7.6 ng/g
	0.57			3.26	≤6.8 ng/g
Satratoxin G	0.09	≤0.18 ng/g	Satratoxin H	0.12	≤0.18 ng/g
	0.06	≤0.18 ng/g		0.64	≤1.33 ng/g
Verrucarin J	1.23	≤9.2 ng/g			

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Germ vs Terrain

Mold is all around us, but consistent exposure combined with poor immune support creates grwoth of mold an, spores and toxins

Mold is found in two places:

Living environment
(in the air)

Food storage
(of grains, nuts, etc)

GERM THEORY

Humans get exposed to germs, and these microorganisms can make people unwell.

These "bugs" are contagious and can be passed off to other people.

These infections cause disease or illness.

Medications and vaccines are used to kill bacteria or virus.

TERRAIN THEORY

Bacteria that reside mostly in the gut microbiome are beneficial for immune function.

In response to damaged tissues from toxin exposure, these microogranisms can pleomorph into disease-causing organisms.

This toxin exposure causes an imbalance in the body, resulting in disease or illness.

Eliminating the toxins by cleansing the terrain gets the foundation of the body balanced.

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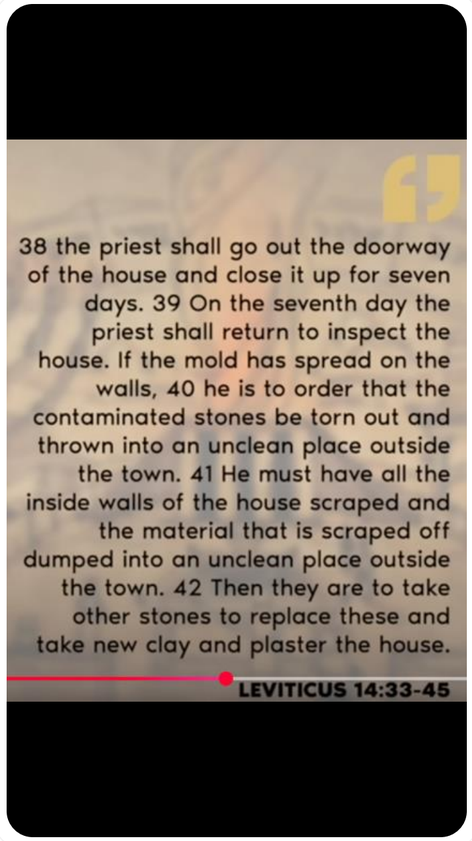
Mold In The Home

Usually found in places with high humidity, wet climates and water exposure

70% of homes have mold in the US- older home, poor/old HVAC, no change of filters, basements all contribute

dont forget about work envirnemnts. fofices!

mold is visible- may be black, green or white
spores and toxins are not visible



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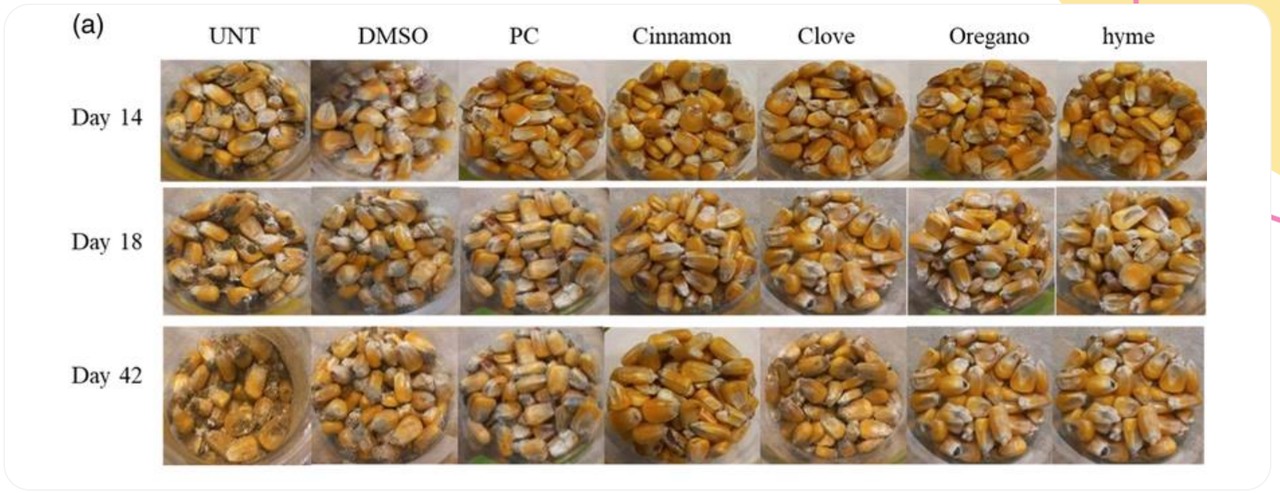
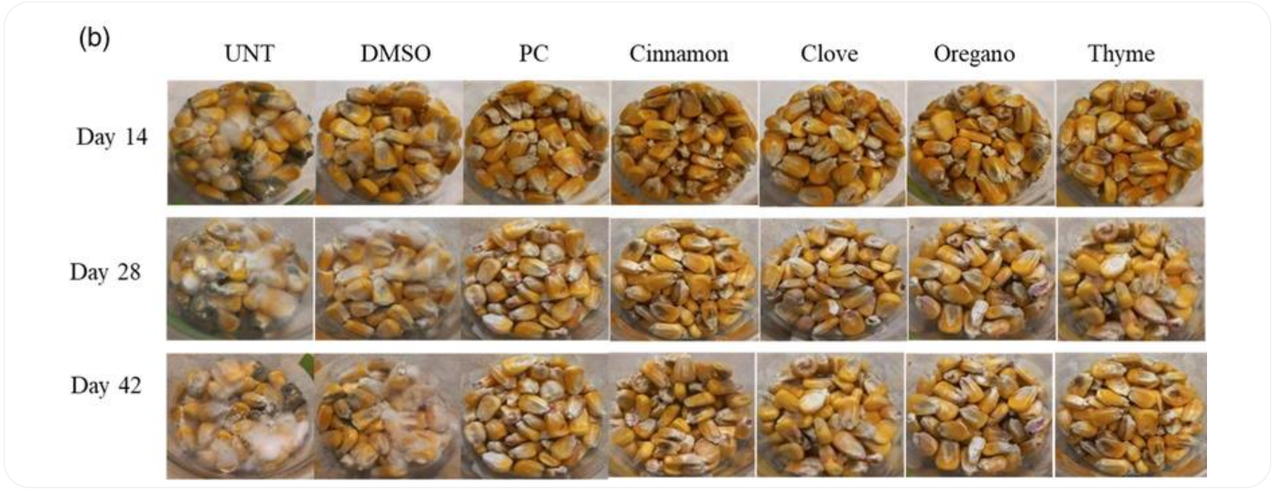
Mold in Stored Food

Nuts

Grains





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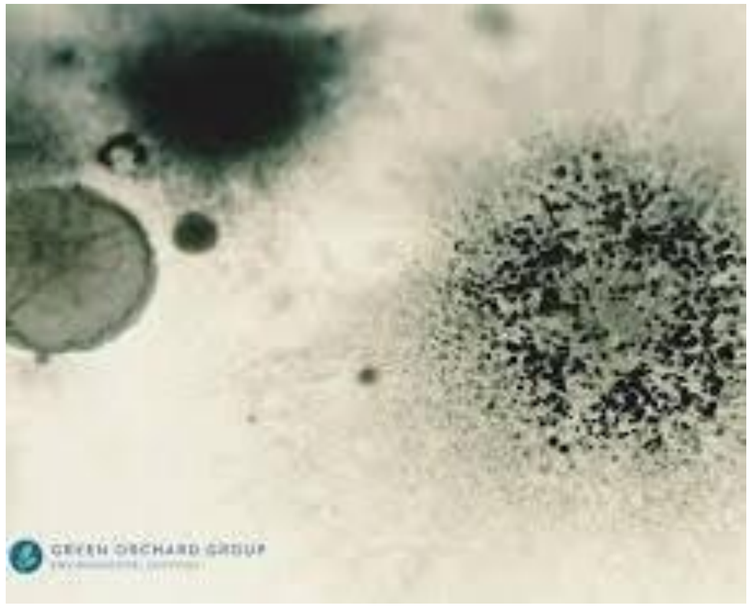
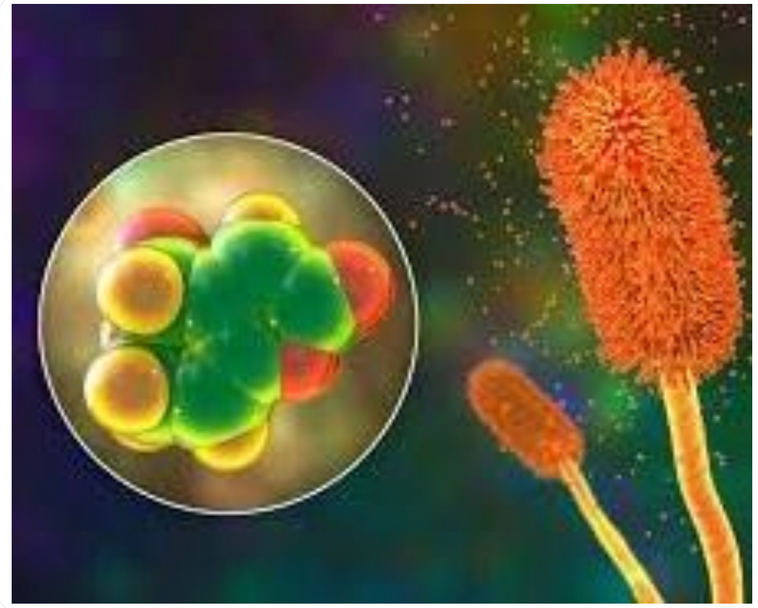
Mold Can Cause Disease In Three Ways

Fungal growth -
anatomical growths

Mycotoxins –
myriad of symptoms

Spores - allergic





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Signs/Symptoms

70% Brain and nervous system symptoms - Brain fog, fatigue, mental issues, depression

64% Respiratory issues - reactive airways and asthma, mucus build up, sinusitis

24% have Gut issues- bloating, microbiome issues- 24% have gut issues

Immune issues- inflammation throughout the body, autoimmune disease trigger

Allergic -usually due to SPORES in respiratory areas- Sneezing, rhinitis, skin rashes, mucous

Musculoskeletal - Fatigue, joint pains, misdiagnosed with MS, lyme

Hormone issues

Cognitive and Behavioral Effects

Headaches and Migraines

Disruption in Sleep-Wake Cycles

Neurological Disorders

Neurotoxicity and Central Nervous System Effects

Increased Anxiety and Depression

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What to Do?

STEP 1 : Decrease exposure

01

Track outdoor spore levels (National Allergy Bureau- tracks with pollen and mold counts)

02

Control home humidity- use dehumidifiers and track humidity levels <50%

03

Ventailate your home – open windows on good AQI days

04

Regularly clean visible mold - tea tree oil or baking soda mixed with water

05

Get a high quality air purifier

06

Test your home – home test kits or a professional

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What to Do?

- Diet - reduce carbs and fats that “feed” mold in the gut. Some advocate a lean carnivore diet
- Probiotics to support gut health
- Nutritional support- high quality supplementation program
- Sauna
- Herbal remedies- oregano, thyme, olive leaf, garlic, neem leaf , sasparilla, grape fruit seed extract, caprillic acid (cocnut oil), chlorella
- Hyperbaric oxygen
- Binders- activated charcoal, bentonite clay, humate, cholestyramine (binds to toxins)
  4g 3x/day
- Ozone therapy

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Heavy Metals

Heavy metals that could be found in collagen

Arsenic

Cadmium

Chromium

Lead

Mercury

Cbsupplements.com/cc/collagen-peptides-heavy-metals/

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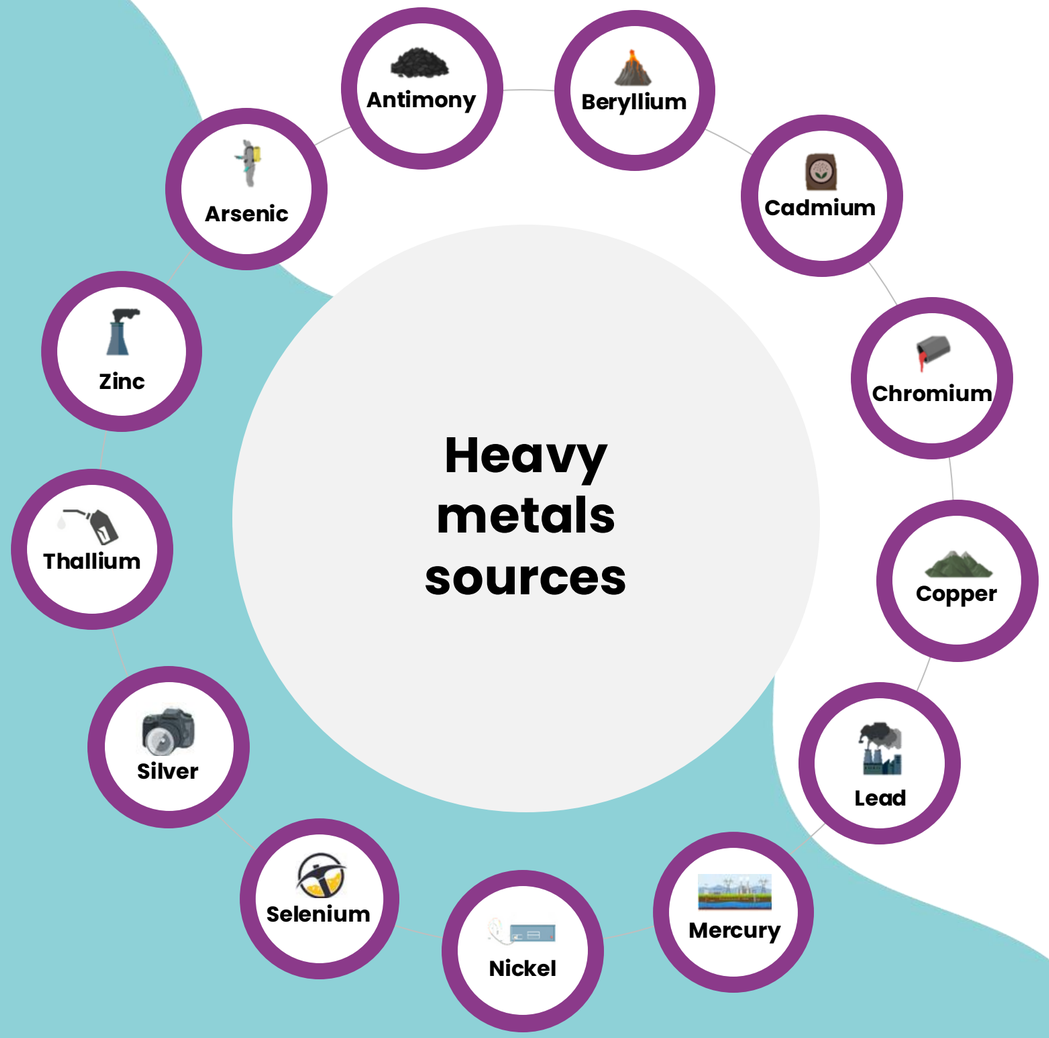

Heavy Metals

VibrantWellness
Vibrant Wellness | 1360 Bayport Ave, San Carlos, CA 94070
1(866) 364-0963 | support@vibrant-america/.com | www.vibrant-wellness.com

LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE

Heavy metals *Indicates NHANES population data reference ranges.

	75th	95th			75th	95th	
	<3				0.02		≤0.16 ug/g
Arsenic*	12.52		≤52 ug/g	**Barium***	<1		≤5.59 ug/g
	<0.1		≤0.76 ug/g		<0.1		≤2.53 ug/g
Cadmium*	0.11		≤0.8 ug/g	**Cesium***	4.03		≤10.3 ug/g
	<0.05		≤0.45 ug/g		<0.1		≤1.16 ug/g
Mercury*	1.21		≤1.61 ug/g	**Nickel**	0.9		≤12.13 ug/g
	<0.1		≤0.2 ug/g		<0.05		≤0.9 ug/g
Tellurium	0.11		≤0.89 ug/g	**Thallium***	0.13		≤0.43 ug/g
	0.01		≤0.07 ug/g		0.21		≤3.72 ug/g
Tungsten*	0.18		≤0.33 ug/g	**Uranium***	0.01		≤0.04 ug/g

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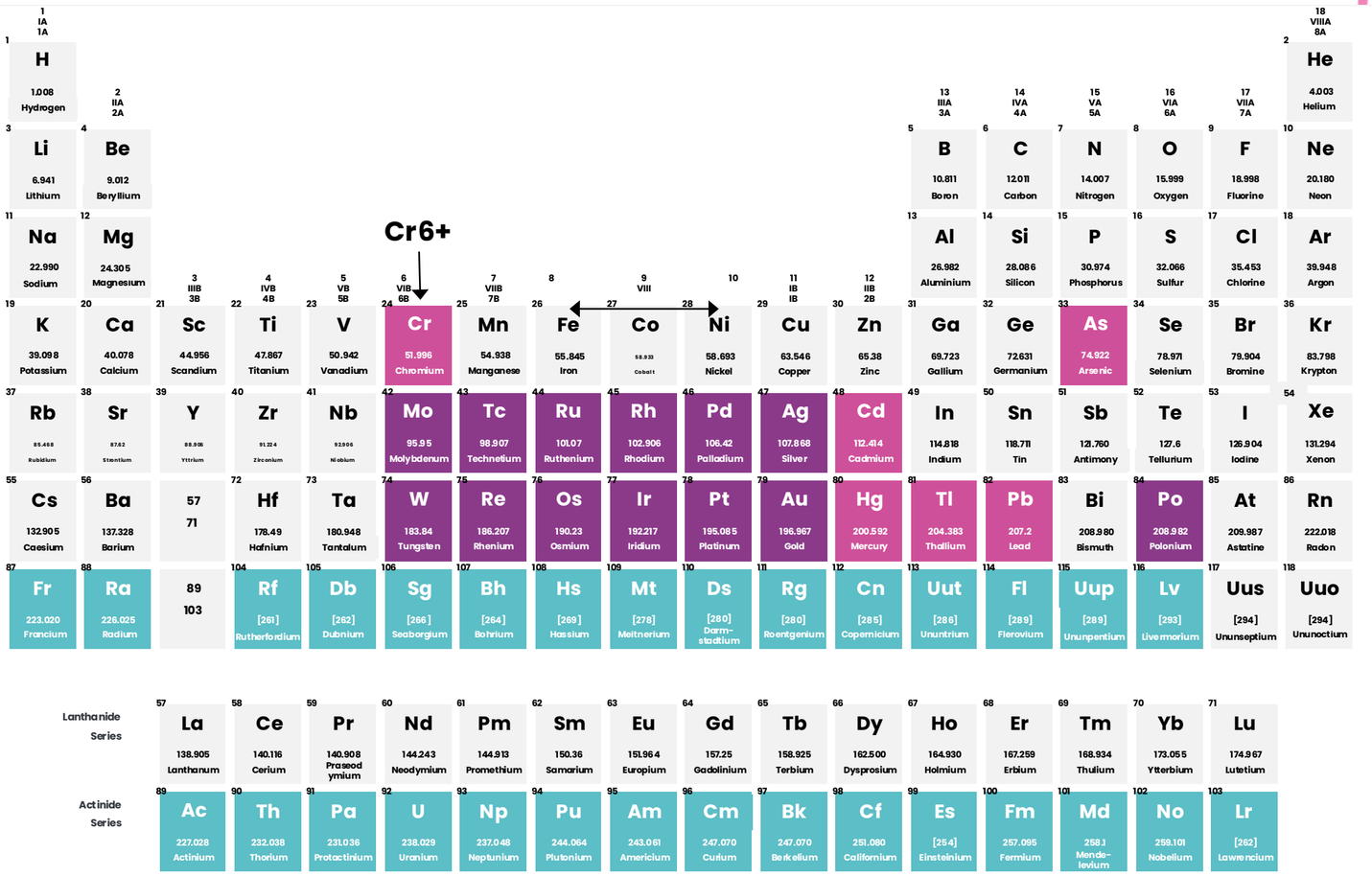
Heavy Metals Periodic Table

There is no strict definition of heavy metals, but they typically exhibit high density and toxicity



- Core Toxic Heavy Metals
- Other Commonly Recognized
- Additional candidates

sciencenotes.org

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Most Common

Mercury

Fish and fillings

Lead

Paint and military

Arsenic

Water, rice

Cadmium

smoking, batteries

Treatment

Increase free radical scavengers (antioxidants)-ALA/ NAC (makes glutathione) and do glutathione

Pee – Water

Chelate – cilantro. Garlic. Selenium/ Zinc

Sweat – Sauna and exercise

Poop – Fiber

Supplments

a.SULFROAPHANE- broccali sprouts and brocoli micrograins. Add to your salad daily. 100x the efct of brocoli
b.Chorella

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Environmental Toxins

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Clearance of Environmental Toxins

Pollution and stupidity remain the the biggest dangers to the continued existence of the human race.

-Steven Hawkins, 2016

https://www.youtube.com/watch?v=tCA_Cu6r2N8

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Air, Water, Food, Skin

AIR

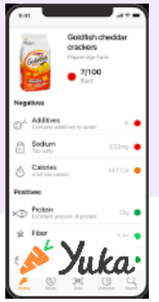
WATER

FOOD

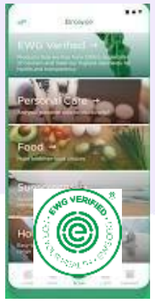
https://www.ewg.org/foodnews/

SKIN

THINK DIRTY



YUKA



EWG

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Parabens: Endocrine Disruptors

Parabens are **synthetic chemicals** used mainly as preservatives. They keep bacteria and mold from growing in products that contain water or oils.

Cosmetics and personal care products: lotions, shampoos, conditioners, deodorants, shaving gels, and makeup

Pharmaceuticals: some creams, ointments, and even oral medications

Processed foods: baked goods, soft drinks, jams, pickles, and condiments

Parabens *Indicates NHANES population data reference ranges.					
	75th	95th		75th	95th	
	0.17			46.74		≤99.3 ug/g
Methylparaben	2178.25	≤653 ug/g	**Propylparaben***	24.54		≤222 ug/g

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PESTICIDES – linked to Parkinsons

JAMA Network | Open

Home | JAMA Network Open | Vol. 8, No. 5

Original Investigation | Neurology

Proximity to Golf Courses and Risk of Parkinson Disease

Brittany Krzyzanowski, PhD[1]; Aidan F. Mullan, MA[2,5]; E. Ray Dorsey, MD[3] ; et al

Author Affiliations | Article Information

RELATED ARTICLES FIGURES SUPPLEMENTAL CONTENT

Key Points

Question Does living within proximity to a golf course affect the risk of Parkinson disease (PD)?

Results A total of 419 incident PD cases were identified (median [IQR] age, 73 [65-80] years; 257 male [61.3%]) with 5113 matched controls (median [IQR] age, 72 [65-79] years; 3043 male [59.5%]; 4504 White [88.1%]). After adjusting for patient demographics and neighborhood characteristics, living within 1 mile of a golf course was associated with 126% increased odds of developing PD compared with individuals living more than 6 miles away from a golf course (adjusted odds ratio [aOR], 2.26; 95% CI, 1.09-4.70). Individuals living within water service areas with a golf course had nearly double the odds of PD compared with individuals in water service areas without golf courses (aOR, 1.96; 95% CI, 1.20-3.23) and 49% greater odds compared with individuals with private wells (aOR, 1.49; 95% CI, 1.05-2.13). Additionally, individuals living in water service areas with a golf course in vulnerable groundwater regions had 82% greater odds of developing PD compared with those in nonvulnerable groundwater regions (aOR, 1.82; 95% CI, 1.09-3.03).

Pesticides *Indicates NHANES population data reference ranges.

	75th	95th			75th	95th	
	4.85				0.42		≤5.44 ug/g
Diethyl phosphate (DEP)*	1.34		≤15.7 ug/g	**Diethyldithiophosphate (DEDTP)***	0.07		≤0.3 ug/g
		4.38	≤3.92 ug/g		1.04		≤33.6 ug/g
Dimethyldithiophosphate (DMDTP)*	0.09		≤6.12 ug/g	**Dimethylthiophosphate (DMTP)***	0.23		≤33.7 ug/g

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VOCs

VOC stands for **Volatile Organic Compounds.** They're a large class of chemicals that easily evaporate into the air at room temperature. That volatility makes them useful in many products but also makes them sneaky indoor air pollutants.

