



Diet and Lifestyle Strategies for Detoxification SNPs

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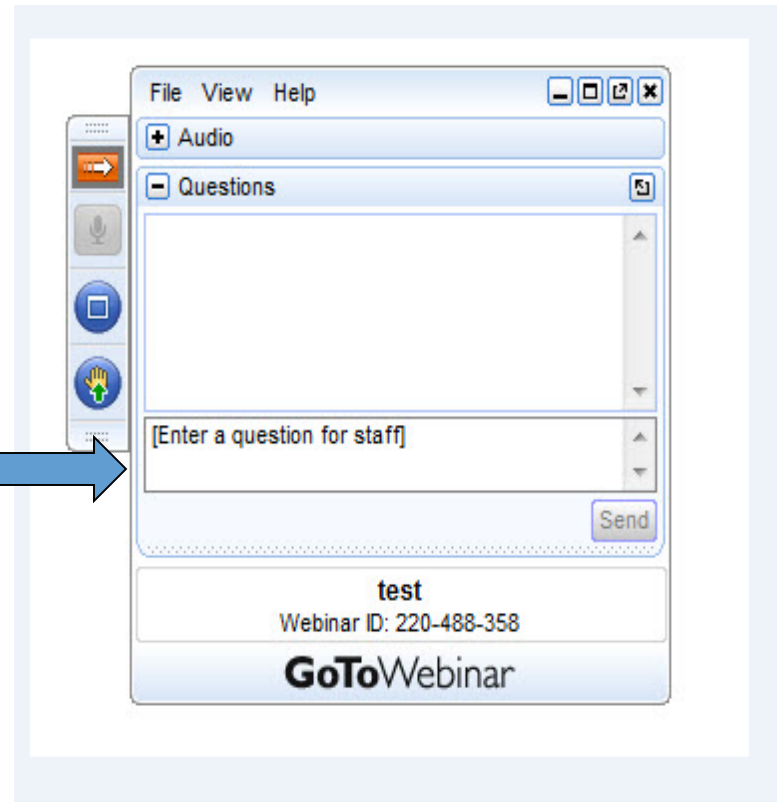
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Technical Issues & Clinical Questions

Please type any technical issue or clinical question into either the “Chat” or “Questions” boxes, making sure to send them to “Organizer” at any time during the webinar.

We will be compiling your clinical questions and answering as many as we can the final 15 minutes of the webinar.





Need More Resources?

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Is Nutrition Important for Detox?

5 Potential Reasons Why Toxic Exposure Could Be a Health Issue for Some

1. Toxin dose and degree of exposure
2. Elimination
3. Deficiency or insufficiency of nutrients
4. Differences in genes for detox
5. Bacterial overgrowth in gut





All Phases of Detoxification Require Adequate Nutrients





Nutrition Protects **A**gainst **T**oxicity

- Sub-optimal or unhealthy nutrition modulates the toxicity of environmental contaminants
- Healthful nutrition decreases the toxicity of pro-inflammatory pollutants
- Healthful nutrition can decrease body burden of environmental contaminants

“We propose that positive lifestyle changes such as healthful nutrition and consumption of diets rich in fruits and vegetables or bioactive nutrients with antioxidant and/or anti-inflammatory properties will reduce the body’s vulnerability to environmental stressors and thus reduce toxicant-mediated disease pathologies.”



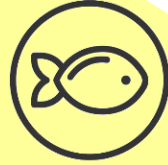
EGGS



SHELLFISH



MILK



FISH



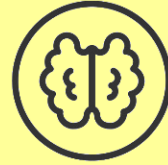
CORN



WHEAT



PEANUTS



NUTS



SOY



SESAME



LUPINES



CELERY



MUSTARD



SUGAR



MEAT



SULFITES

ARTIFICIAL
SWEETENERSARTIFICIAL
COLORTRANS
FATS

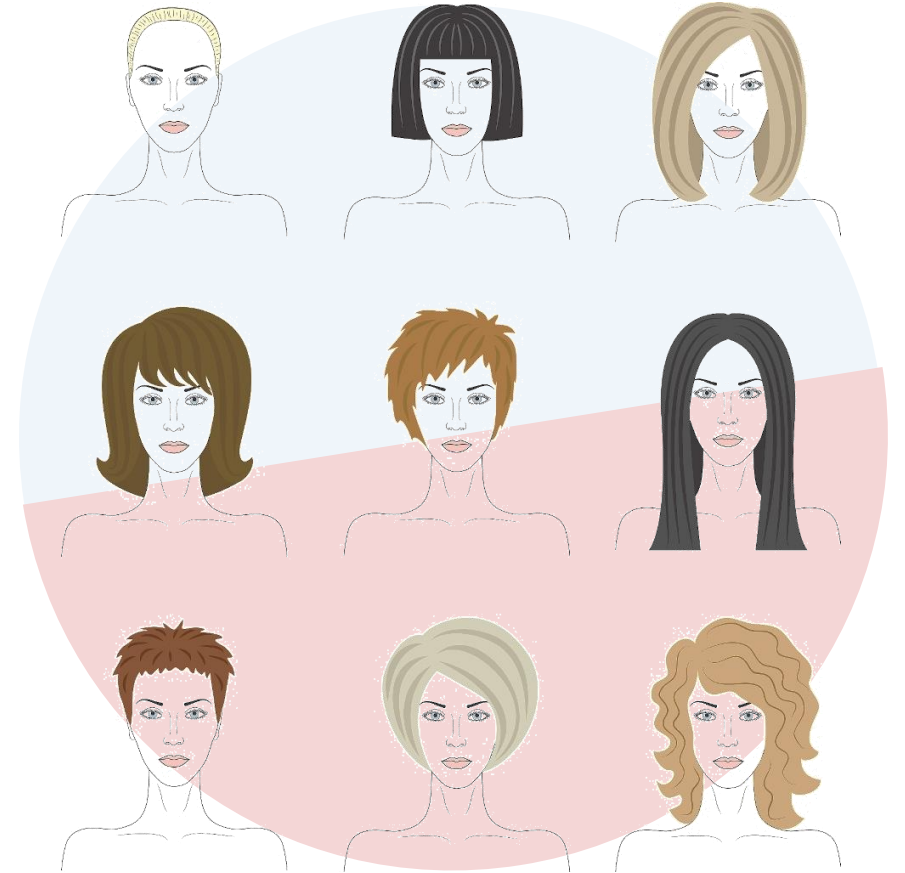
PRESERVATIVES

Reducing Toxin Load First and Foremost



It's What We Put in and Take out: *Elimination Diet + Nutrients*

“A statistically significant (47%) reduction in the Metabolic Screening Questionnaire scores resulted [*after 7 days of an elimination diet and a detox protein powder*]...” in 25 healthy women.





Powdered Detox Supplement Together with an Elimination Diet Reduces Symptoms of Fibromyalgia

Women with fibromyalgia on a 4-week program consisting of an elimination diet + phytonutrient-containing medical powder had reduced symptoms



What about Fasting/Juice Cleanses?



The Downside of Detox Diets

“The main health risks of detox diets relate to severe energy restriction and nutritional inadequacy. Extreme fasting can lead to protein and vitamin deficiencies, electrolyte imbalance, lactic acidosis and even death.”





Caloric Restriction and Toxicity

“Loss of body fat through caloric restriction mobilizes stored lipophilic xenobiotics and results in distribution to other tissues.”





Is There a Place for Fasting within Detox Protocols?

- Intermittent feeding
- Time-restricted feeding
- Periodic fasting
- Animal studies indicating improvements for diabetes, cardiovascular disease, cancers and neurological disorders such as