Where VOCs are found

Household products: paints, varnishes, glues, cleaning sprays, air fresheners, candles, disinfectants

Office equipment: printers, copiers, correction fluids, markers

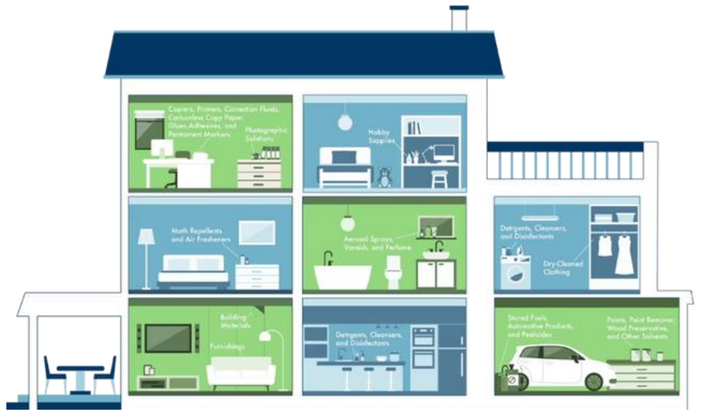
Personal care: perfumes, nail polish remover, hair sprays

Fuels: gasoline, kerosene, propane

Building materials: carpets, pressed wood furniture, vinyl flooring, insulation

SOURCES OF VOCS

Volatile Organic Compounds



Volatile organic compounds *Indicates NHANES population data reference ranges.						
	75th	95th			75th	95th	
	0.52				659.25	1324.79	≤1215.72 ug/g
2-Methylhippuric Acid (2MHA)*	75.06		≤248 ug/g	3-Methylhippuric Acid (3MHA)			≤612.83 ug/g
	27.51		≤752.72 ug/g		3.78		≤256 ug/g
N-Acetyl (2,Hydroxypropyl) Cysteine (NAHP)*	50.47		≤403 ug/g	N-Acetyl (3,4-Dihydroxybutyl) Cysteine*	335.55		≤583 ug/g
	11.17		≤46.1 ug/g		0.82		≤3.03 ug/g
Phenyl glyoxylic Acid (PGO)*	278.65		≤518 ug/g				

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Plasma Exchange

- 2 -3-hour procedure
- Via one or two IV catheters
- Comfortable treatment
- Anticoagulant given
- Blood passess via centrifuge
- Plasma removed
- Red blood cells combined with 5% Albumin
- Blood + Albumin returned to body

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Approved by the FDA in 1970

50+ years of 3rd line therapy in hospitals

1. TTP
2. Myasthenia Gravis
3. Autoimmune encephalitis
4. Hyperviscosity syndrome
5. Stiff person syndrome
6. Drug overdose
7. Transplant rejection
8. Blood Cancer
9. Graft vs. Host disease

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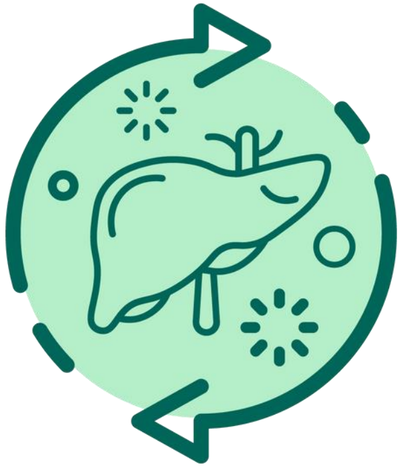
Thank You!

DOWNLOAD FREE GUIDE:

www.drshah.com/toxins



Restoring Balance

Toxins and Environmental Health

Session 2

Dr. Charles Turnpaugh, DC, DACNB, AFMCP

Meet Your Speaker

Dr. Charles Turnpaugh, DC, DACNB, AFMCP

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Restoring Balance: Advanced Strategies in Environmental and Oxidative Health

Pushing the boundries of healthcare

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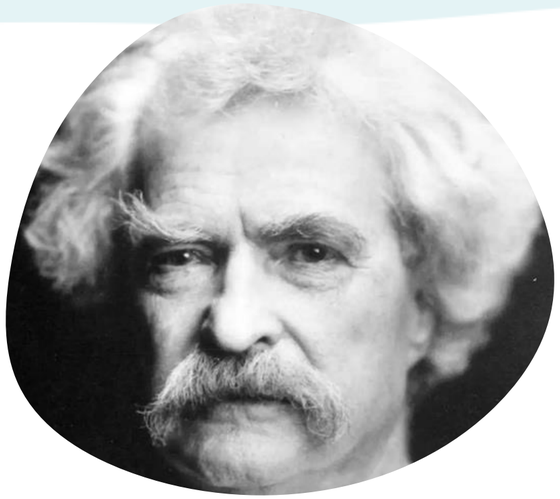
Restoring Balance and Environmental Health featuring our Toxins Testing and Stress Oxidative panels.



Mark Twain: Credit The Mark Twain/House & Museum

"It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so."

Mark Twain

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“What we know is limited. What we don’t know is limitless, and yet healthcare draws its boundaries as if it knows enough.

Chris Turnpaugh

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Arsenic Deck Case

A compelling real world case from the late 1990s where a woman in Louisiana was mis-suspected of intentional poisoning only for investigators to later realize both she and her husband had extremely elevated arsenic levels from exposure to CCA treated wood. The incident unfolded while they were building a structure outdoors, likely a deck or cabin, using pressure treated lumber. Notably, the husband's levels were even higher than hers, exonerating him

static.EWG.org/2002/allhandsondeck.pdf

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Arsenic Deck Case

Late 1990s, Louisiana

- Context: A wife became seriously ill with arsenic poisoning symptoms, triggering police suspicion toward her husband.

- Toxicology: analysis revealed both had elevated arsenic; the husband's level was greater, indicating the exposure came from building with CCA treated lumber.

- Outcome: Case was eventually dismissed as no foul play was found; the poisoning was accidental and environmental

Arsenic Deck

In 2007 my wife's friend, Stacy, became seriously ill with arsenic poisoning after a splinter from her 16-year-old CCA-treated deck introduced the toxic compound into her system.

she built a ranch and chose to build a concrete patio to avoid future exposure!

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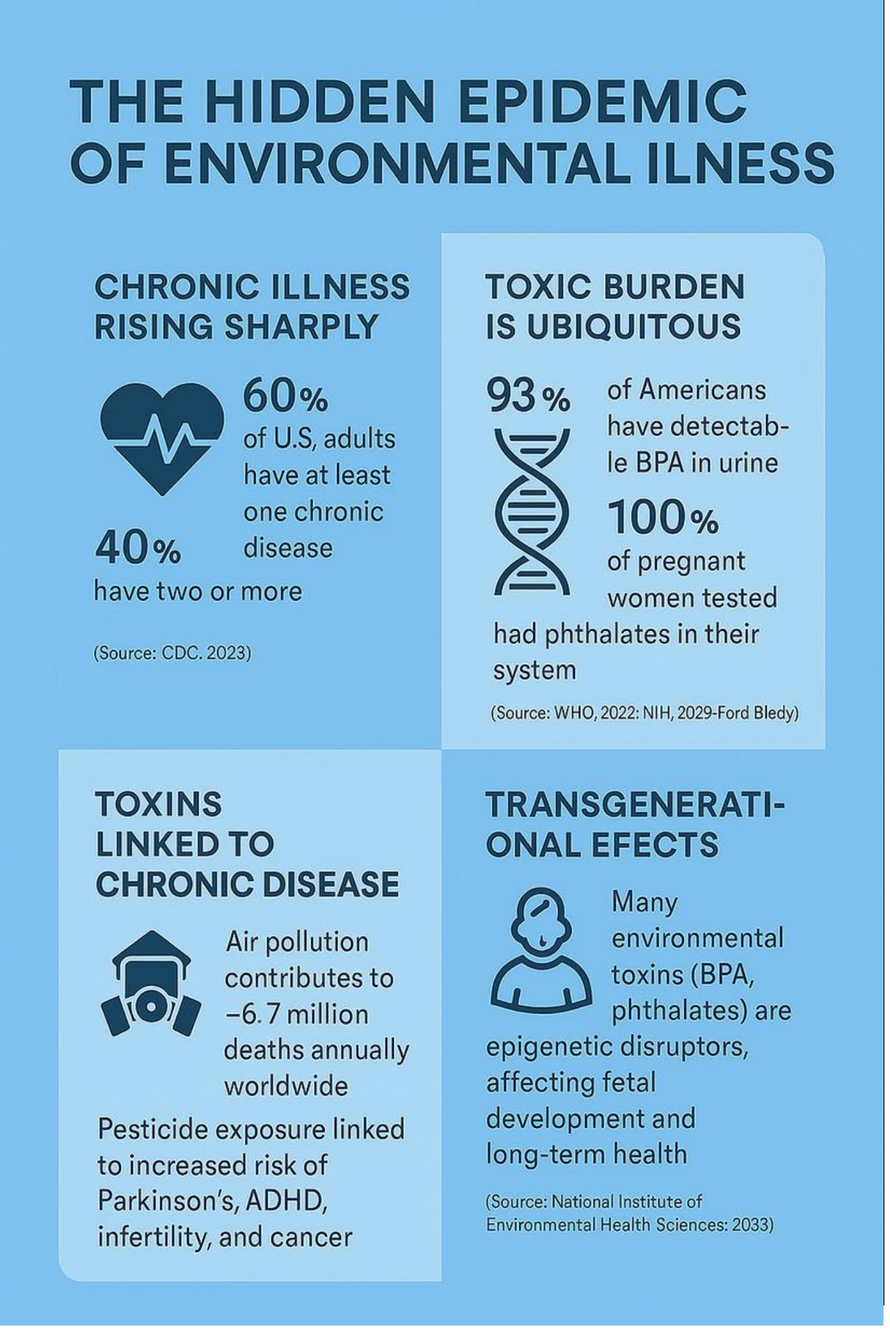

The Hidden Epidemic of Environmental Illness

Chronic Illness Rising Sharply

- 60% of U.S. adults have at least one chronic disease
- 40% have two or more

(Source: CDC, 2023)

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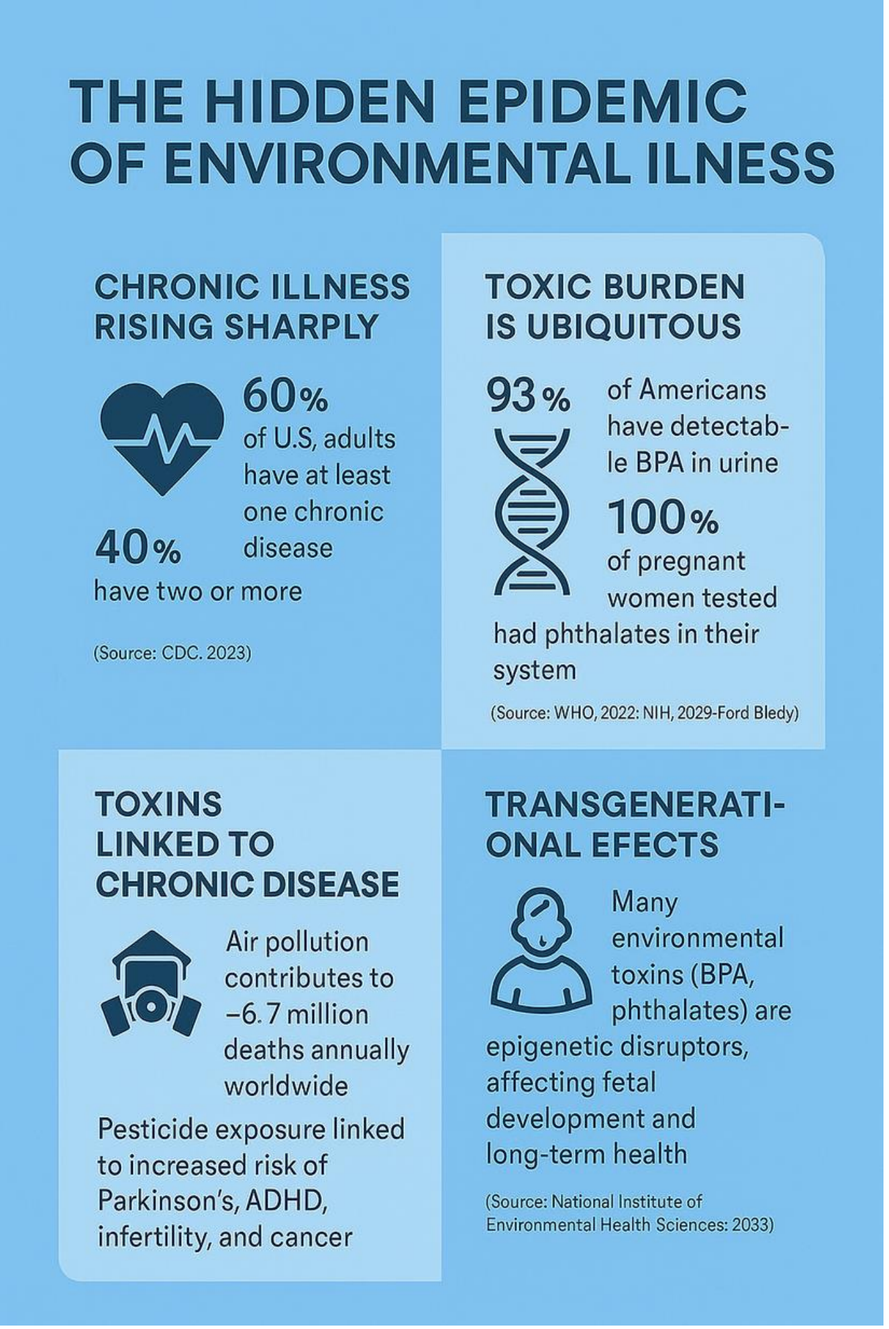

The Hidden Epidemic of Environmental Illness

Toxic Burden is Ubiquitous

- 93% of Americans have detectable BPA in urine
  (Source: CDC NHANES, 2021)
- 100% of pregnant women tested had phthalates in their system
  (Source: EWG/Cord Blood Study)

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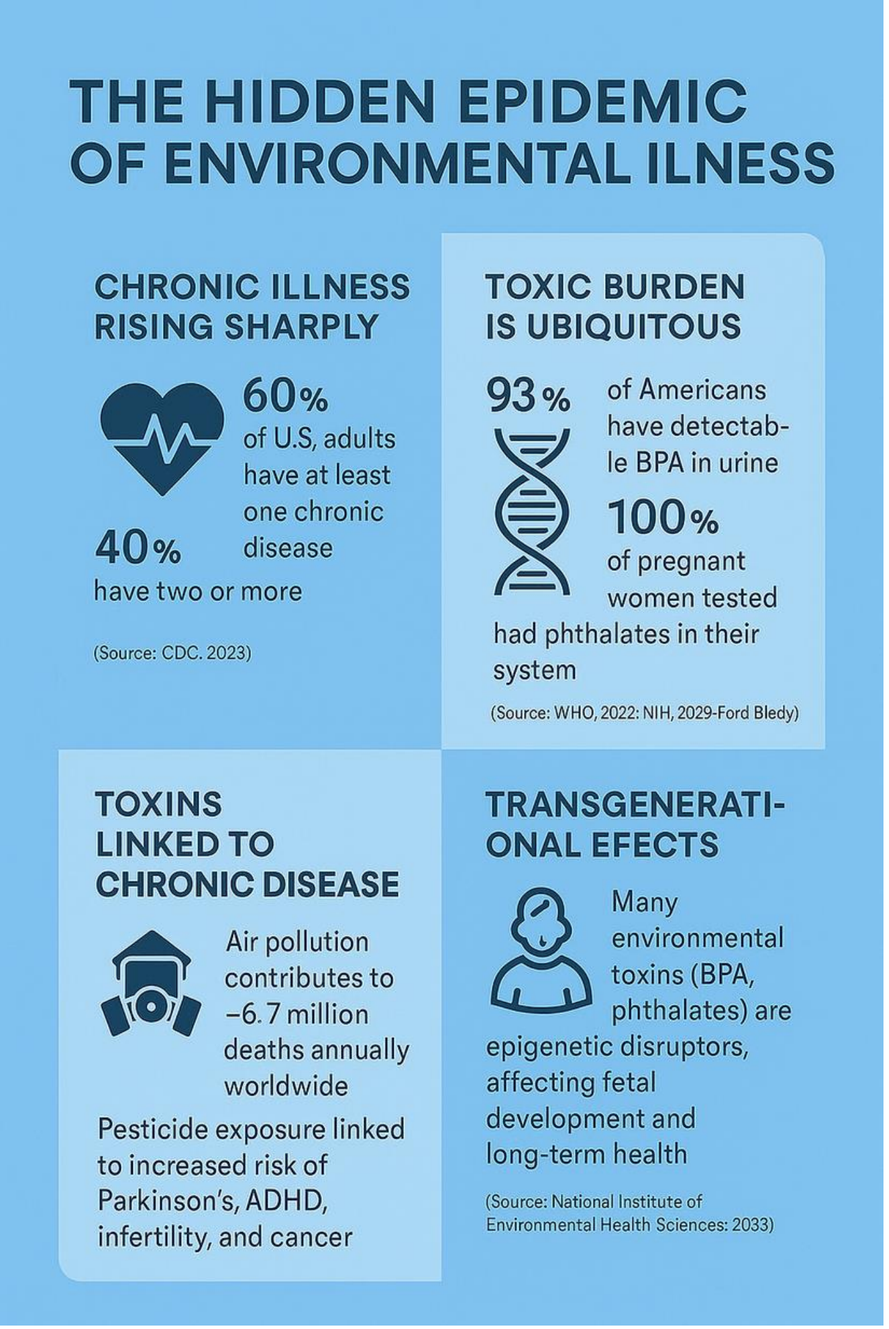

The Hidden Epidemic of Environmental Illness

Toxins Linked to Chronic Disease

- Air pollution is responsible for 6.7 million premature deaths every year
  (Source: WHO, 2025)

- Pesticide exposure linked to increased risk of Parkinson's, ADHD, infertility, and cancer

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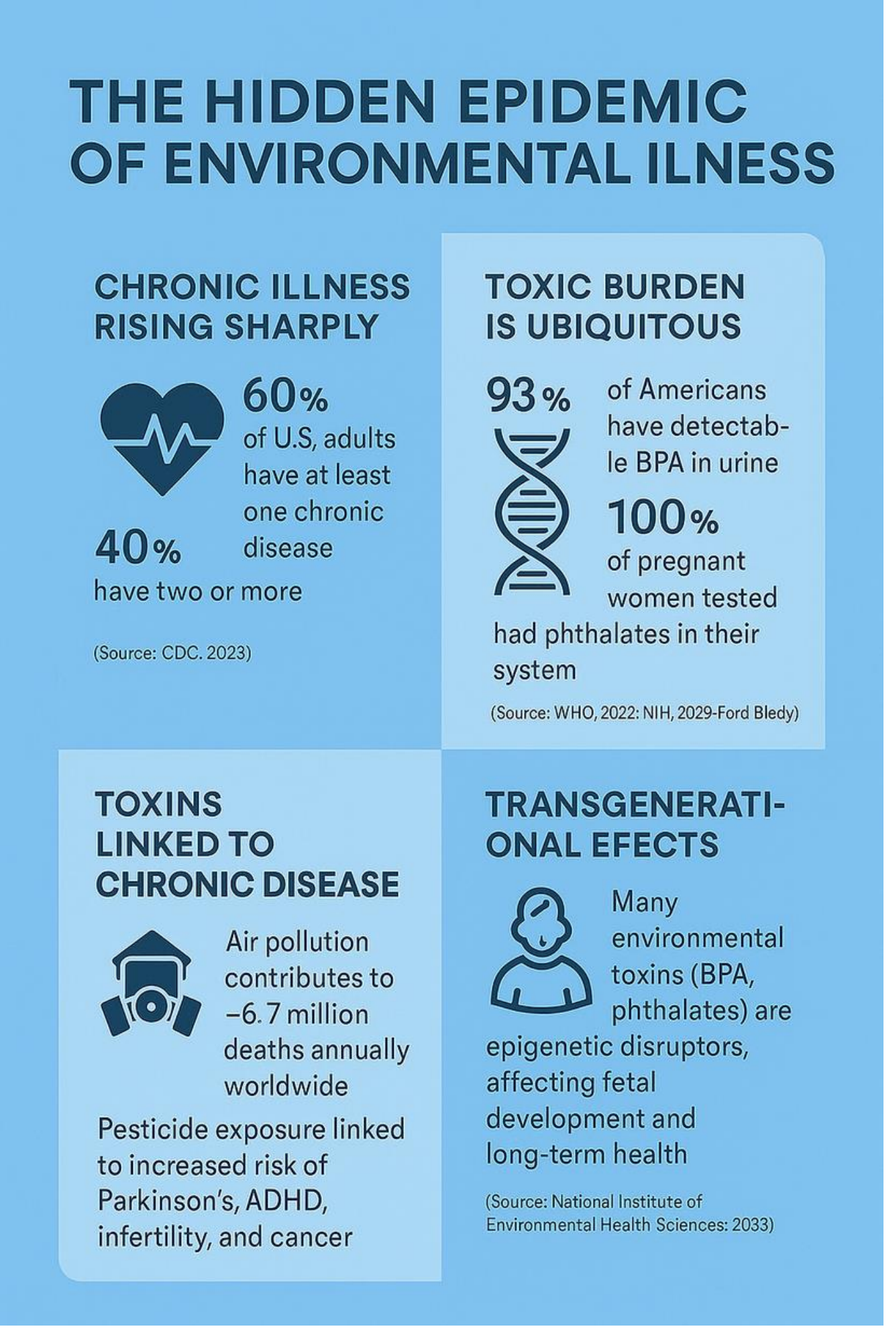

The Hidden Epidemic of Environmental Illness

Transgenerational Effects

- Many environmental toxins (BPA, phthalates) are epigenetic disruptors, affecting fetal development and long-term health

(Source: NIH: National Toxicology Program)

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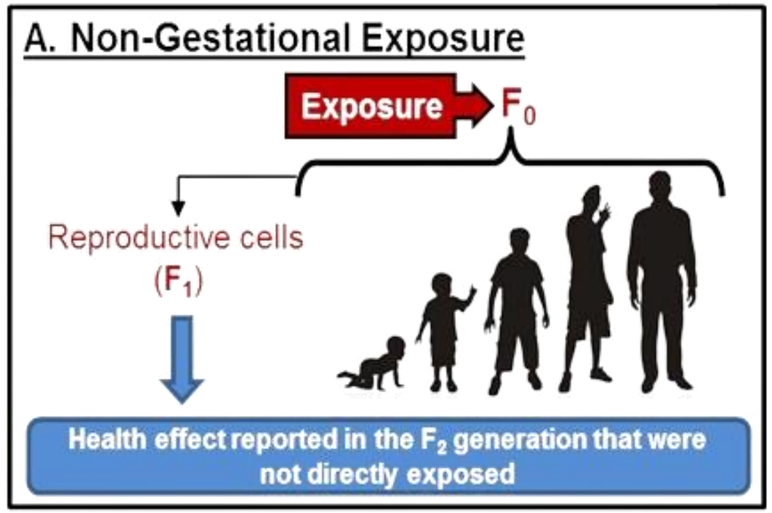
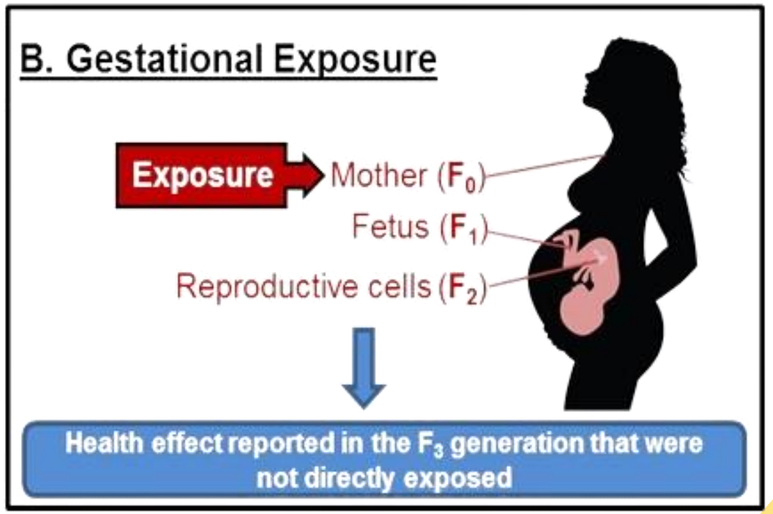
The Hidden Epidemic of Environmental Illness

What is Transgenerational Inheritance?

- Exposure occurs in the F_0 generation
- Exposure stops – not continuous, not across generations
- Health effect is evaluated in generation(s) not directly exposed.





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The Hidden Epidemic of Environmental Illness

Tong, T., Duan, W., Xu, Y., Hong, H., Xu, J., Fu, G., Wang, X., Yang, L., Deng, P., Zhang, J., He, H., Mao, G., Lu, Y., Lin, X., Yu, Z., Pi, H., Cheng, Y., Xu, S., & Zhou, Z. (2022). **Paraquat exposure induces Parkinsonism by altering lipid profile and evoking neuroinflammation in the midbrain.** Environment international, 169, 107512. https://doi.org/10.1016/j.envint.2022.107512

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The Hidden Epidemic of Environmental Illness

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The Hidden Epidemic of Environmental Illness

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The Hidden Epidemic of Environmental Illness

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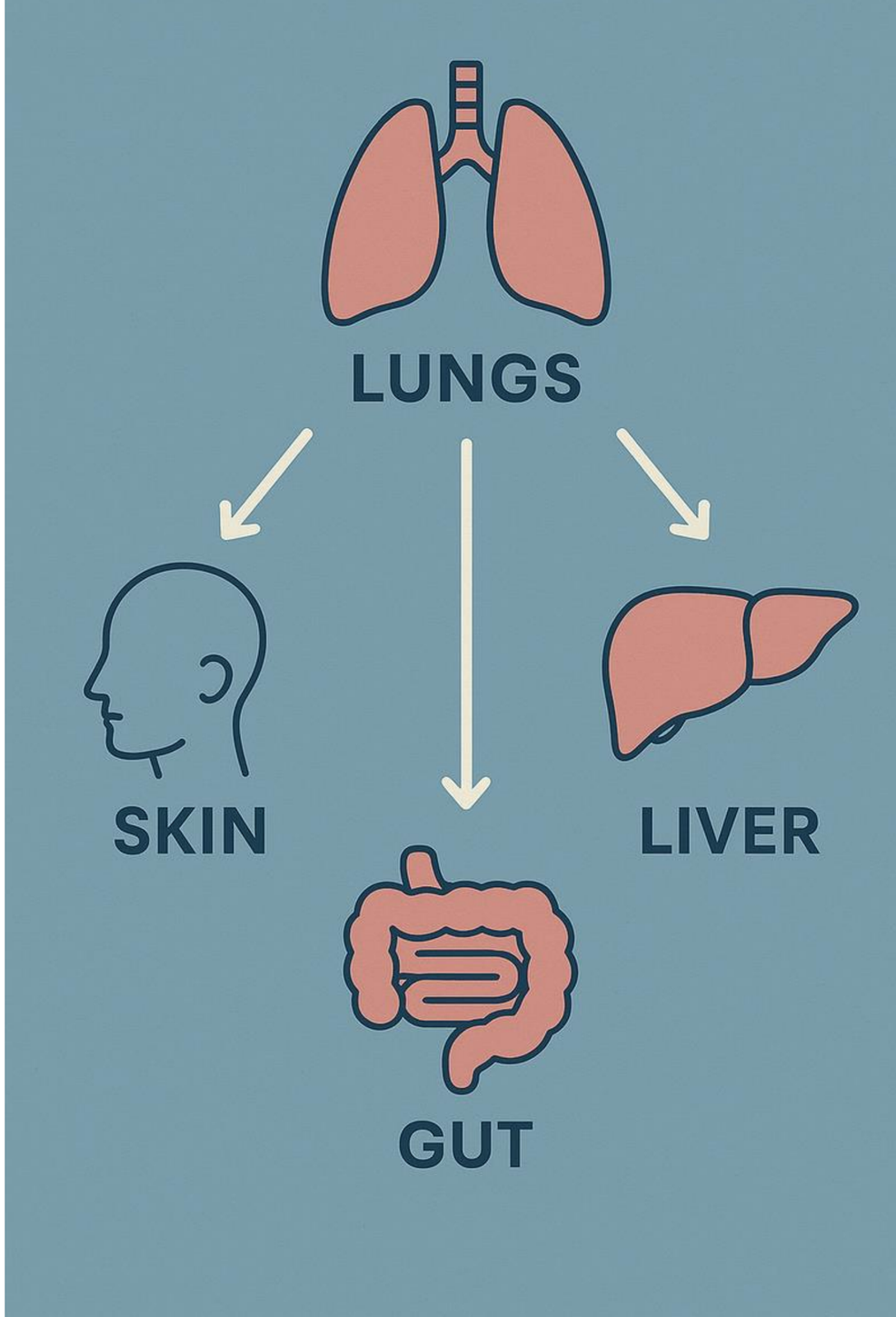
Sources of Environmental Exposure

- Air
- Water
- Plastics
- Food
- Cosmetics
- Home building materials



Vibrant Environmental Toxins Panel

Mechanisms of Toxin-Driven Disease

- Disruption of detox pathways (Phase I/II/III)
- Mitochondrial damage
- Inflammation & immune dysregulation
- Oxidative stress (ROS vs. antioxidants)

fatigue, brain fog, infertility, mood disorders.

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Vibrant Environmental Toxins Panel

Why Test?

- Objective evidence replaces guesswork
- Pinpoints exposure sources
- Tracks progress and compliance

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Vibrant Environmental Toxins Panel

Vibrant Environmental Toxins Panel Overview

- LC-MS/MS urine-based test
- Detects 40+ toxins including
  - Plastics (e.g., BPA, MEHP)
  - VOCs (e.g., benzene, toluene)
  - Pesticides (e.g., 3PBA)
  - Solvents (e.g., perchlorate)
  - Parabens, phenols

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Vibrant Oxidative Stress and Environmental Toxins Panel Overview

- Detox & Redox-Related SNPs: Identifies why the system may struggle
- Environmental Toxins: Identifies what might burdening the system
- Oxidative Stress: Shows how the body might be coping—or failing—with that burden

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Total Tox Burden

The Total Tox Burden test measures exposure to a broad range of harmful chemicals, including heavy metals, mycotoxins, and environmental pollutants. These toxins can accumulate in the body and contribute to chronic health issues like autoimmune disease, cancer, and neurological disorders.

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Total Tox Burden: Heavy Metals

Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Cadmium
Cesium
Gadolinium
Lead

Mercury
Nickel
Palladium
Platinum
Tellurium
Thallium
Thorium
Tin
Tungsten
Uranium

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Total Tox Burden: Environmental Chemicals

2,4-Dichlorophenoxyacetic Acid (2,4-D)
Perchlorate
2,2-bis(4-Chlorophenyl)acetic Acid (DDA)
Diethyldithiophosphate (DEDTP)
Dimethyldithiophosphate (DMDTP)
Diethylthiophosphate (DETP)
Dimethylphosphate (DMP)
Diethylphosphate (DEP)
Dimethylthiophosphate (DMTP)
Atrazine
Atrazine Mercapturate

2-Hydroxyethyl Mercapturic Acid (HEMA)
N-Acetyl Propyl Cysteine (NAPR)
Diphenyl Phosphate (DPP)
Tiglylglycine (TG)
Bisphenol A (BPA)
Triclosan
4-Nonylphenol
2-Methylhippuric Acid (2MHA)
3-Methylhippuric Acid (3MHA)
4-Methylhippuric Acid (4MHA)
2-Hydroxyisobutyric Acid (2HIB)
Phenylglyoxylic Acid (PGO)
N-acetyl phenyl cysteine (NAP)

Glyphosate
3-Phenoxybenzoic Acid (3PBA)
Monoethyl Phthalate (MEP)
Mono-2-ethylhexyl Phthalate (MEHP)
Mono-(2-ethyl-5-hydroxyhexyl) Phthalate (MEHHP)
Mono-(2-ethyl-5-oxohexyl) Phthalate (MEOHP)
Mono-ethyl Phthalate (MEtP)
Methylparaben
Propylparaben
Butylparaben
Ethylparaben
N-acetyl-S-(2-carbamoylethyl)-cysteine (NAE)
N-Acetyl (2-Cyanoethyl) Cysteine (NACE)
N-Acetyl (2-Hydroxypropyl) Cysteine (NAHP)
N-Acetyl (3,4-Dihydroxybutyl) Cysteine (NADB)

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Why Run These Panels?

Environmental Toxins Panel

What it tells you:

- What is burdening the system
- (e.g., BPA, phthalates, VOCs, pesticides, flame retardants, PFAS)

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Total Tox Burden: Mycotoxins

Trichothecenes (toxic compounds produced by mold)

Deoxynivalenol
Diacetoxyscirpenol
Nivalenol
Roridin A
Roridin E
Roridin L2
Satratoxin G
Satratoxin H
T-2 Toxin
Verrucarin A
Verrucarin J

Aflatoxins

Aflatoxin B1
Aflatoxin B2
Aflatoxin G1
Aflatoxin G2
Aflatoxin M1

Other Mycotoxins

Chaetoglobosin A
Citrinin
Dihydrocitrinone
Enniatin B1
Fumonisins B1
Fumonisins B2
Fumonisins B3
Gliotoxin
Mycophenolic Acid
Ochratoxin A
Patulin
Sterigmatocystin
Zearalenone

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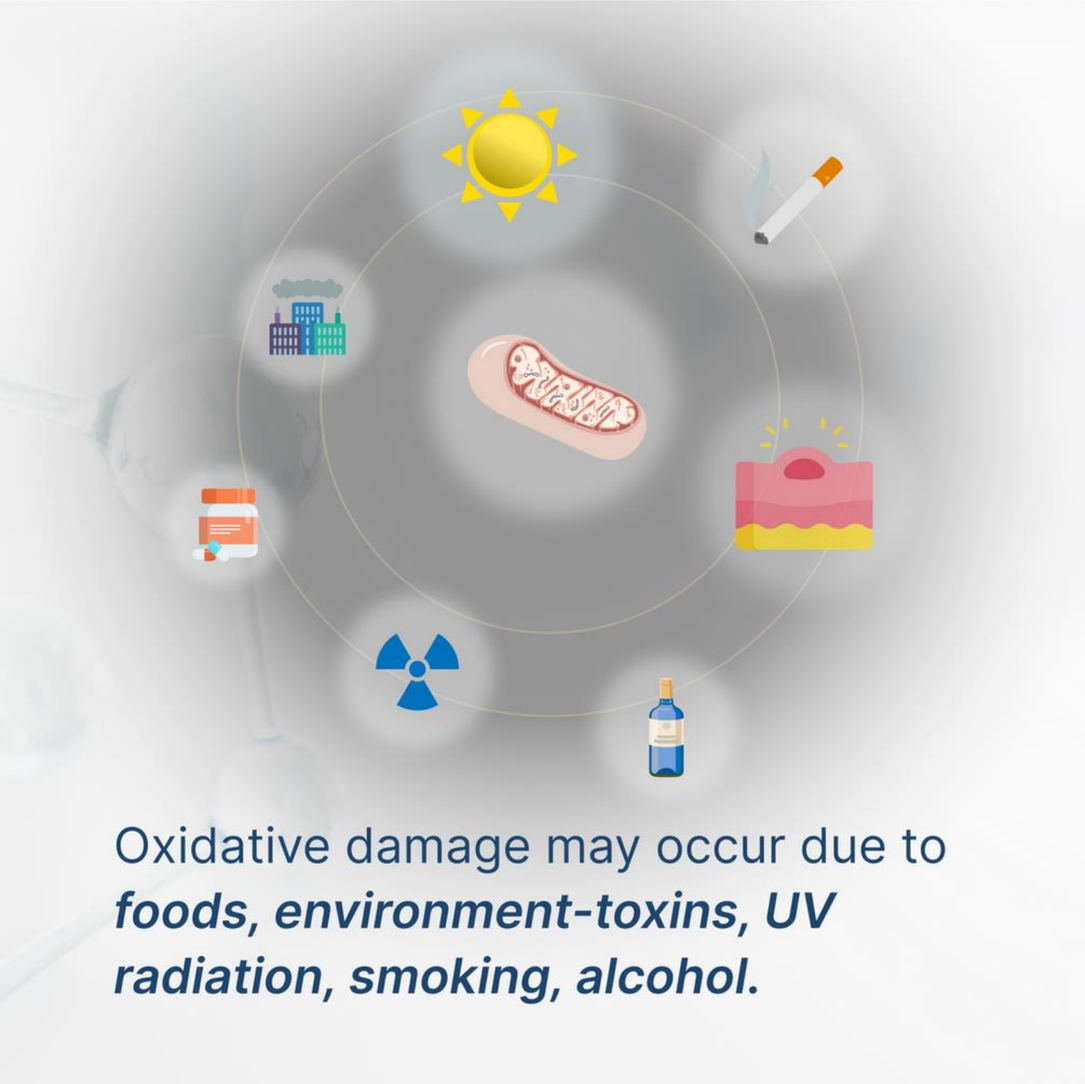

Oxidative Stress Profile

Oxidative stress plays a significant role in aging, chronic disease, and inflammation. The Oxidative Stress Profile measures markers of oxidative damage, antioxidant levels, and mitochondrial function, providing a clear view of your body's oxidative burden.

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Oxidative Stress Profile: Key Markers

Oxidative Damage & Cellular Stress Markers

Lipid Peroxidation Markers:
Malondialdehyde (MDA)
Glutathione 4-Hydroxynonenal (GS-HNE)
8-Iso-Prostaglandin F2α (8-iso-PGF2α)
11-β-Prostaglandin F2α
15(R)-Prostaglandin F2α

Protein Oxidation Markers:
Dityrosine
3-Bromotyrosine
3-Chlorotyrosine

DNA Damage Markers:
8-Hydroxy-2-Deoxyguanosine (8-OHdG)
8-Hydroxyguanine
8-Hydroxyguanosine

Genetic Markers & Enzymatic Antioxidant Response

PRKAA2: rs2796498, rs10789038
CAT (Catalase): rs1001179, rs7943316, rs4756146
COX-2: rs20417
CYB5R3: rs916321
CYP1A1: rs1048943
GLUL: rs10911021
GPX (Glutathione Peroxidase):
GPX1: rs1050450, rs1987628
GPX2: rs4902346, rs2071566
GPX4: rs713041
GSTM (Glutathione S-Transferase):
GSTM1: rs366631
GSTM5: rs3754446
GSTP1: rs1695
GSS (Glutathione Synthetase): rs121909307
GSR (Glutathione Reductase): rs8190955
HMOX1 (Heme Oxygenase 1): rs2071746
CYBA (Cytochrome B-245 Alpha Chain): rs4673, rs9932581
SELENOP (Selenoprotein P): rs3877899
SOD (Superoxide Dismutase):
SOD1: rs2234694
SOD2: rs4880
SOD3: rs1799895, rs8192287
TXNRD (Thioredoxin Reductase):
TXNRD1: rs7310505
TXNRD2: rs1548357
TRXR2: rs4485648
XDH (Xanthine Dehydrogenase): rs206812, rs2073316

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Why Run These Panels?

Total Tox Burden

Purpose:

- To identify specific environmental exposures that may be driving chronic symptoms, inflammation, endocrine disruption, or immune dysregulation.

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Why Run These Panels?

When to order:

- Unexplained fatigue, weight gain, brain fog
- Hormonal imbalances or infertility
- Neurological symptoms (e.g., numbness, anxiety, memory loss)
- History of mold, chemical, or solvent exposure
- Persistent inflammation without clear infectious cause
- Suspected impaired detoxification

Why Run These Panels?

Oxidative Stress Panel

Purpose:

Assesses the cellular damage from oxidative stress and the patient's genetic susceptibility to detox and antioxidant challenges.

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Why Run These Panels?

Oxidative Stress Panel

What it tells you:

- How the body is responding to toxins, infections, and inflammation
- Why the patient may be vulnerable via genetic variants in detox and antioxidant systems

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Why Run These Panels?

When to order:

- Chronic illness with suspected oxidative or mitochondrial damage
- Neurodegenerative risk (e.g., Parkinson's, Alzheimer's)
- Autoimmunity or post-viral syndromes
- Cancer risk or active diagnosis
- Evaluating need for redox therapy
- Post-exposure follow-up (e.g., environmental clean-up, mold, pesticides)

Why Run These Panels?

Environmental Toxins Panel

Clinical clues to run it:

- Fatigue, brain fog, unexplained weight gain
- Hormonal imbalances, infertility
- Neurological symptoms or immune dysregulation
- History of chemical exposure or mold

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TILT, or toxicant-induced loss of tolerance

Theory of Claudia S. Miller

A two-stage disease process. In the first stage, exposures to toxicants such as pesticides, solvents, mold toxins, or chemical disrupt immune and neurological regulation in susceptible individuals. This initiation phase causes the body to lose its natural tolerance for everyday substances. In the second stage, exposures that were previously harmless, such as common foods, fragrances, or medications begin to trigger disproportionate symptoms.

TILT, or toxicant-induced loss of tolerance

Often presents with **multisystem complaints**: fatigue, cognitive impairment, pain syndromes, chemical sensitivity, and food intolerance. Research suggests it may contribute to a wide spectrum of chronic illnesses, including **chronic fatigue syndrome, fibromyalgia, migraine headaches, depression, asthma, multiple chemical sensitivity, and attention deficit disorder**.

TILT, or Toxicant-induced Loss of Tolerance

TILT underscores the importance of reducing environmental exposures, supporting detoxification pathways, and gradually working to restore tolerance in order to improve health and quality of life.

Takeaway: After certain toxic exposures, substances that were once harmless can suddenly trigger widespread symptoms.

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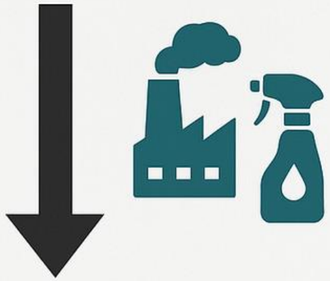
PROGRESSION

INITIATION

Susceptibility followed by exposure to toxicants



TRIGGERING

Loss of tolerance and emergence of symptoms

Toxicant-Induced Loss of Tolerance

Genetic susceptibility and exposure

Oxidative markers and Immune shifts

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Immune Dysregulation from Environmental Toxins

Shifts the immune system to a Th2/Th17 dominant pattern

These patterns can remain after the toxin is reduced or removed

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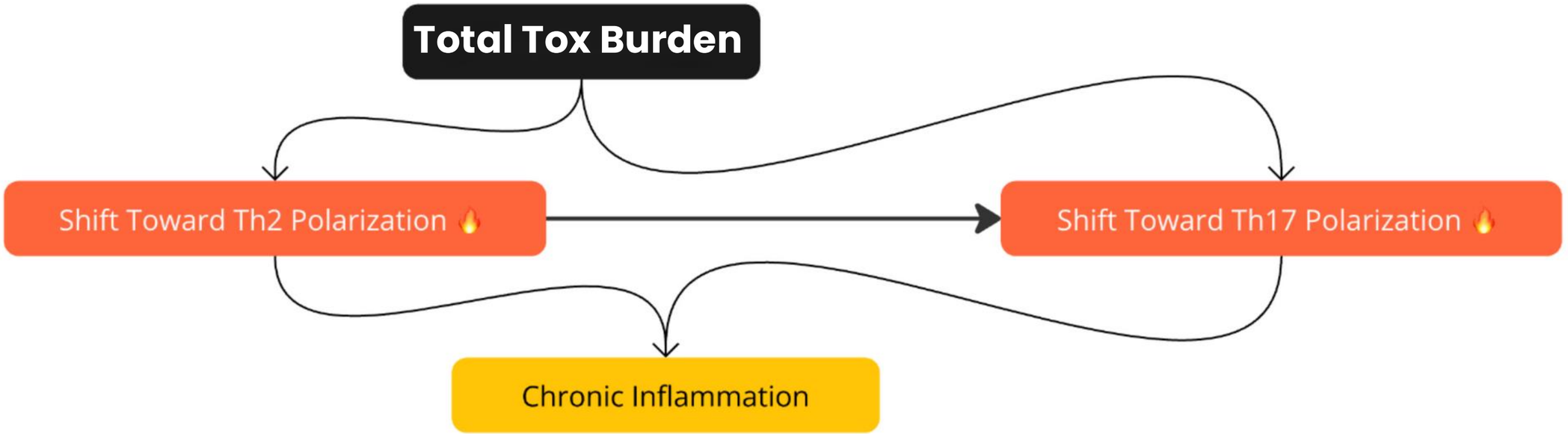

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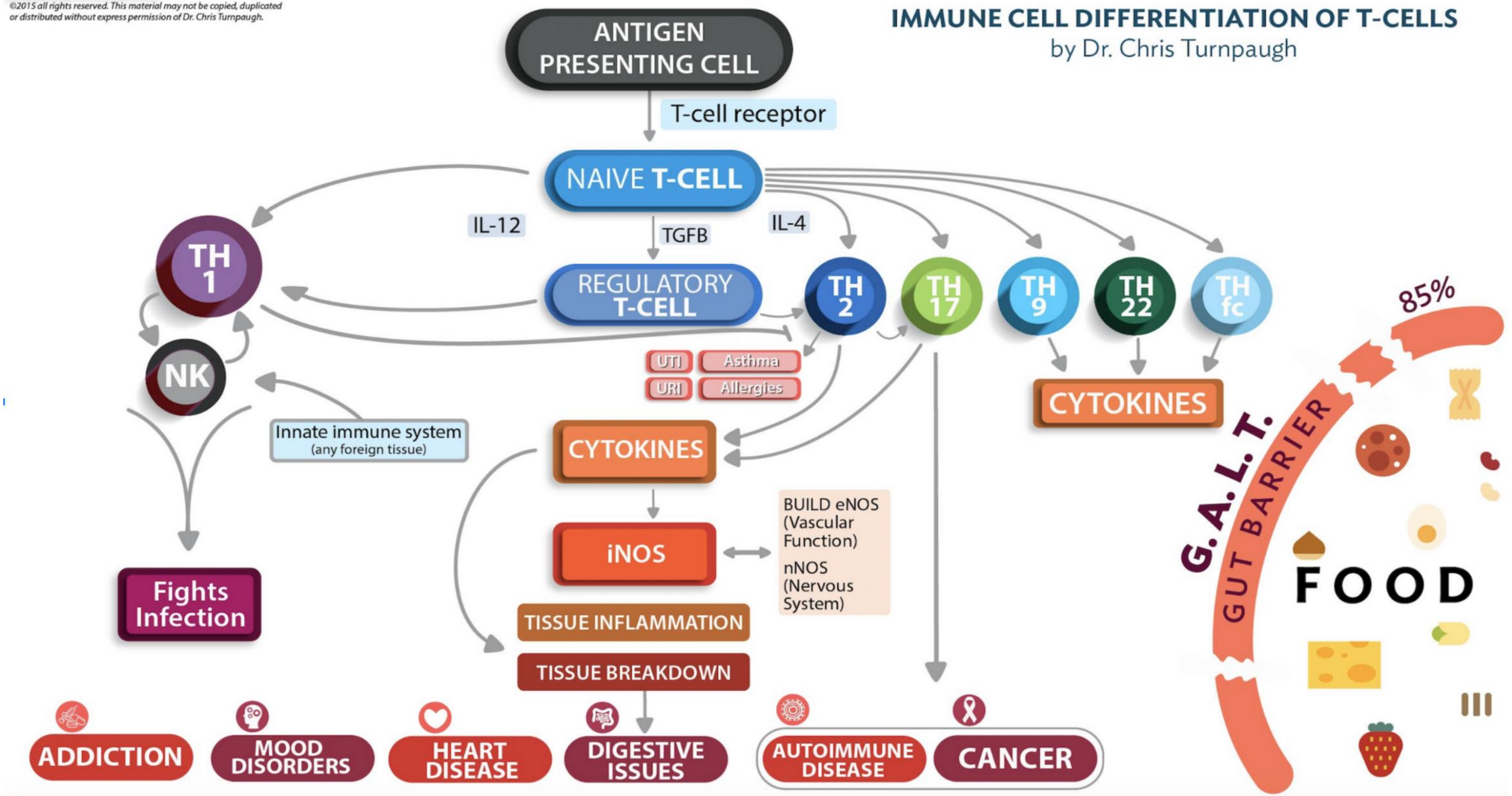
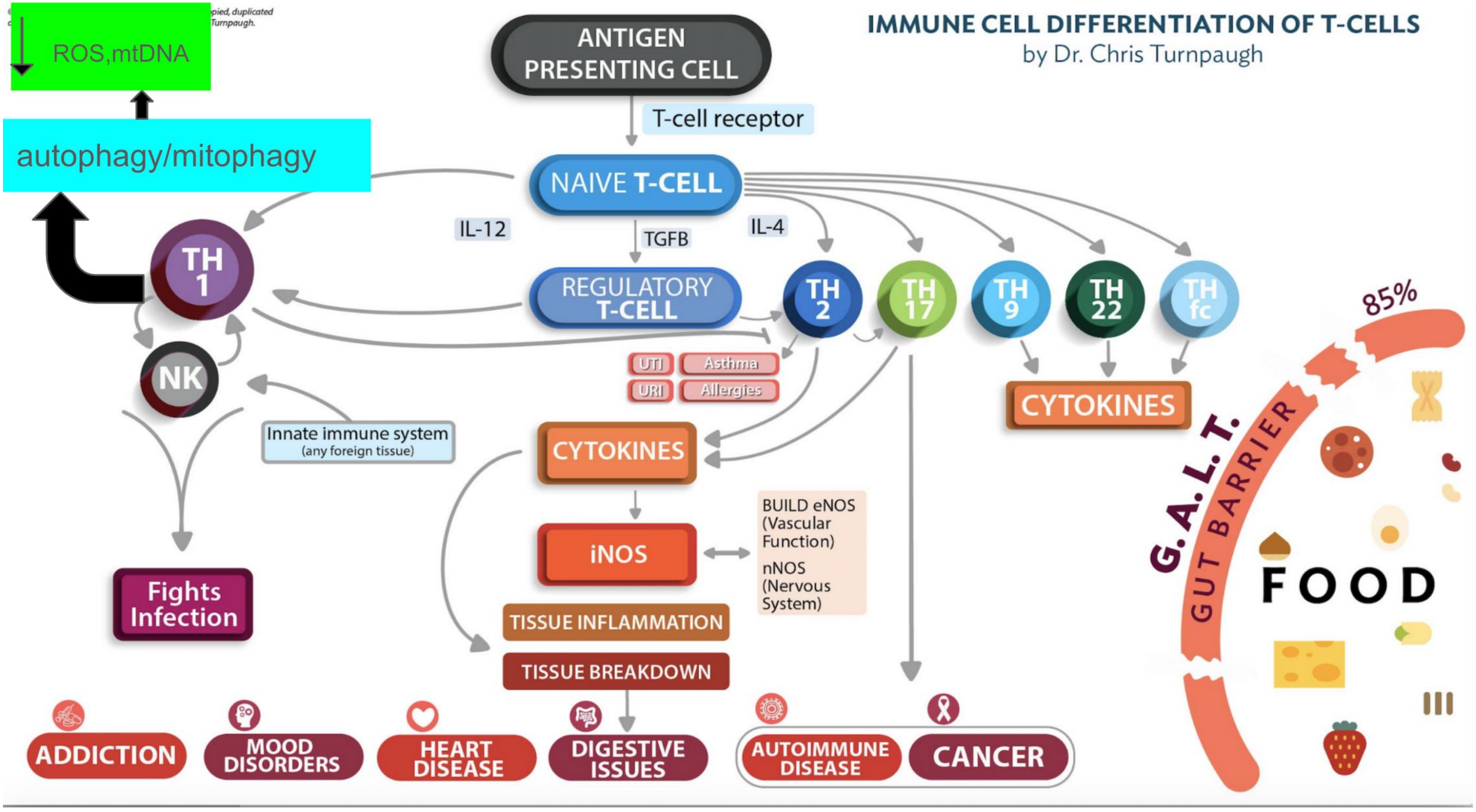
IMMUNE CELL DIFFERENTIATION OF T-CELLS

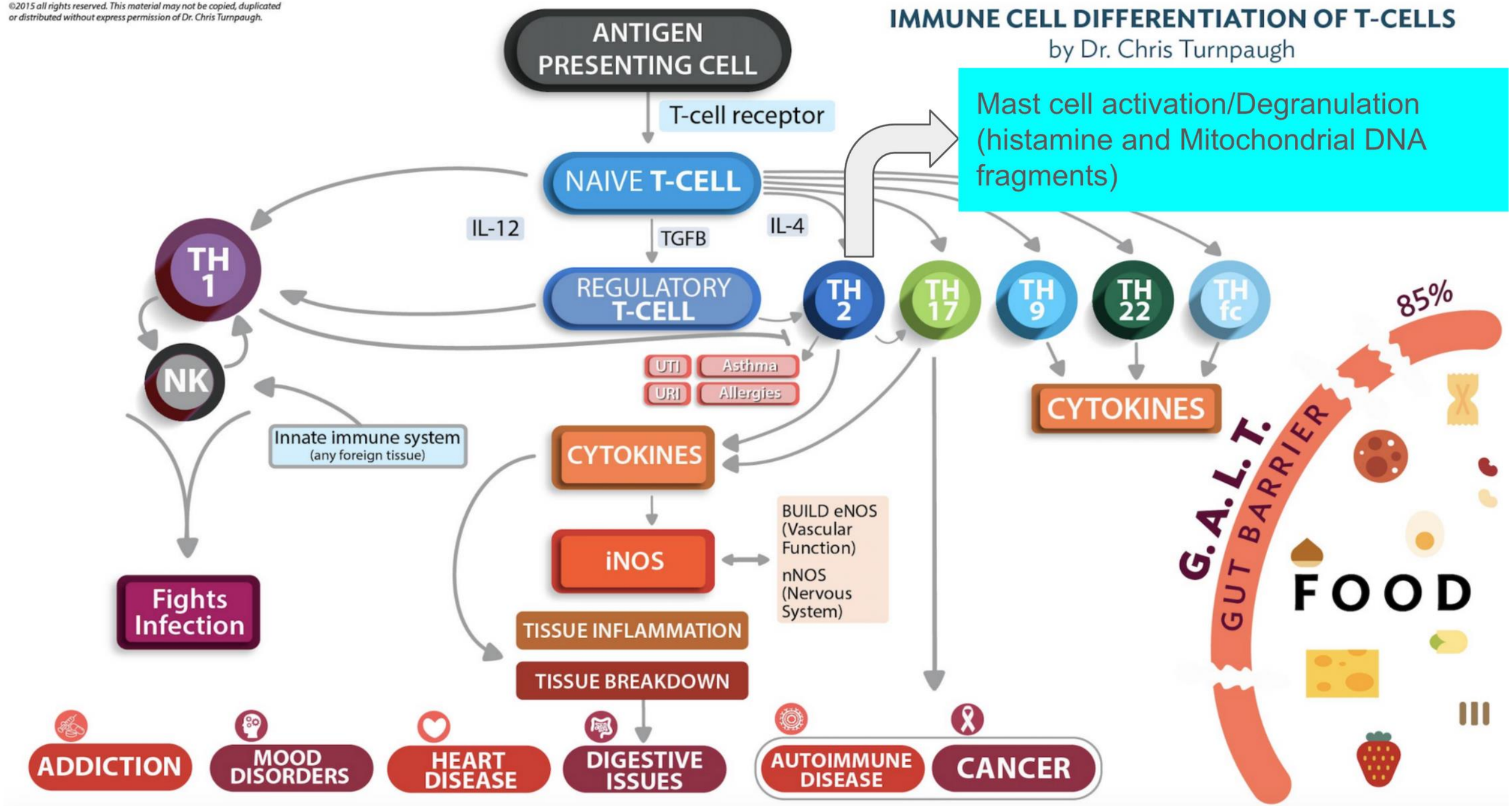
by Dr. Chris Turnpaugh

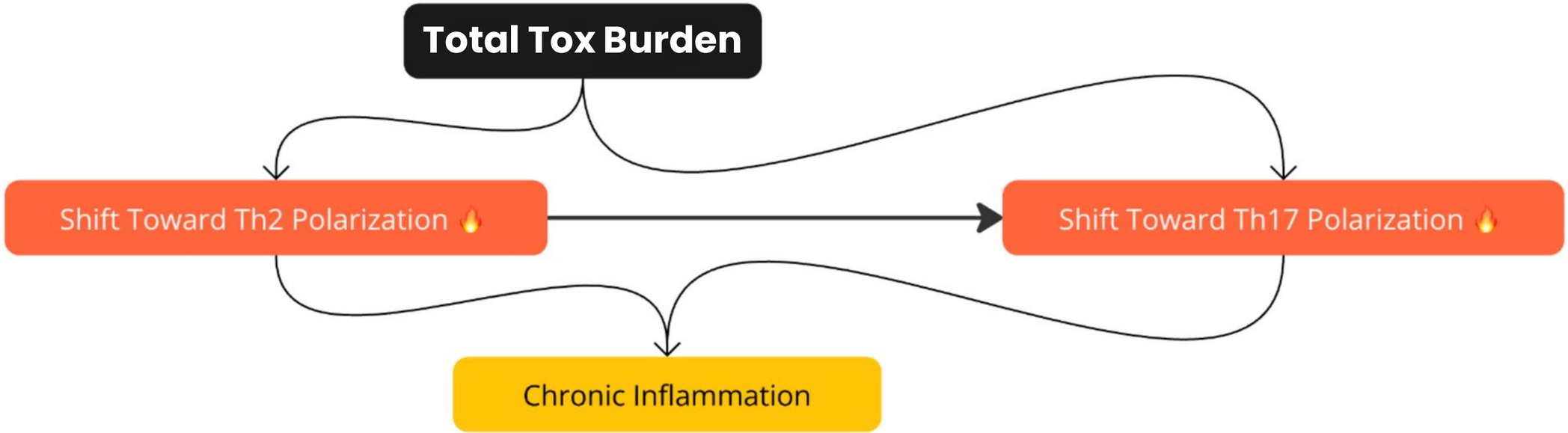



ROS,mtDNA
autophagy/mitophagy
IMMUNE CELL DIFFERENTIATION OF T-CELLS
by Dr. Chris Turnpaugh
ANTIGEN PRESENTING CELL
T-cell receptor
NAIVE T-CELL
IL-12
TGFB
IL-4
TH 1
REGULATORY T-CELL
TH 2
TH 17
TH 9
TH 22
TH fc
NK
UTI
Asthma
URI
Allergies
CYTOKINES
Innate immune system
(any foreign tissue)
CYTOKINES
Fights Infection
iNOS
BUILD eNOS (Vascular Function)
nNOS (Nervous System)
TISSUE INFLAMMATION
TISSUE BREAKDOWN
ADDICTION
MOOD DISORDERS
HEART DISEASE
DIGESTIVE ISSUES
AUTOIMMUNE DISEASE
CANCER
85%
G.A.L.T.
GUT BARRIER
FOOD

IMMUNE CELL DIFFERENTIATION OF T-CELLS

by Dr. Chris Turnpaugh





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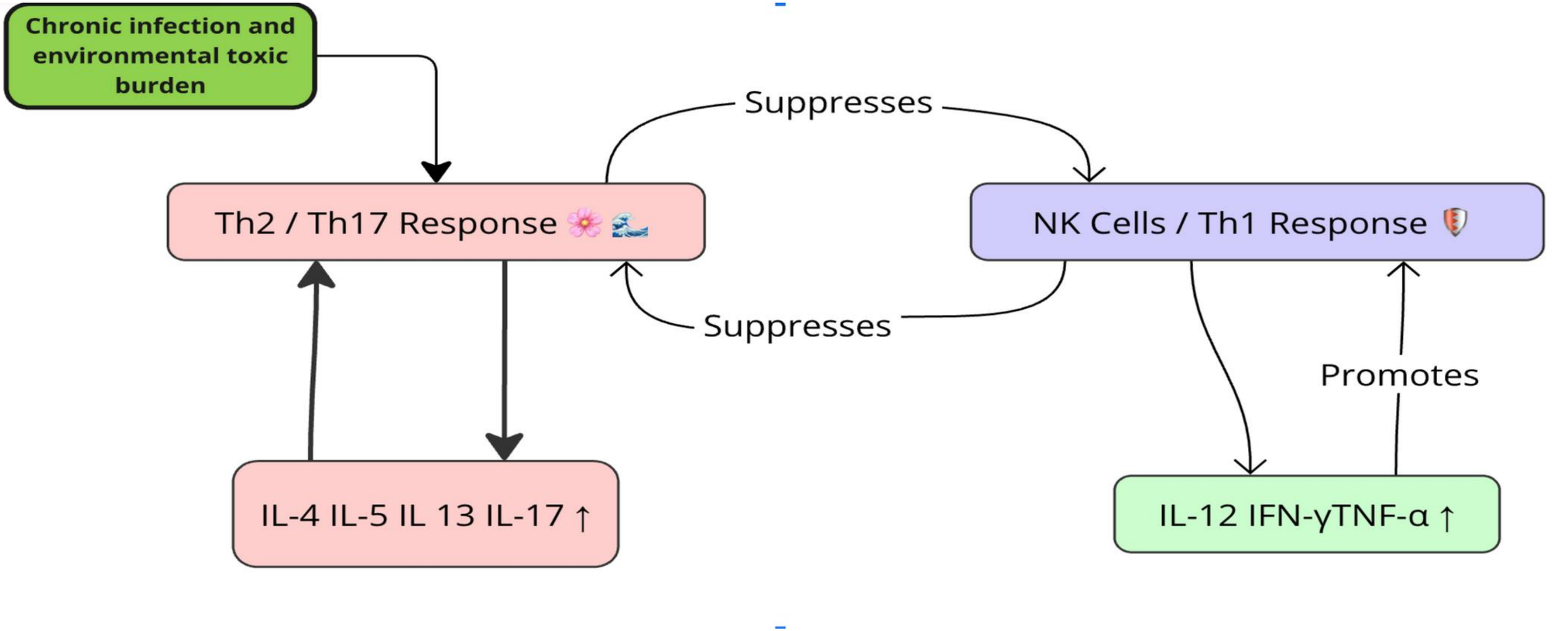

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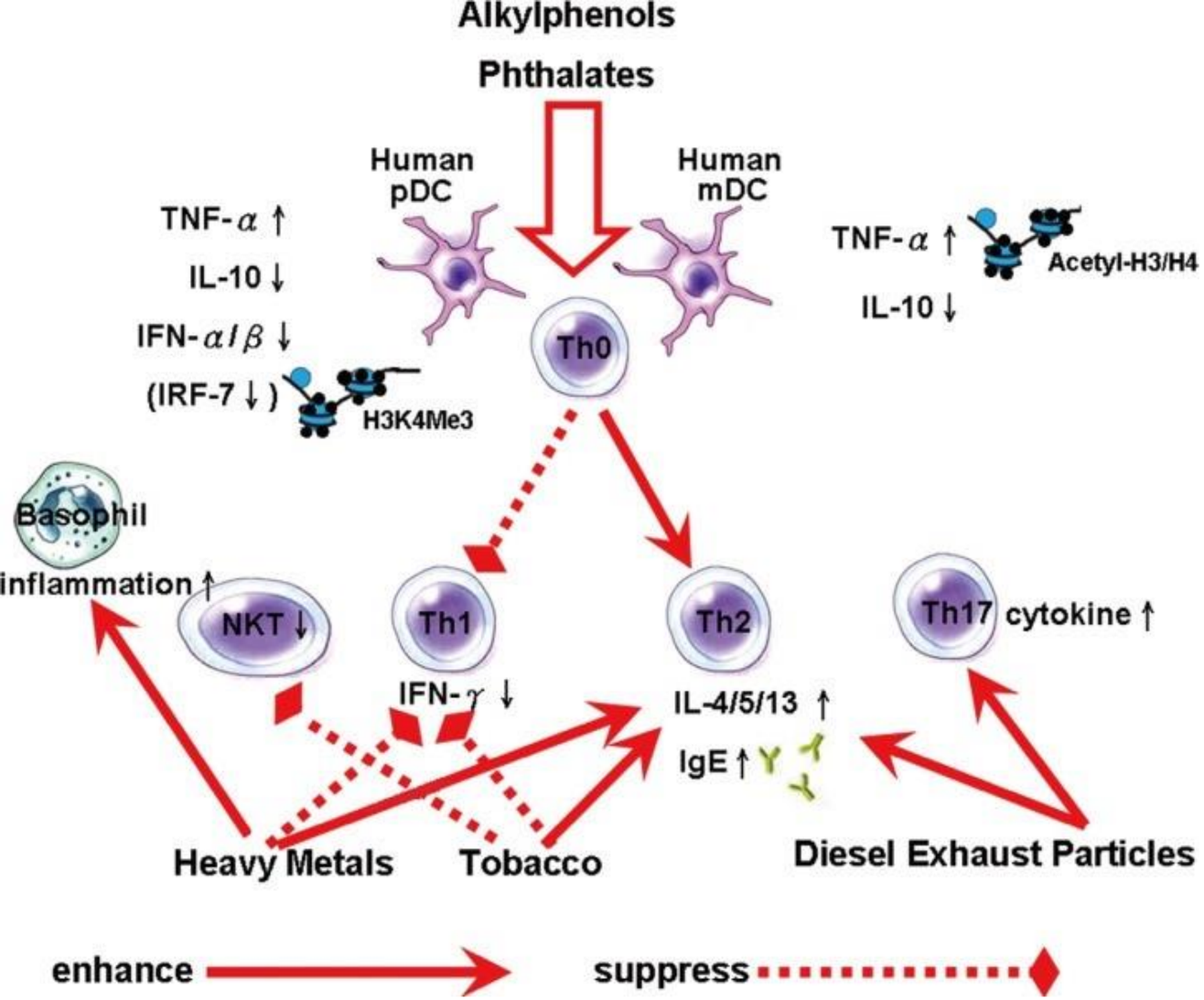
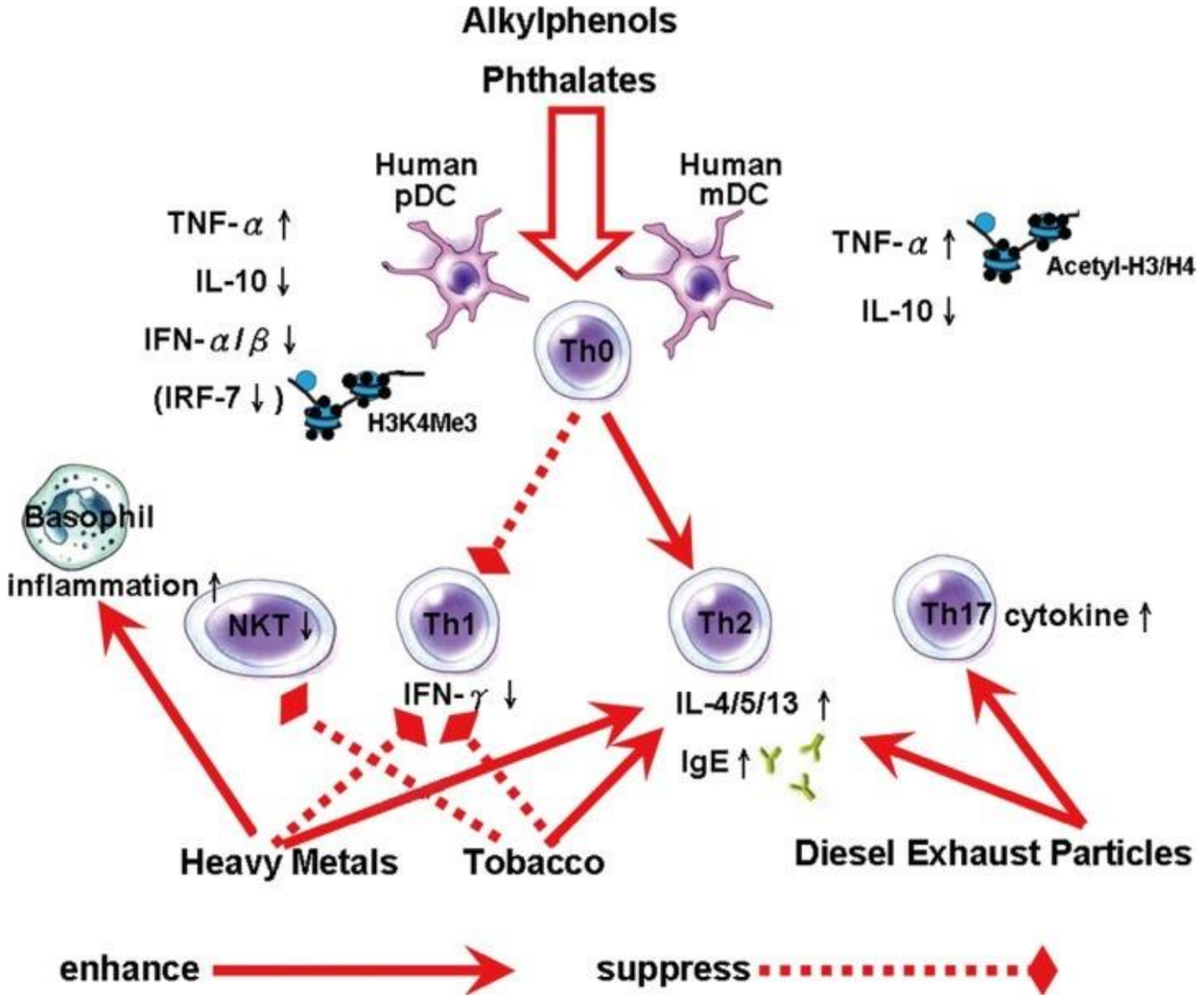


Yang SN, Hsieh CC, Kuo HF, et al. The effects of environmental toxins on allergic inflammation. Allergy Asthma Immunol Res. 2014;6(6):478-484. doi:10.4168/aair.2014.6.6.478

Possible mechanisms of the effects of environmental toxins on allergic inflammation. Alkyphenols and phthalates alter the function of human plasmacytoid dendritic cells (pDC) and myeloid DCs (mDC) by changing the expression cytokines, including tumor necrosis factor-α (TNF-α), interleukin (IL)-10, interferon (IFN)-α and IFN-β via the epigenetic regulation by histone acetylation as well as trimethylation. Alkyphenols and phthalates change the T cell stimulation function of DCs that promote Th2 development but suppress Th1 development. Heavy metals suppress Th1 development by inhibiting IFN-γ expression and promote Th2 development by enhancing IL-4 expression and increase the production of IgE. Heavy metals also increase IgE-dependent basophil-mediated inflammation. Tobacco smoke suppresses the Th1 immune response by inhibiting IFN-γ expression and the survival of natural killer T cells and promotes the Th2 immune response by increasing IL-4, IL-5, and IL-13 expression. Diesel exhaust particles increase IgE levels, and pulmonary and systemic Th2 and Th17 cytokine levels.

Environmental toxin	Effects on allergic inflammation	Reference
Endocrine-disrupting chemicals		
Alkylphenols		
Octylphenol	Suppresses the Th1 immune response Augments the Th2 immune response Increases TNF-α expression in DC Decreases IL-10, IFN-α and IFN-β expression in DC	6, 10, 18
Nonylphenol	Th2-skewing of DC Increases IL-6 and TNF-α expression in DC Decreases IFN-γ expression in T cell	15
Phthalate		
DEHP/BBP	Enhances Th2 differentiation Increases Th2 cytokines Increases IgE Decreases IFN-α and IFN-β expression in DC Decreases IFN-γ expression in T cell Increases IL-13 expression in T cell	22, 23
Tobacco smoke	Increases IgE sensitization Decreases IFN-γ expression Decreases NK cell activity Increases IL-4 and IL-5	31-34
Heavy metals		
Lead	Decreases IFN-γ expression	35
Mercuric chloride	Increases IgE production Increases IL-4 expression Increases IgE-dependent mediators in basophil	36
Diesel exhaust particles	Increases IgE production Increases Th2/Th17 cytokine levels	38
Pesticides	Interferes with the Th1/Th2 balance	59

Yang SN, Hsieh CC, Kuo HF, et al. The effects of environmental toxins on allergic inflammation. Allergy Asthma Immunol Res. 2014;6(6):478-484. doi:10.4168/aair.2014.6.6.478



What to do about it ??

- Remove exposure
- Reduce the burden in the body
- Restore the immune imbalance

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Case Study: KM — Infertility, Oxidative Stress, and Environmental Burden

Patient Overview:

- Name: KM, Age: 30
- Height: 65 inches
- Initial Weight: 236 lbs, BMI: 39.3
- History:
  - Two miscarriages
  - Difficulty conceiving for 2+ years
  - Mild IBS symptoms
  - Regular 28-day menstrual cycle

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Case Study: KM — Infertility, Oxidative Stress, and Environmental Burden

Patient Overview:

- AMH 3.4
- Luteal phase FHS and LH WNL
- Estradiol/total estrogen and progesterone WNL
- All thyroid hormones WNL
- Vitamin D 24

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Case Study: KM — Infertility, Oxidative Stress, and Environmental Burden

Environmental Toxins Panel – Positive Results

- Bisphenol A (BPA): High
- Mono-ethyl phthalate (MEtP): High
- 2,4-D (herbicide): Elevated
- Glyphosate: Elevated

Interpretation: Endocrine disruptors + mitochondrial toxin load possibly affecting fertility, gut barrier, and oocyte quality

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Case Study: KM — Infertility, Oxidative Stress, and Environmental Burden

Oxidative Stress Panel – Key Abnormalities

- 8-Hydroxyguanosine: High (DNA damage)
- 8-iso-prostaglandin F2α (8-isoPGF2α)): High lipid peroxidation

Interpretation: Poor mitochondrial resilience, impaired cellular repair, and detox inefficiency

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Case Study: KM — Infertility, Oxidative Stress, and Environmental Burden

Oxidative Stress Panel – Key Abnormalities

- rs713041 GPX4 Elevated ROS production: C/C
- rs121909307 GSS Lower glutathione levels:C/C

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Case Study: KM — Infertility, Oxidative Stress, and Environmental Burden

Clinical Intervention Plan:

- Detox/biotransformation Phase I & II support
- Redox Restore –
- GI Repair Matrix –
- Lifestyle – Clean personal care products, filtered water, low-plastic diet, air purification
- Mitochondria Support
- Vitamin D3 support

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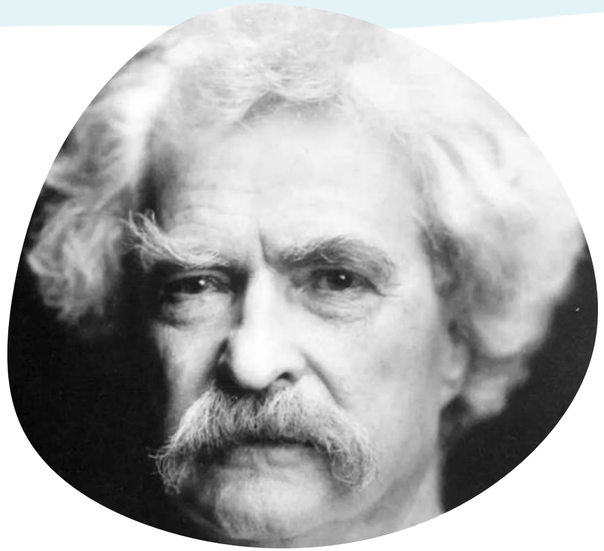
Case Study: KM — Infertility, Oxidative Stress, and Environmental Burden

Outcome 14 months

- 15 weeks pregnant
- Healthy fetal development confirmed via ultrasound
- GI symptoms resolved
- Energy and mood dramatically improved
- lost 33 pounds

(less food reactivity and rashes less anxiety etc)



Mark Twain: Credit The Mark Twain/House & Museum

"It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so."

Mark Twain

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“What we know is limited. What we don’t know is limitless, and yet healthcare draws its boundaries as if it knows enough. But healing demands we challenge every line.”

Chris Turnpaugh (inspired by Newton & Socrates)

"What we know is a drop, what we don’t know is an ocean.
"I know that I am intelligent because I know that I know nothing."

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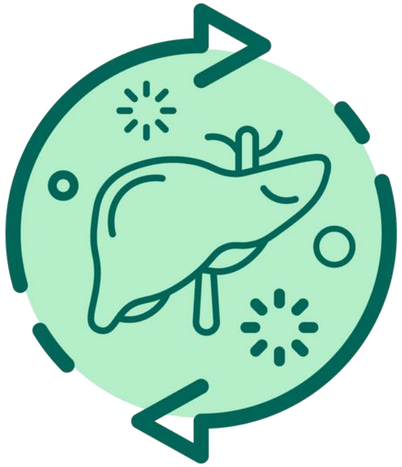
Thank You!

TurnpaughHWC.com

Instagram: @turnpaugh_health

We are always looking for qualified providers



Restoring Balance

Toxins and Environmental Health

Session 3

Ryan Bentley MD, PhD, DC, ABFM

Meet Your Speaker

Ryan Bentley

MD, PhD, DC, ABFM

Balance Over Bias

"Don't choose sides. Choose clarity."

Meet Your Speaker

Ryan Bentley

MD, PhD, DC, ABFM

Balance Over Bias

"Don't choose sides. Choose clarity."

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Unseen. Unchecked. Unhealed:

Identify Hidden Toxins, Personalize Protocols, Deliver Reliable Outcomes

One dis(-)ease may be caused by many factors, and one factor may cause many dis(-)eases

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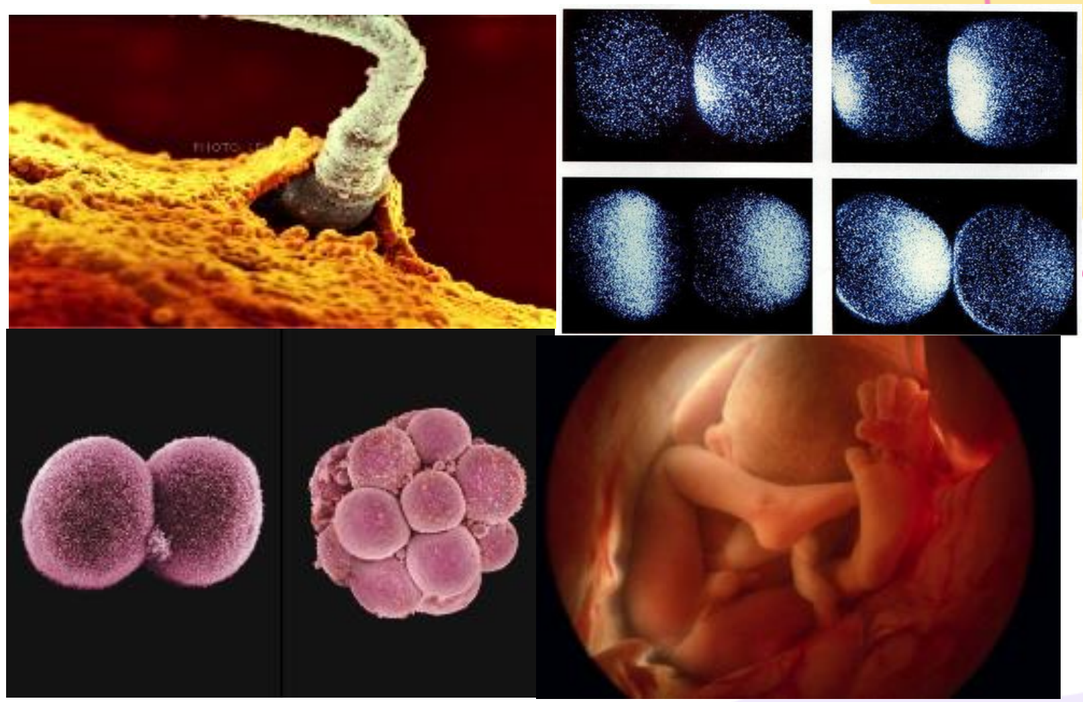
Health = Energy

You don’t make the room brighter by turning down the darkness.

-You turn up the light

It’s not about dimming the darkness; it’s about amplifying the light.
It's not about toning down disease; it's about increasing health



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Mental-Emotional-Spiritual Stress
Chemical-Dietary Stress
Structural-Physical Stress
Thermal-Electro-Magnetic Stress
Microbial Stress

Normal 120/80 mmHg

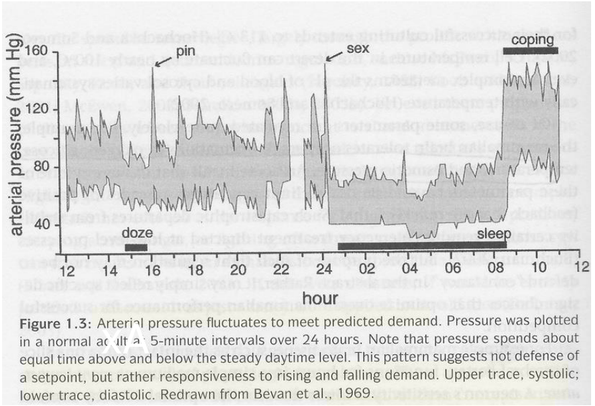

Figure 1.3: Arterial pressure fluctuates to meet predicted demand. Pressure was plotted in a normal adult at 5-minute intervals over 24 hours. Note that pressure spends about equal time above and below the steady daytime level. This pattern suggests not defense of a setpoint, but rather responsiveness to rising and falling demand. Upper trace, systolic; lower trace, diastolic. Redrawn from Bevan et al., 1969.

Allostasis, Homeostasis, and the Costs of Physiological Adaptation (9/28/2004) by Jay Schulkin (Editor)

Compensatory Physiology

Neurological Patterns

Endocrine Patterns

Physiological Patterns

Pathology

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When the fish is sick, change the water!

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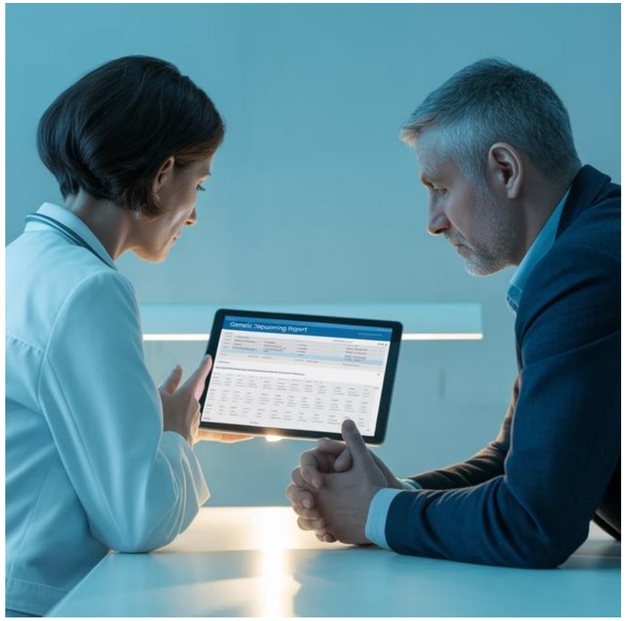
Beyond Generic Detox Protocols

Traditional Approach

One-size-fits-all cleanses and generic protocols that ignore individual biochemistry and genetic variations, often leading to inadequate results or adverse reactions.

Personalized Method

Tailored interventions based on comprehensive assessment, genetic factors, and specific toxic burden profiles for optimal therapeutic outcomes and patient safety.



Effective detoxification requires understanding that each patient's toxic exposure history, genetic polymorphisms, and elimination capacity create unique treatment requirements.

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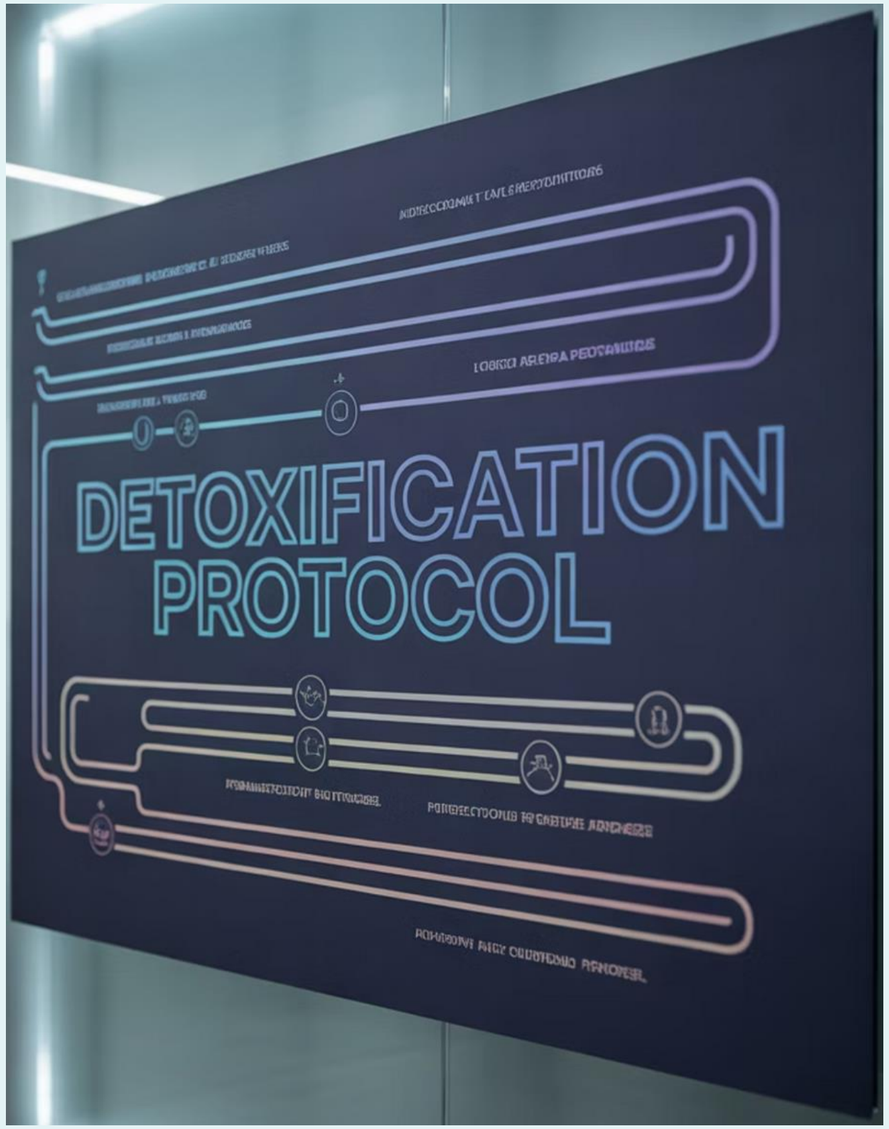

The P.R.E.C.I.S.E. Detox Method

A comprehensive framework for personalized detoxification protocols that addresses unique toxic burden, genetic makeup, and individual health circumstances through systematic assessment and customized intervention strategies.

"It works because it's built on pattern recognition, not protocol chasing."

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P.R.E.C.I.S.E. Framework

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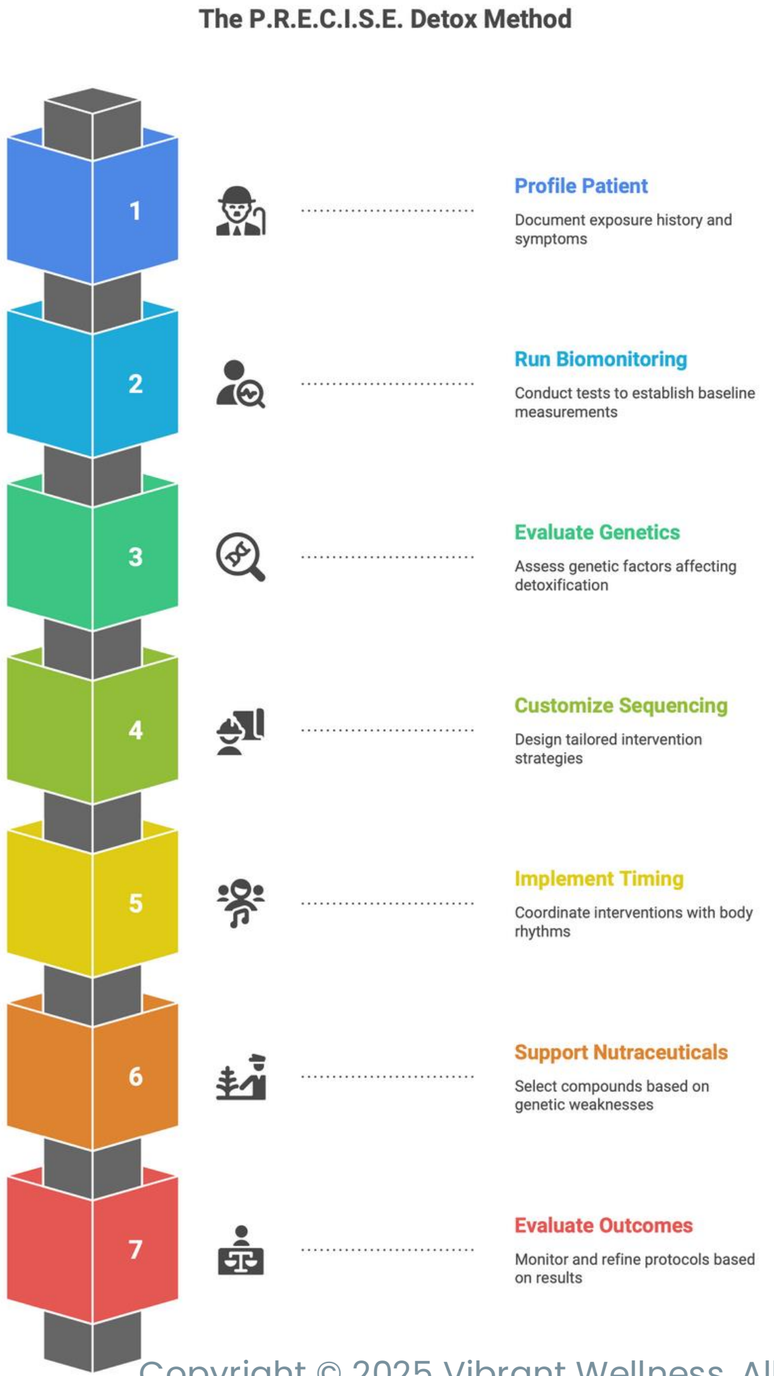


Profile Patient Exposure

Document comprehensive exposure history including occupational, environmental, and lifestyle factors over 2-3 weeks.

Run Biomonitoring Tests

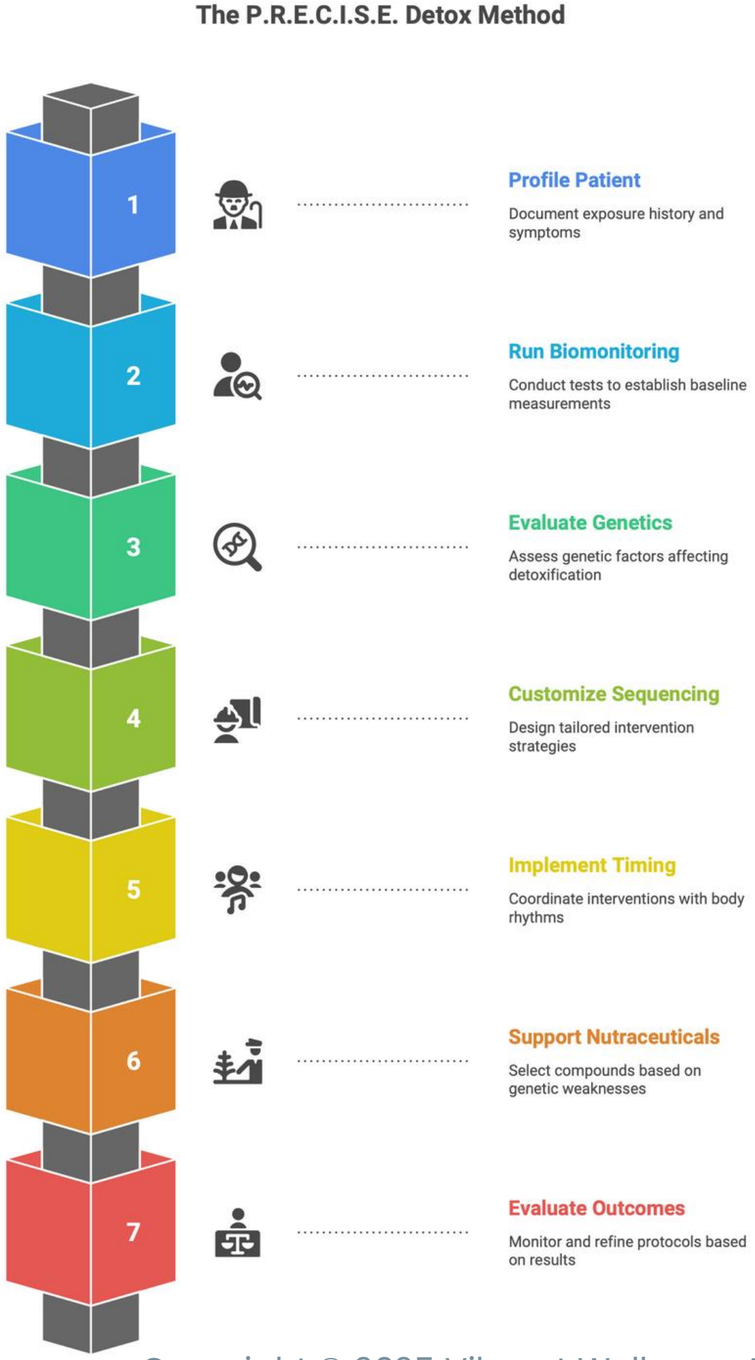
Select and execute appropriate testing protocols including mass spectrometry when indicated for baseline measurements.

Evaluate Genetic Factors

Assess polymorphisms in Phase I/II enzymes, methylation capacity, and transporter function vulnerabilities.

Customize Intervention Sequence

Design preparatory support, mobilization strategies, and excretion protocols matched to elimination capacity.



P.R.E.C.I.S.E. Framework

Implement with Precision

Begin with gentle organ support, coordinate supplementation with natural rhythms, and adjust pace based on individual tolerance and response patterns.

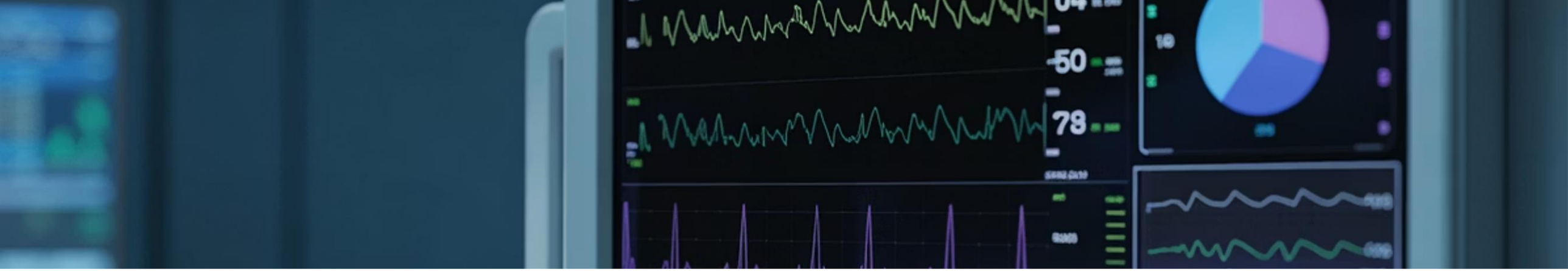
Support with Targeted Nutraceuticals

Select compounds based on genetic weaknesses, utilize specific toxin binders, and provide pathway support matched to detoxification capacity.

Evaluate Outcomes Systematically

Monitor symptom changes, retest biomarkers for toxin reduction tracking, and document responses for protocol refinement guidance.

The framework's adaptability ensures interventions respect individual biochemistry while preventing harmful effects from inappropriate timing or intensity.



Monitoring & Refinement Strategy

Systematic Assessment

- Standardized symptom tracking tools
- Regular biomarker retesting schedules
- Protocol response documentation
- Protocol response documentation

Ongoing Adaptation

Detoxification requires continuous refinement as patient condition improves, addressing deeper toxicity layers and adjusting focus to different compounds based on systematic monitoring data.

Remember: Detoxification is an ongoing process, not a one-time event requiring responsive treatment plan adjustments.

Transforming Lives Through Precision Care

Root Cause Focus

Address underlying toxic burden rather than just managing symptoms for lasting therapeutic outcomes.

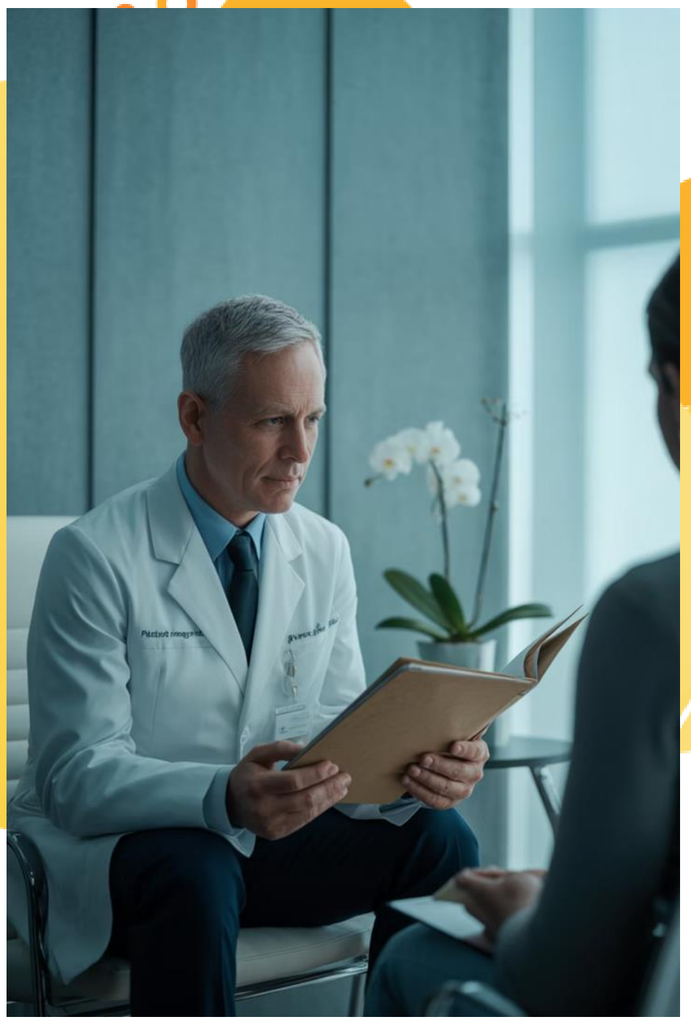
Evidence-Based Results

Systematic monitoring ensures protocol effectiveness and guides refinements with clinical confidence.

Restored Vitality

Patients reclaim their health through individualized care that respects unique biochemical terrain.

Your commitment to personalized, carefully monitored detoxification protocols transforms lives. The complexity is worthwhile when patients experience restored health, renewed energy, and reclaimed lives.



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The P.R.E.C.I.S.E. Decision Tree

1

Comprehensive History/Physical + Baseline Labs

Rule out common conditions with standard bloodwork first

2

Evaluate Signs and Symptom Persistence

When symptoms continue despite normal conventional testing

3

Total Tox Panel

Identify specific environmental toxin exposures

4

Toxic Genetics Assessment

Evaluate detoxification pathway function and genetic vulnerabilities including MTHFR, GST, HLA, SOD, and other relevant polymorphisms.

5

Personalized Detox Protocol

Support all three phases based on individual findings

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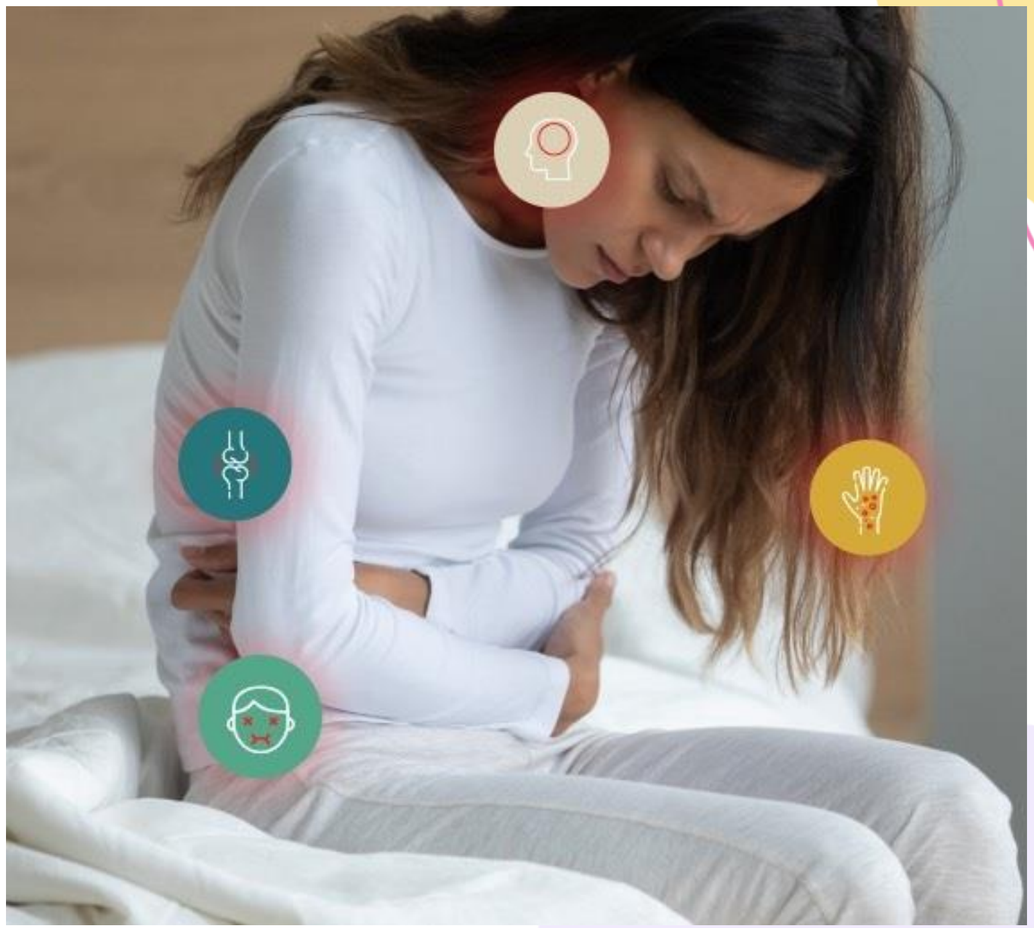
Total Tox Burden Test

When Labs Are Normal but Patients Aren't

Mold toxins (29)
Heavy metals (20)
Glyphosate (38)
BPA
These don't just show up unless you look for them — and they wreak havoc at the mitochondrial level



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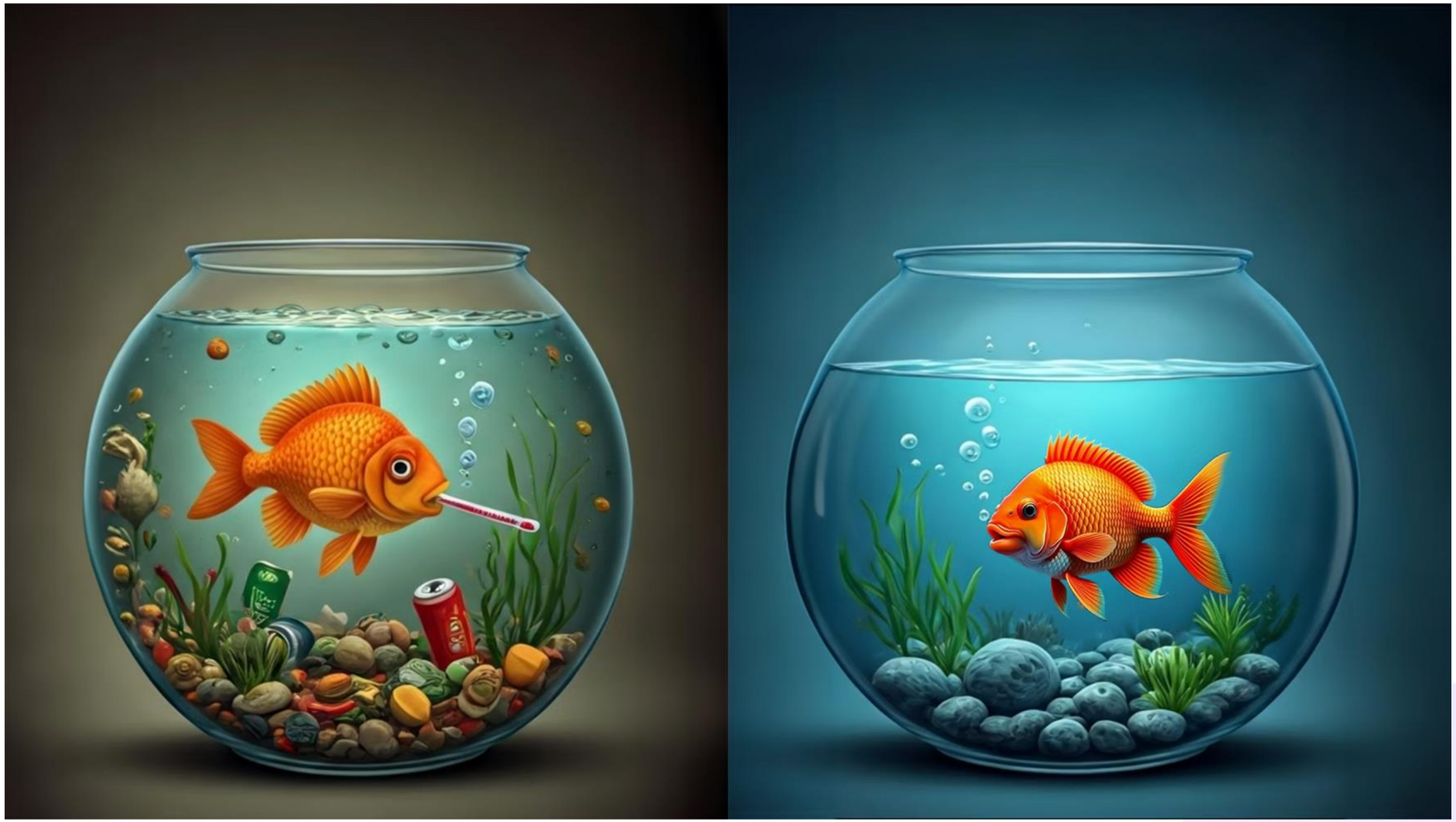
When the fish is sick, change the water!



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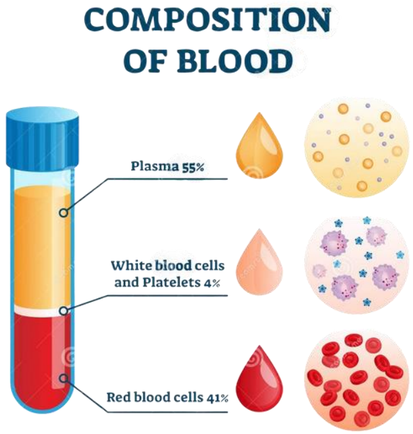
What is Therapeutic Plasma Exchange?



1 **Blood Withdrawal**

A small amount of blood is gently drawn from one arm.

2 **Plasma Separation**

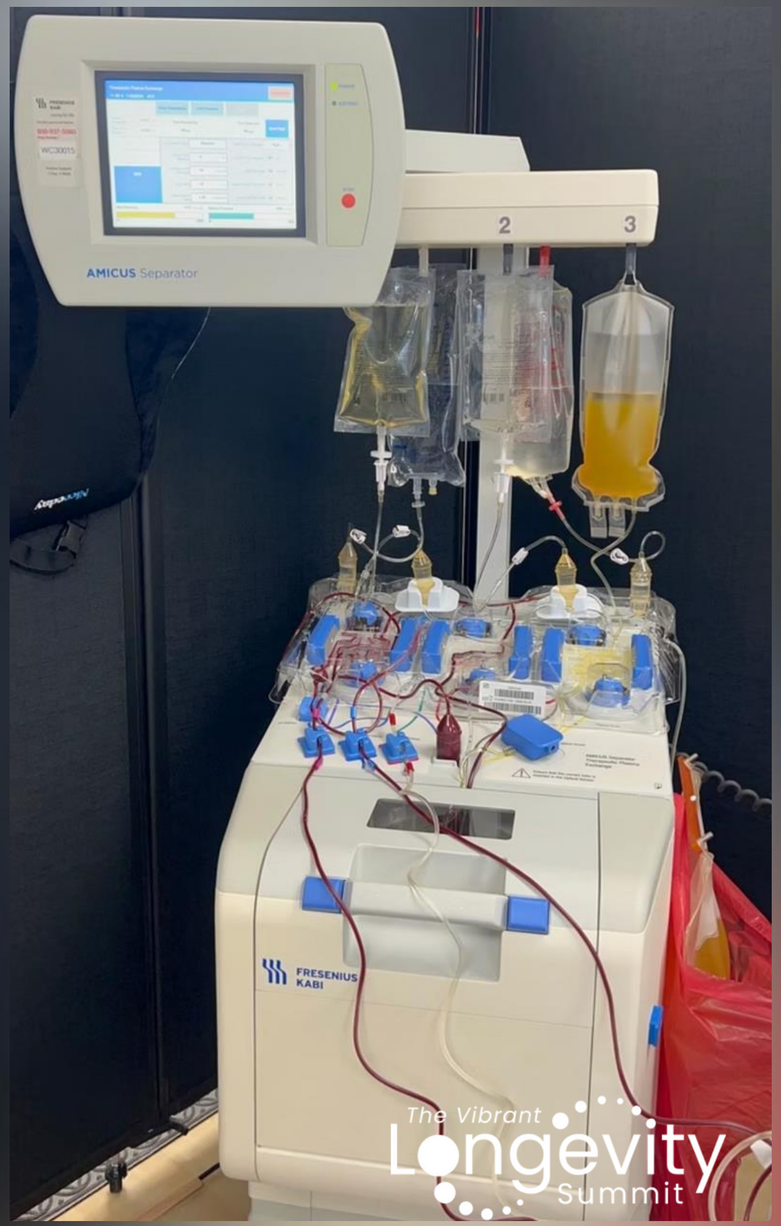
The plasma is separated from other blood components using specialized equipment.

3 **Harmful Substance Removal**

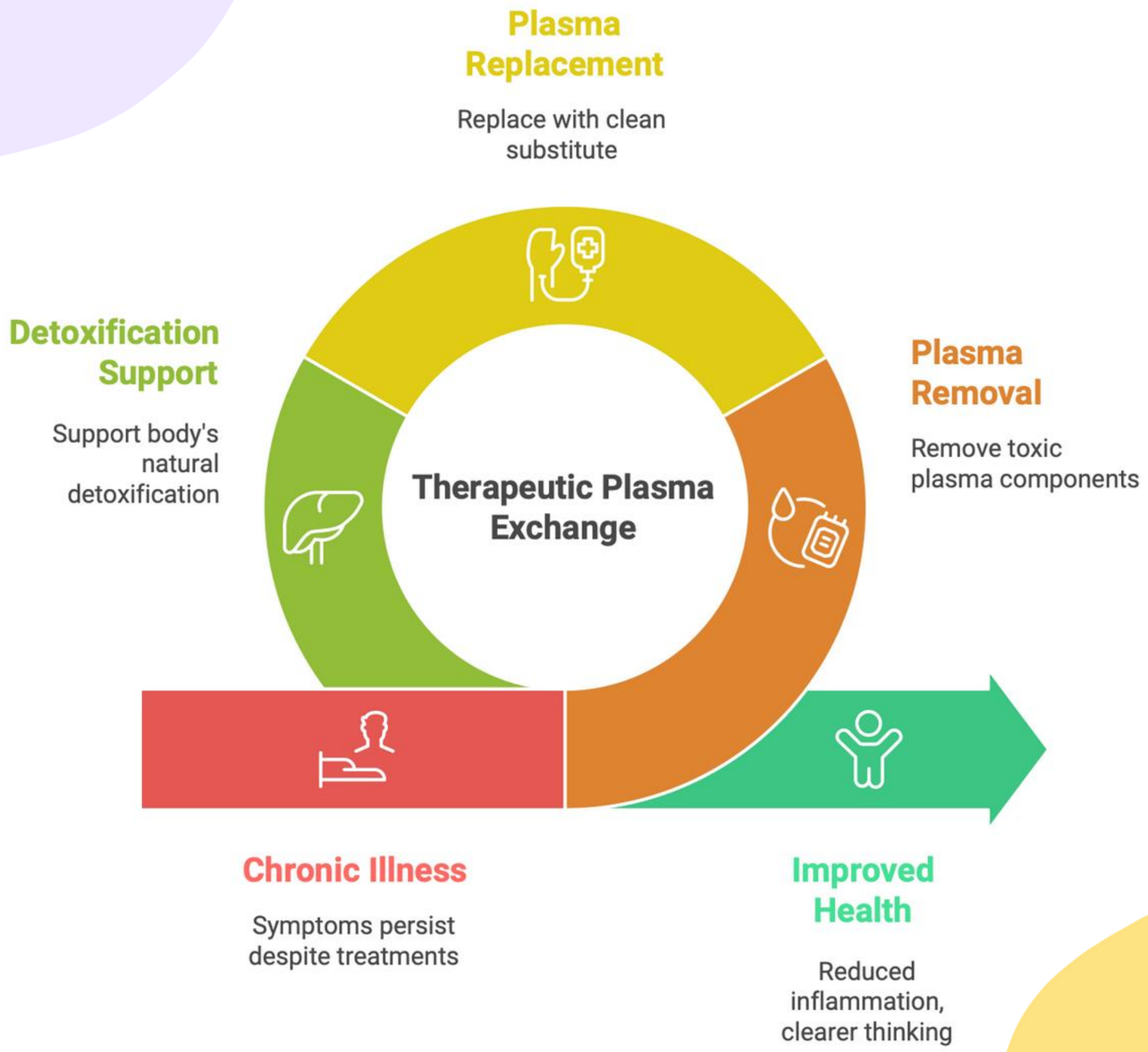
Disease-causing antibodies, toxins, and inflammatory proteins are removed from the plasma.

4 **Clean Fluid Replacement and Blood Components**

The removed plasma is replaced with clean albumin solution and mixed back wit your blood components



Resetting the Body with TPE



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TPE for Environmental Toxin Exposure

Industrial Toxins

TPE helps remove harmful chemicals from industrial exposure.

Pesticides

Agricultural chemicals like glyphosate can be effectively cleared through TPE.

Microplastics

TPE aids in removing microplastics that accumulate in the body over time.

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TPE for Heavy Metal Detoxification

Metal	Sources	TPE Effectiveness
Lead	Old paint, contaminated water	High
Mercury	Seafood, dental amalgams	Moderate to High
Cadmium	Industrial exposure, cigarette smoke	Moderate
Arsenic	Contaminated water, certain foods	High

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Therapeutic Plasma Exchange (TPE)

Traditional Uses of TPE:

- Neurological Disorders: Guillain-Barré Syndrome, Chronic Inflammatory Demyelinating Polyneuropathy (CIDP)
- Myasthenia Gravis: A condition where antibodies attack the neuromuscular junction, leading to muscle weakness.
- Lambert-Eaton Myasthenic Syndrome: Another autoimmune disorder affecting the neuromuscular junction, causing muscle weakness.
- Transplant Rejection: TPE can help to remove antibodies that are attacking the transplanted organ.
- Drug Overdose: TPE can help to remove drugs from the blood in cases of overdose.
- Thrombotic Thrombocytopenic Purpura (TTP): A rare blood disorder where blood clots form in small blood vessels, leading to damage to the organs.
- Hemolytic Uremic Syndrome (HUS): A serious condition that affects the kidneys and blood, often caused by an infection.

Therapeutic Plasma Exchange (TPE)

Non-Traditional Uses of TPE:

- Autoimmune Diseases: Lupus, Rheumatoid Arthritis, Multiple Sclerosis
- Systemic Sclerosis: A connective tissue disorder that causes hardening and thickening of the skin.
- Vasculitis: Inflammation of blood vessels, which can affect various organs.
- Environmental Toxin Exposure: Heavy metal poisoning, pesticide exposure
- Antiphospholipid Syndrome: An autoimmune disorder that causes blood clots and can affect various organs.
- Paroxysmal Nocturnal Hemoglobinuria (PNH): A rare blood disorder where red blood cells are destroyed prematurely.
- Chronic Fatigue Syndrome: A condition characterized by persistent fatigue and other symptoms.
- Fibromyalgia: A disorder that causes widespread musculoskeletal pain, fatigue, and other symptoms.
- Chronic Lyme Disease: A persistent infection with the Lyme bacteria.
- Alzheimer's Disease: TPE has been used to treat Alzheimer's disease, but the evidence is still inconclusive.

Therapeutic Plasma Exchange: When the Burden is Too High

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For patients with extreme toxin burden or compromised detoxification pathways, Therapeutic Plasma Exchange (TPE) can provide rapid relief by directly removing circulating toxins from the bloodstream.

Case Example: 38-year-old Male

Severely debilitated firefighter with confirmed high-level exposure to multiple toxins during industrial fire. Conventional detoxification methods produced minimal improvement due to genetic polymorphisms affecting Phase 2 pathways.

Toxin Reduction

84%

Decrease in measurable toxin levels after 3 TPE sessions

Time to Improvement

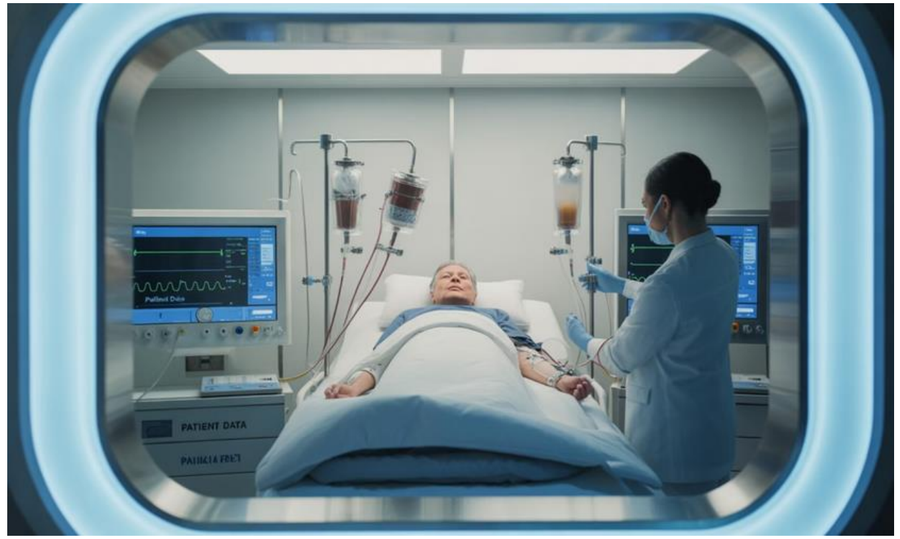
14 days

Significant symptom reduction observed within two weeks

Energy Recovery

85%

Patient-reported energy improvement at 3-month follow-up



"He didn't need motivation once he felt normal."

TPE is particularly valuable for patients with genetic susceptibilities that impair natural detoxification processes. By removing the toxic burden directly from circulation, it can provide a "reset" that allows conventional detoxification support to work more effectively.

"When people feel good for the first time, they change without being told."

Before Intervention

Total Tox Burden - Summary

High — Mycotoxins, Environmental Toxins

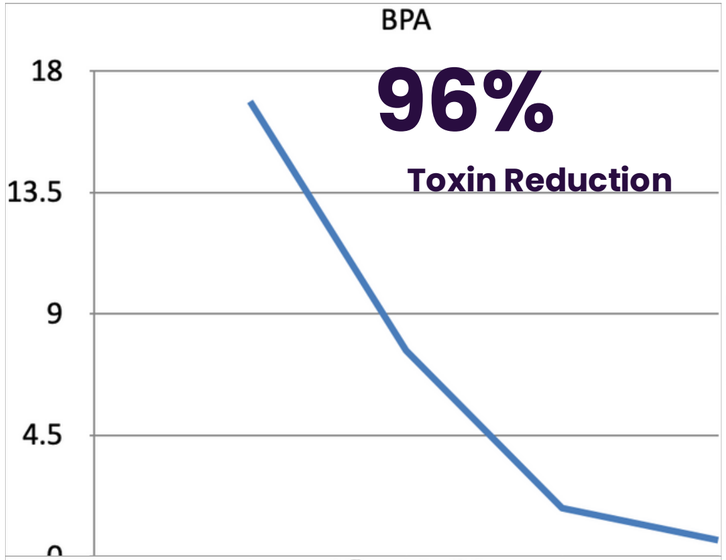
Test Name	Current	Previous	Result (75th / 95th)	Reference
Bisphenol A (BPA)^ (ug/g)	16.87		2.12 / 5.09	≤5.09
Aflatoxin B1 (AFB1) (ng/g)	13.96		3.9 / 6.93	≤6.93
Diacetoxyscirpenol (DAS) (ng/g)	14.60		2.4 / 4.27	≤4.27
Dihydrocitrinone (ng/g)	57.26		9.3 / 16.53	≤16.53
Fumonisins B1 (ng/g)	17.08		3.45 / 6.13	≤6.13
Fumonisins B2 (ng/g)	20.69		4.05 / 7.2	≤7.2
Nivalenol (NIV) (ng/g)	6.07		1.8 / 3.2	≤3.2
Roridin A (ng/g)	9.19		4.28 / 7.6	≤7.6

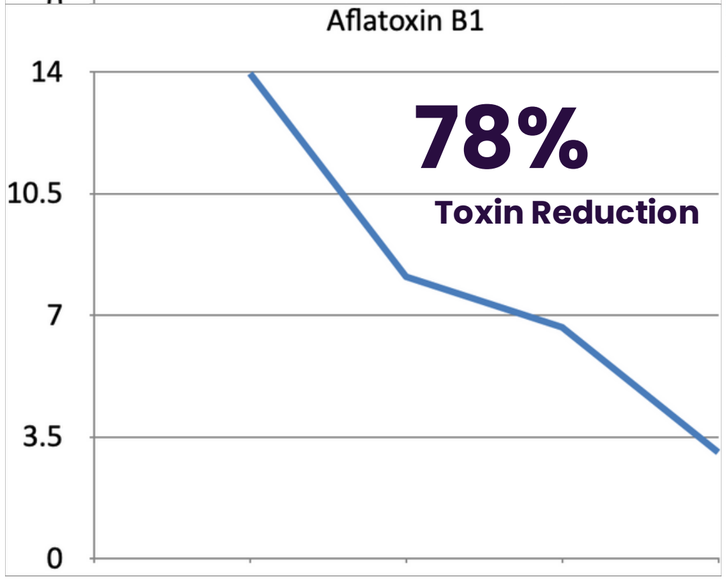
Suboptimal — Mycotoxins, Heavy Metals, Environmental Toxins

Test Name	Current	Previous	Result (75th / 95th)	Reference
Dimethylthiophosphate (DMTP)^ (ug/g)	13.46		5.91 / 33.7	≤33.7
Propylparaben^ (ug/g)	40.54		36.7 / 222	≤222
Triclosan (TCS)^ (ug/g)	110.47		29.9 / 358	≤358
Aluminum (ug/g)	34.55		17.83 / 45.15	≤45.15
Antimony^ (ug/g)	0.11		0.07 / 0.16	≤0.16
Fumonisins B3 (ng/g)	7.87		6.08 / 10.8	≤10.8
Roridin L2 (ng/g)	6.35		3.83 / 6.8	≤6.8
Satratoxin G (ng/g)	0.11		0.1 / 0.18	≤0.18
Verrucarin J (ng/g)	6.95		5.18 / 9.2	≤9.2

Creatinine

Test Name	Current	Previous	Result (0 / 0.24 / 2.16)	Reference
Urine Creatinine (mg/mL)	0.37			0.25-2.16





After TPE Protocol

Total Tox Burden - Summary

High — Heavy Metals

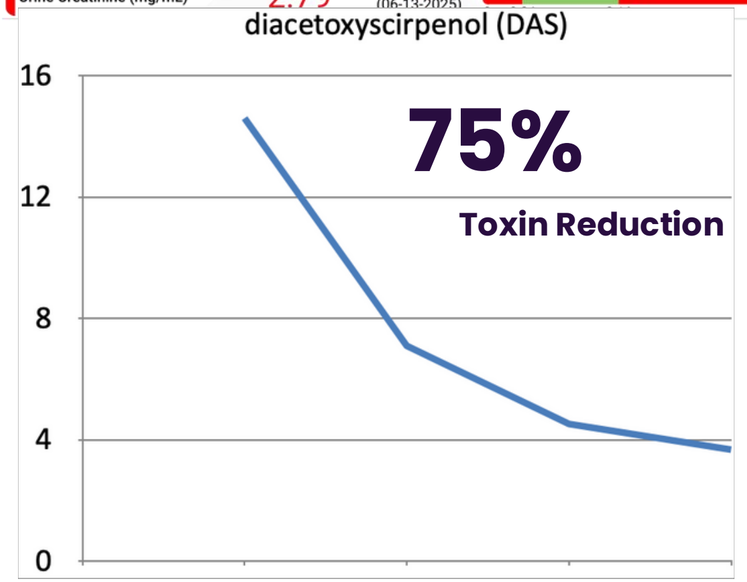
Test Name	Current	Previous	Result (75th / 95th)	Reference
Tin^ (ug/g)	3.78	5.56 (06-13-2025)	1 / 3.72	≤3.72

Suboptimal — Mycotoxins, Environmental Toxins

Test Name	Current	Previous	Result (75th / 95th)	Reference
Triclosan (TCS)^ (ug/g)	71.27	78.53 (06-13-2025)	29.9 / 358	≤358
Diacetoxyscirpenol (DAS) (ng/g)	3.68	4.52 (06-13-2025)	2.4 / 4.27	≤4.27
Fumonisins B2 (ng/g)	5.57	6.01 (06-13-2025)	4.05 / 7.2	≤7.2

Creatinine

Test Name	Current	Previous	Result	Reference
Urine Creatinine (mg/mL)	2.79	3.27 (06-13-2025)		0.25-2.16



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Before Intervention

Total Tox Burden - Summa

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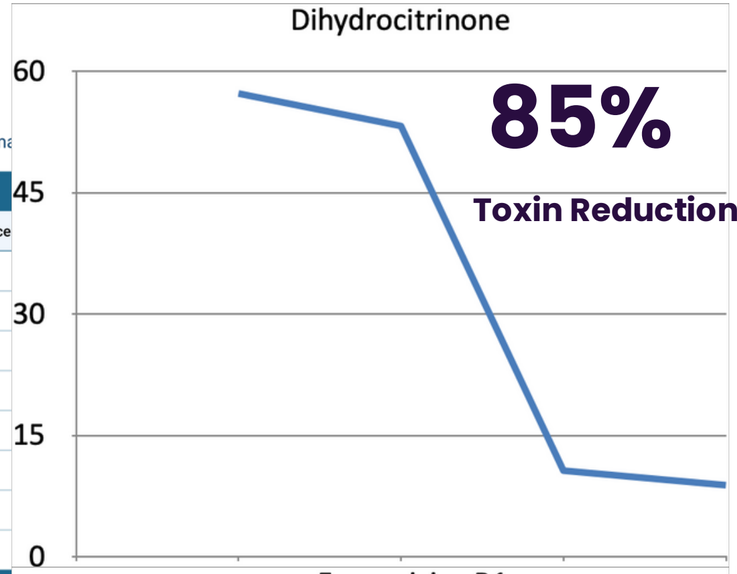

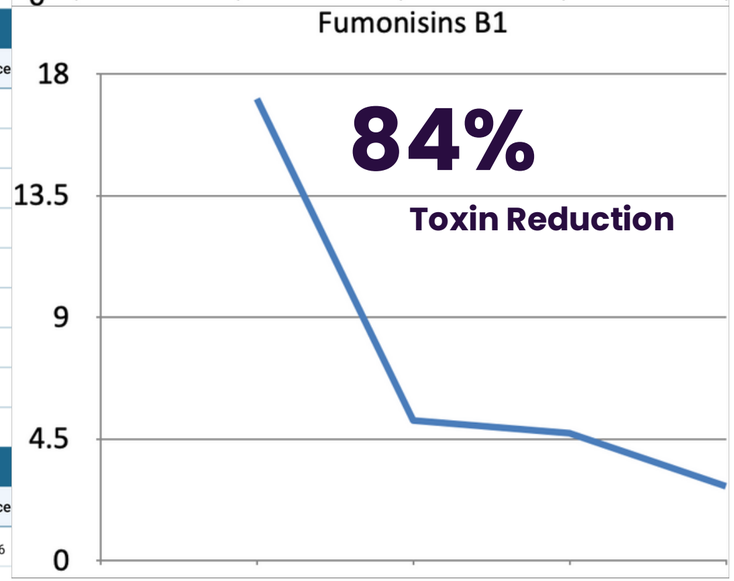

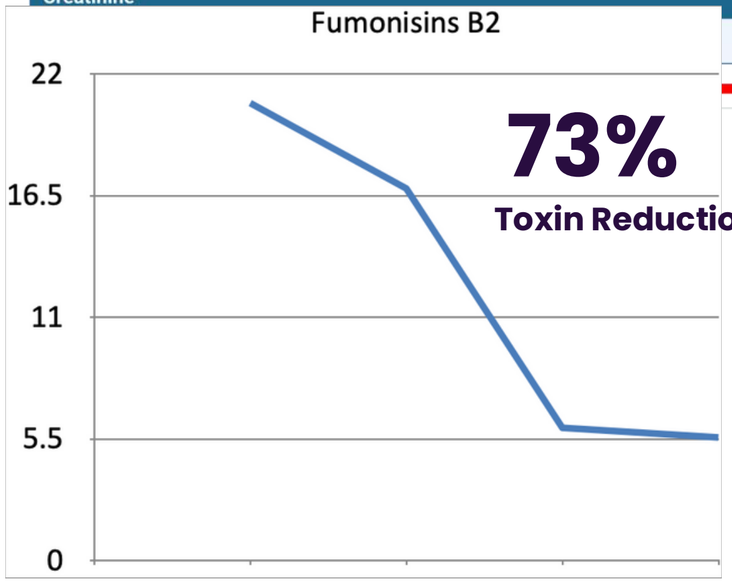

After TPE Protocol

Total Tox Burden - Summary

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Creatinine

Test Name	Reference
	0.25-2.16

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Before Intervention

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Creatinine

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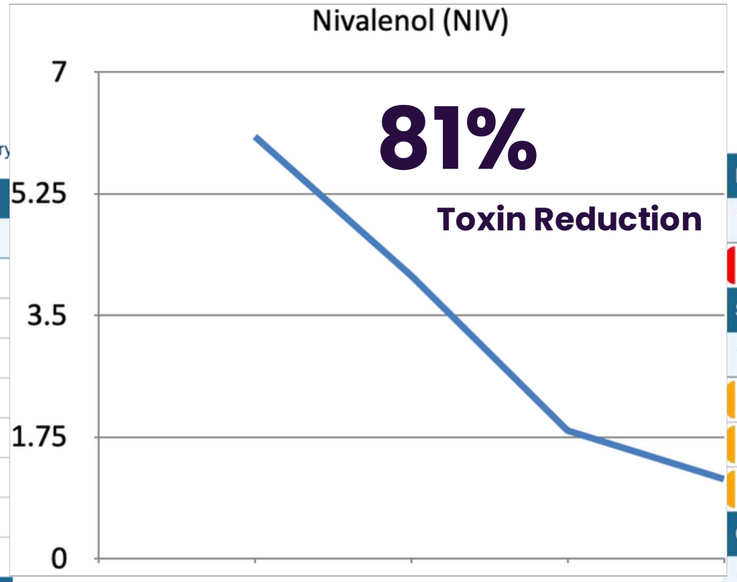

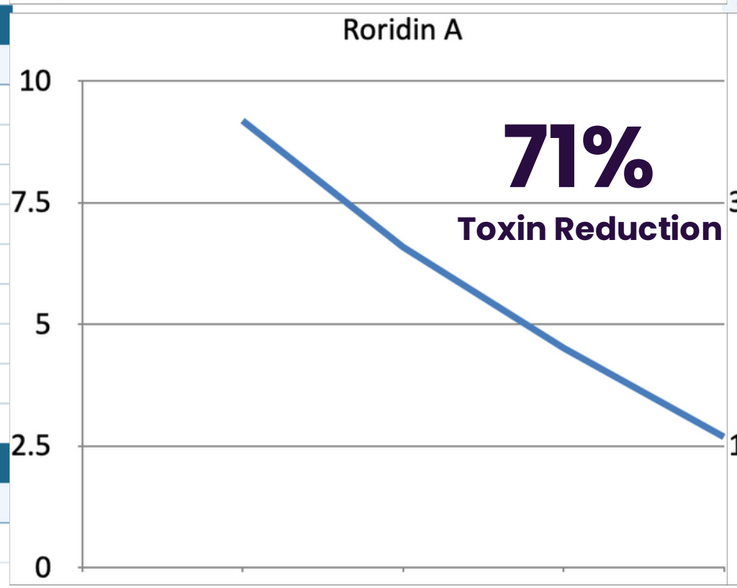

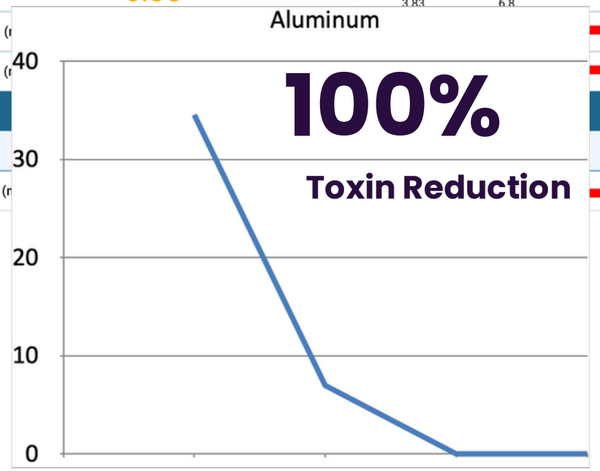

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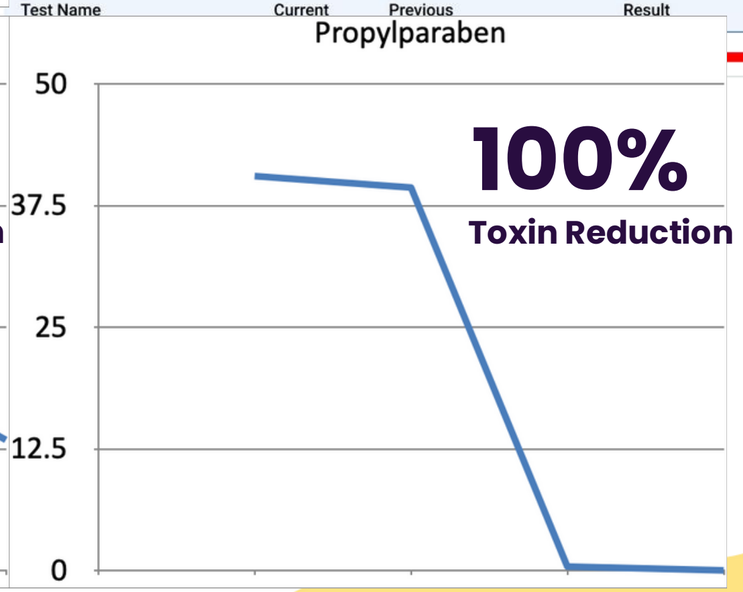

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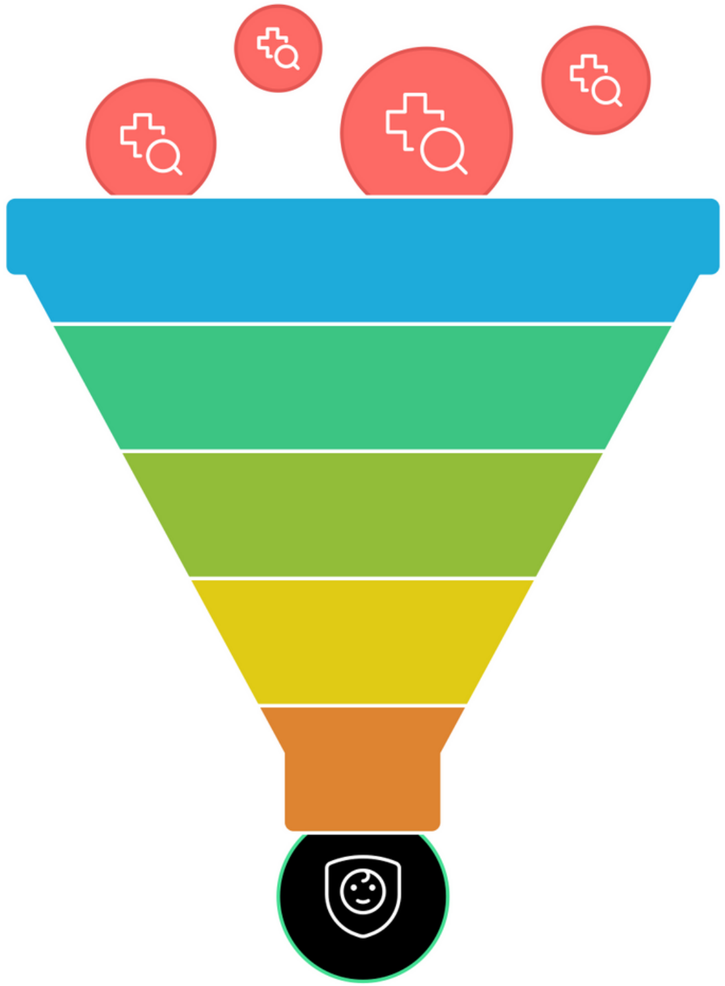
PRIME Process Model for Systematic Detoxification



Preparation Phase

Establishing conditions for toxin processing

Readiness Assessment

Verifying detoxification capacity

Intelligent Mobilization

Safely releasing stored toxins

Metabolic Conjugation

Transforming toxins for excretion

Elimination Enhancement

Ensuring complete toxin excretion

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How the Body Clears Toxins: Detoxification Pathways

Phase 1: Activation (Cytochrome P450)

- **Upregulated by:** Cruciferous vegetables, milk thistle, rosemary, resveratrol, quercetin
- **Essential cofactors:** Vitamin B2, B3, iron, magnesium

Phase 2: Conjugation

The initial phase where lipophilic toxins are transformed into more reactive intermediates that can be further processed.

Methylation:

B12, folate, B6, magnesium, TMG, SAMe

Glutathione Conjugation:

NAC, glutathione, selenium, glycine, alpha-lipoic acid, zinc

Sulfation:

B6, molybdenum, taurine, MSM, cysteine

Acetylation:

Acetyl-CoA, B5, l-carnitine

Glucuronidation:

Calcium D-glucarate, magnesium, curcumin, green tea extract, ellagic acid

Phase 3: Elimination

Primary Routes: Cell Membrane, Bile (primary), urine, stool, sweat

Supportive Interventions:

- Sauna therapy, optimal hydration
- Bitter herbs (dandelion, gentian)
- EPA/DHA, Phosphatidylcholine, taurine, ox bile
- Artichoke extract, soluble fiber

"You need all three. Otherwise, you risk worsening symptoms."

Clinical Pearl: Beta-glucuronidase from dysbiotic bacteria can reverse conjugation → REABSORPTION. Use binders (charcoal, cholestyramine, bentonite clay, modified citrus pectin, zeolite) to block enterohepatic recirculation and prevent recycled toxin overload.

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Omega-3 Fatty Acids: The Foundation of Detox

Membrane Fluidity, Transporter Function, and Inflammatory Resolution

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Why Omega-3s Matter in Detoxification

Cell Membranes: The Detox Highway

Transporters like MDR1, MRP2, and OATP are embedded in lipid bilayers. Membrane fluidity directly affects their function and efficiency in toxin elimination.

Omega-3s = Fluidity & Flexibility

EPA and DHA incorporate into phospholipid bilayers, reducing oxidative damage and improving transporter conformation for optimal detox pathways.

The Consequence of Deficiency

Low omega-3 status creates rigid, saturated membranes that trap toxins inside cells, particularly in liver, kidney, and brain tissue.

Toxin Genetics Test, Micronutrient, Whole Blood Nutrient
NutriPro Test

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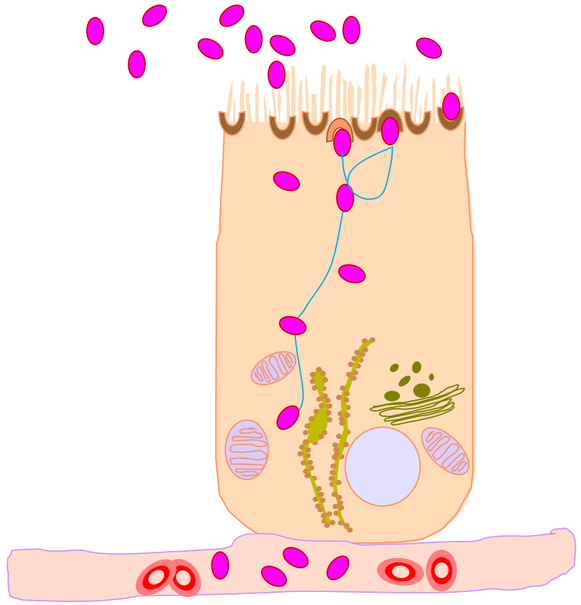
Transporter Function Depends on Omega-3 Status

Phase III Gatekeepers

MRP2, MDR1, and OATP transporters serve as critical gatekeepers in Phase III detoxification. Their expression and velocity are entirely membrane-dependent, making omega-3 status crucial for optimal function.

Clinical Consequences of Poor Omega-3 Status

- Inefficient drug clearance and metabolism
- Estrogen dominance and hormonal imbalances
- Poor tolerance to detox protocols ("detox crashes")
- Brain fog, chronic fatigue, and neuroinflammation
- Increased mold and chemical sensitivity



> "You can't detox if the doors are rusted shut."

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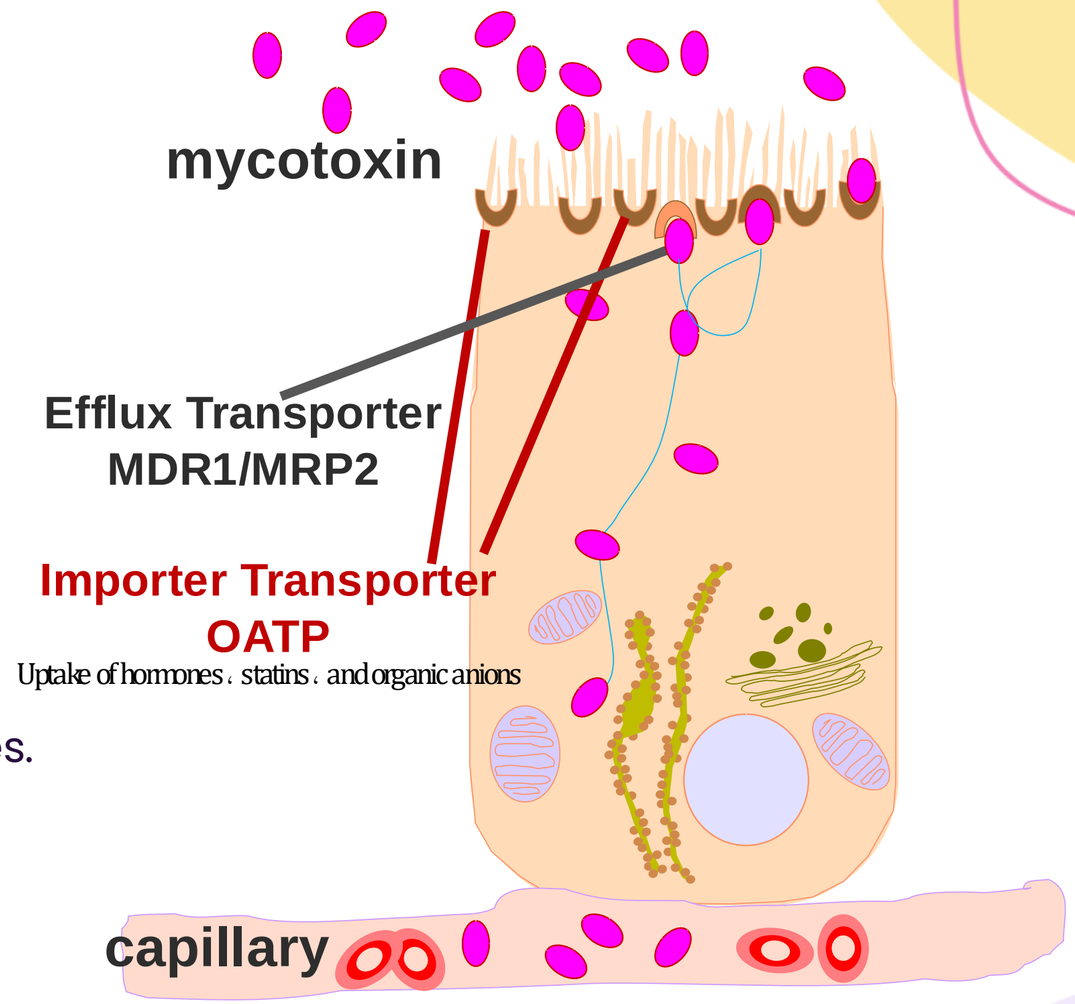
The Pharmacogenomics of Detoxification: MDR1 and MRP2 Transport Proteins

Understanding genetic variants in detoxification pathways is crucial for personalized medicine. Two critical Phase III transporters—MDR1 (ABCB1) and MRP2 (ABCC2)—and how their genetic variations impact clinical outcomes, diagnostics, and treatment strategies.



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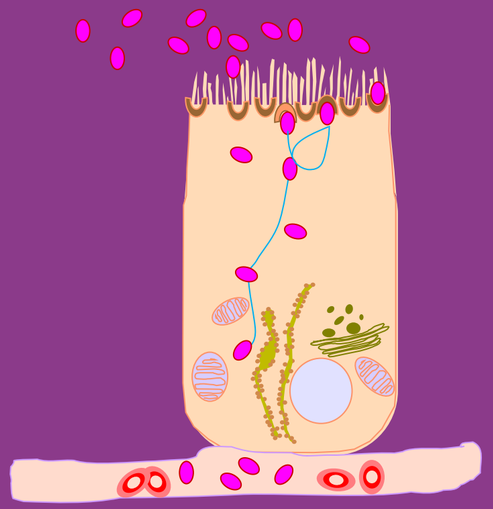
Functional Role of MDR1 (ABCB1)

*MDR1/P-glycoprotein functions as a critical **Phase III efflux transporter** that utilizes ATP to actively pump xenobiotics and toxicants out of cells, forming a crucial component of our body's defense system.*

Common Substrates:

- Pharmaceuticals (digoxin, cyclosporine, chemotherapeutics, statins)
- Mycotoxins from environmental mold exposure
- Endogenous bile acids
- Steroid hormones and metabolites
- Lipophilic environmental toxins (pesticides, plasticizers)



Key Locations

- Liver (canalicular membrane → bile excretion)
- Kidney tubules (→ urine elimination)
- Intestinal epithelium
- (apical membrane → fecal excretion)
- Blood-brain barrier (BBB) protection
- Placental barrier function

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Clinical Impact of MDR1 rs3734091 C/C Genotype

The rs3734091 SNP is associated with **reduced expression or function of MDR1**, especially with the **C/C genotype**, compromising critical detoxification pathways.

Impaired Drug Clearance

Elevated serum drug levels leading to increased risk of toxicity or adverse effects, particularly with narrow therapeutic index medications

Increased CNS Toxin Load

Impaired efflux at the blood-brain barrier results in neurological symptoms including brain fog, neuroinflammation, and cognitive dysfunction

Elevated Systemic Toxic Burden

Lipophilic environmental toxins (pesticides, phthalates, PCBs) are not exported efficiently, increasing total body burden

GI Barrier Compromise

Intestinal MDR1 normally helps expel xenobiotics; dysfunction leads to impaired mucosal defense and potential intestinal permeability

Heightened Drug Sensitivity

Enhanced response to medications due to reduced clearance, requiring dose adjustments for patient safety

Clues That Suggest MDR1 Dysfunction

Neurotoxic Symptoms

Brain fog, migraines, anxiety, cognitive slowing, or unexplained neurological symptoms

Drug Sensitivity

Adverse reactions to common medications including SSRIs, statins, beta-blockers, and opioids

Poor Detox Response

Headaches, fatigue, insomnia during detoxification protocols or "detox reactions"

Laboratory Findings

Poor urinary toxin clearance, dysbiosis on stool tests, increased intestinal permeability (elevated zonulin), high inflammatory markers (CRP, IL-6, TGF-β)

Clinical suspicion should be heightened when patients present with unexplained neurological symptoms or unusual medication responses despite normal conventional lab results.

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Clinical Support Strategies for MDR1 (rs3734091 C/C)

Evidence-based interventions to support patients with compromised MDR1 function

1 Membrane Fluidity Support

- Omega-3 fatty acids (EPA/DHA): 1-3g daily
- Phosphatidylcholine: 1-2g daily
- Vitamin E as mixed tocopherols: 200-400 IU daily

2 Transporter Upregulation

- Sulforaphane from broccoli sprouts: 10-30mg daily
- Curcumin (liposomal or with piperine): 500-1000mg twice daily
- Quercetin as MDR1 modulator: 500mg twice daily
- Green tea catechins (EGCG): 300-500mg daily

3 Neuroprotection

- N-acetylcysteine (NAC): 600-1200mg twice daily
- Liposomal glutathione: 200-500mg daily
- Resveratrol: 100-250mg daily
- Magnesium L-threonate: 2000mg daily (144mg elemental)

4 Environmental Management

- Mold/mycotoxin remediation and binders
- Minimize pharmaceutical burden when possible
- Clean air, water, and organic food when possible
- Avoid known MDR1 inhibitors: ketoconazole, verapamil, cyclosporine

Clinical Pearl: "ABCB1 is your blood-brain barrier's gatekeeper. If rs3734091 is homozygous abnormal, expect toxins and drugs to linger longer—especially in the brain."

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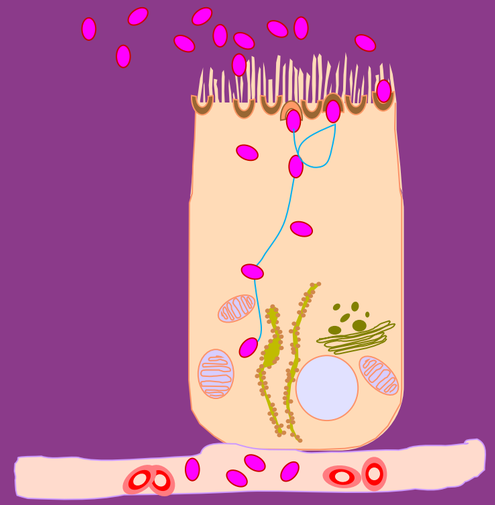
Functional Role of ABCC2 (MRP2)

MRP2 (Multidrug Resistance-Associated Protein 2) is a critical ***Phase III detoxification transporter*** *that complements MDR1 function but with distinct substrate preferences.*

MRP2 primarily pumps conjugated toxins (glucuronides, sulfates, glutathione conjugates) from liver cells into bile, completing Phase II detoxification pathways.

Common Substrates

- Mycotoxins (ochratoxin A, aflatoxin)
- Heavy metal conjugates
- Estrogen metabolites (especially 4-OH)
- Bilirubin (critical for preventing jaundice)
- Glutathione conjugates of xenobiotics
- Drug conjugates (acetaminophen, NSAIDs)



Key Locations

Predominantly expressed on the canalicular (bile-facing) membrane of hepatocytes, with additional expression in kidney proximal tubules and intestinal epithelium.

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Clinical Impact of MRP2 rs2056131 G/G Genotype

1

Reduced MRP2 Expression/Function

Decreased efflux of Phase II conjugates leads to accumulation in hepatocytes and systemic recirculation

2

Toxin Recirculation

Bile-excreted conjugates back up and are reabsorbed via enterohepatic circulation, creating a vicious cycle

3

Estrogen Dominance

Conjugated estrogens not efficiently cleared, leading to PMS, fibroids, breast tenderness, and hormonal imbalances

4

Environmental Sensitivity

Increased sensitivity to mold, metals, and environmental toxins due to inefficient clearance mechanisms

5

Therapeutic Challenges

Detox intolerance and adverse drug reactions due to poor clearance of glucuronidated or sulfated compounds

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Clinical Protocol Recommendations for MRP2 Dysfunction

Evidence-based interventions for patients with the rs2056131 G/G genotype require a multifaceted approach focusing on upregulation, bile flow, binding, and supporting hormonal balance.

Transporter Upregulation

- Liposomal glutathione: 250-500mg daily
- Sulforaphane from broccoli sprouts: 10-30mg daily
- Milk thistle (silymarin): 150mg 3x daily
- Taurine: 500-1000mg twice daily

Bile Flow Support

- Phosphatidylcholine: 1-2g daily
- Dandelion root extract: 500-1000mg daily
- Artichoke extract: 300-600mg daily
- Digestive bitters before meals

Binding Strategy

- Activated charcoal: 1-2g 60-90 min after liver support
- Chlorella: 2-4g daily with meals
- GI Detox formulas with bentonite/zeolite

Estrogen Support

- Calcium-D-glucarate: 500mg twice daily
- DIM (diindolylmethane): 100-200mg daily
- Ground flaxseed: 2 Tbsp daily
- Cruciferous vegetables or extracts

Clinical Pearl: "With ABCC2 mutations like rs2056131 G/G, the liver might be conjugating toxins correctly—but if MRP2 can't ship them out, the toxins recirculate and poison the host again."

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Omega-3s & Inflammation Resolution

Detoxification generates significant inflammation, particularly from Phase I intermediates that produce reactive oxygen species, quinones, and reactive metabolites. This inflammatory burden can overwhelm the body's natural resolution mechanisms.

Resolvins

Specialized pro-resolving mediators derived from EPA that actively resolve inflammation and restore tissue homeostasis.

Protectins

DHA-derived molecules that protect neural tissue and support cellular repair during detoxification stress.

Maresins

Macrophage-derived mediators that resolve inflammation and turn off the immune fire that can derail detox protocols.

Detox with No EPA/DHA = Is like decluttering a house while it is on fire!!!!!!

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Omega-3s & Mitochondrial Resilience

Mitochondria require DHA for optimal membrane potential and energy production. These cellular powerhouses play three critical roles in successful detoxification protocols.

1 ATP Production

Provide essential energy for Phase II conjugation reactions and Phase III efflux pump function.

2 Oxidative Stress Buffer

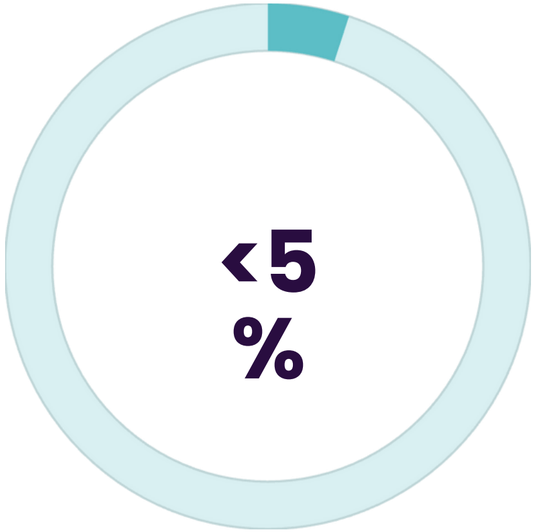
Neutralize reactive oxygen species and free radicals generated by detox intermediates.

3 Cellular Repair

Support autophagy and repair mechanisms necessary for tissue recovery during detoxification.

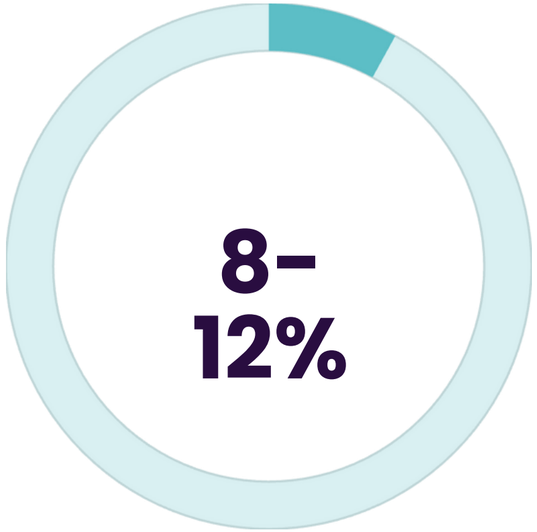
> "If mitochondria are weak, detox is dangerous."

Omega-3 Index: Your Detox Readiness Score



Dysfunctional Biology

Linked to low HRV, endothelial dysfunction, chronic inflammation, and poor response to detox protocols.



Optimal Target

Enhances Phase III transport, improves detox tolerance, and reduces inflammatory backlash.

The Omega-3 Index serves as a reliable biomarker for detoxification readiness. Values below 5% indicate dysfunctional membrane biology that compromises the effectiveness of binders, glutathione, and fasting protocols.

Clinical Testing Options: OmegaCheck™, NutriPro test, Whole Blood Nutrient, Micronutrient Test

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Clinical Integration: When to Suspect Low Omega-3s

Key Signs & Symptoms

- **Hormonal Dysfunction**

  Estrogen/progesterone imbalances indicating poor Phase III elimination of steroid hormones.
- **Detox Intolerance**

  Brain fog, fatigue, and flu-like episodes during detoxification protocols suggest membrane dysfunction.
- **Drug Sensitivity**

  Statin side effects may indicate OATP transporter inefficiency related to membrane rigidity.
- **Chronic Inflammation**

  Persistent elevation of CRP >1.0 mg/L despite anti-inflammatory interventions.
- **Neurological Symptoms**

  Low HRV, poor sleep recovery, chronic fatigue, or heightened neurotoxin sensitivity.

> "Low omega-3 status = poor detox"

Clinical Support Strategy: Dosing & Sources

Repletion Protocol

- **Target dose:** 2-4 grams combined EPA + DHA daily, typically 4 grams, the most expensive supplement is the one that doesn't work
- **Reassessment:** Test omega-3 index after 90 days

Dietary Sources

- Wild-caught salmon, sardines, anchovies
- Cod liver oil (monitor vitamin A dosage)
- Algal DHA for vegetarian patients

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Because if life is energy... and toxins dim that energy... then your job isn't to treat the disease. It's to *turn the light back on.*

-Me

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Free Resources for Clinicians

Detox Flowchart

Step-by-step decision tree for when and how to test for environmental toxins

Protocol Cheat Sheet

Supplement protocols organized by toxin type and detox phase

Case Interpretation Guide

How to analyze test results and create personalized treatment plans

Ongoing Education BentleyMD.com

Have access to free and paid education in my teaching portal

Also, get notified to pre-purchase my new book

Unseen. Unchecked. Unhealed:

Identify Hidden Toxins, Personalize Protocols, Deliver Reliable Outcomes

Clarity. Precision. Results.

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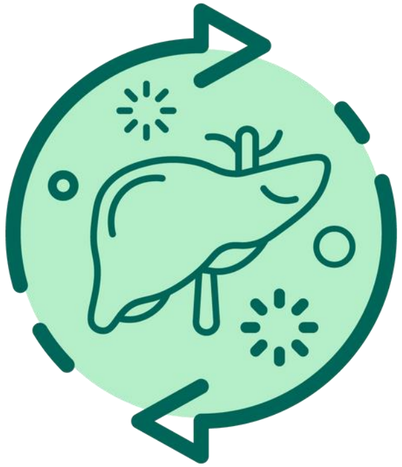
God Bless You



Restoring Balance

Toxins and Environmental Health

Session 4

Dr. Elena Villanueva, DC

Meet Your Speaker

Dr. Elena Villanueva, DC

Founder of Modern Holistic Health and BioOne Sciences

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The Missing Link in Longevity: How Reducing Toxic Load Unlocks Health Outcomes and Business Profitability

Dr. Elena Villanueva, DC

Clinical Takeaways:

Detox as a Core Longevity Strategy

1. Incorporate evidence-based approaches to uncover the **upstream causes** of aging and disease.

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Clinical Takeaways:

Detox as a Core Longevity Strategy

1. Incorporate evidence based approaches to uncover the **upstream causes** of aging and disease.
2. Learn **proven strategies** that restore **health** and help people live **healthier, longer lives.**

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Clinical Takeaways:

Detox as a Core Longevity Strategy

1. Incorporate evidence based approaches to uncover the **upstream causes** of aging and disease.
2. Learn **proven strategies** that restore **health** and help people live **healthier, longer lives.**
3. Apply **clinically validated protocols** that target the upstream causes supporting the **repair and regeneration of cells, tissues, and DNA.**

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Traditional Detox vs. Precision Longevity Detox

	Traditional Detox
Protocol Design	Complex and incomplete
Lab Monitoring	None or incomplete
Sustainability	Drives non-compliance or lacks clinical results
Clinical Accuracy	Guesswork
Patient Buy-In	Low Retention

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Traditional Detox vs. Precision Detox

Precision Longevity Detox

Protocol Design	SNP-Informed, Phase Specific
Lab Monitoring	Before/After Biomarkers
Sustainability	Bundled Retesting, 90-Day Cycles
Clinical Accuracy	Multi-System Lab Data
Patient Buy-In	High Engagement + Visible Results

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The Clinical Blind Spot

Why Protocols Fail

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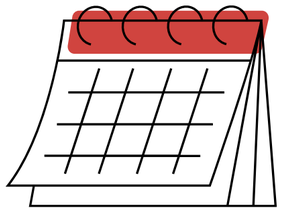
The 12-Month Detox & Restoration

Framework for Clinical & Patient Success

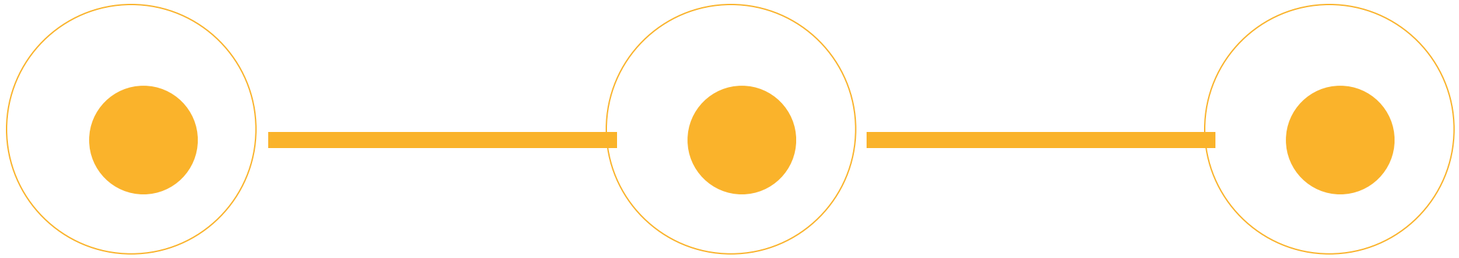


Months 1 & 2

Open Detox Pathways

Open Methylation Pathways

Increase Dense Nutrition



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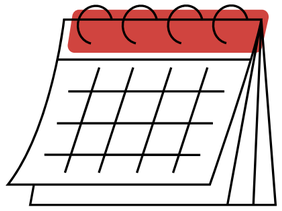
The 12-Month Detox & Restoration

Framework for Clinical & Patient Success



Months 3 – 10

Deep Detoxification

Body Restoration

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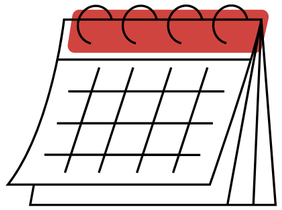
The 12-Month Detox & Restoration

Framework for Clinical & Patient Success



Months 11 & 12

Optimization

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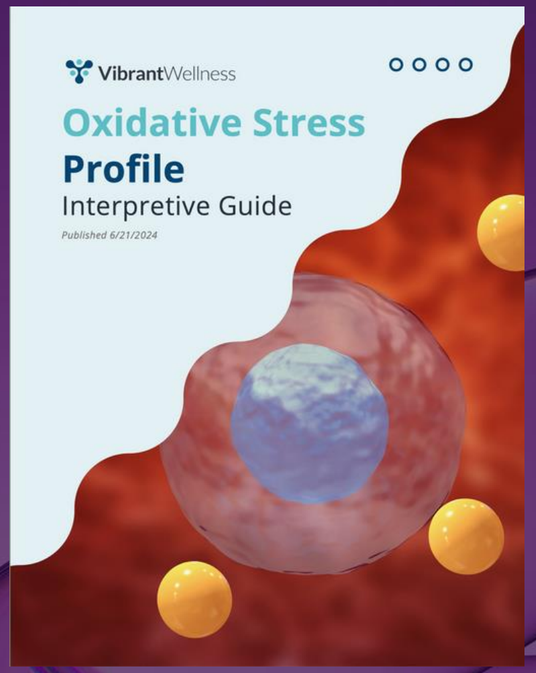
The Three Top Panels That Drive Protocol Clarity

Methylation affects detox, hormones,
and 250+ vital body functions



8-OHdG, glutathione, lipid peroxidation

87 markers for
metals, mold, chemicals

Each panel = better outcomes + additional revenue stream.

75%

Toxin Reduction

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80%

AVG Zone Shift Success

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100%

Positive Patient Response

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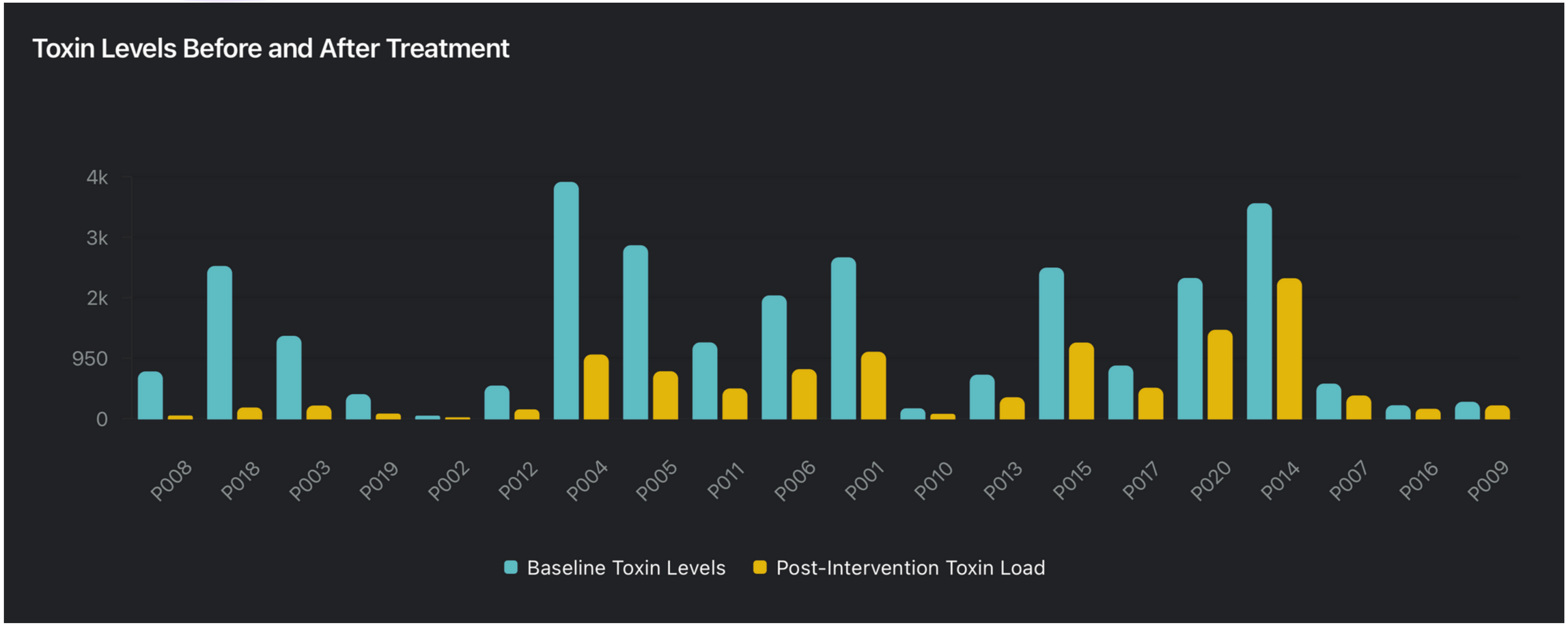
Test Name	Current	Previous	Result	Reference
2-Hydroxyethyl Mercapturic Acid (HEMA)^ (ug/g)	18.29		75th: 1.7 — 95th: 4.75	≤4.75



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Case Highlights

Simpler Detox, Greater Impact

Jessica
(RA, fatigue)
Mold detox, back to work

Jenny
(Hashimoto's, anxiety) Fewer products, better sleep, tapering off meds

Melissa
(psychiatric + neuro burden)
Gut-brain repair + detox → regained cognitive function

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Precision Detox

A Scalable, Predictable Business Model

Visit Fees
Structured and repeatable

Labs
Data Patients Value

Supplements
Targeted, protocol-based

$5,000+
10 Patients / month

$13,000+
25 Patients / month

$26,000+
50 Patients / month

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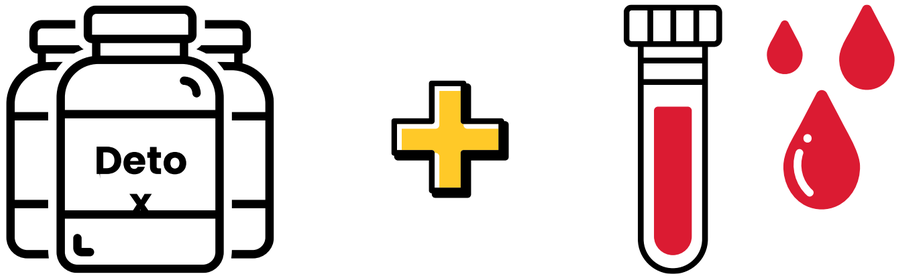
Beyond the Detox

The Business Synergy of TPE



TPE: Rapid reset for patients. Accelerated ROI for practices.

- **ROI**: 190% in 12 months
- **Break-even**: 4–5 months
- **Peak Profit Margins**: 78%”

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Ready To Implement?

We've created resources for you.

Testing + Retesting Guideline

+

12-Month Protocol Overview

+

Symptom Tracking Templates

+

Assessment-to-Strategy Reference Chart

Pick up your kit at the Booth

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“Reducing toxic load isn’t just about health, it’s about unlocking human potential. And that’s what we’re here to do...together”

Thank You!

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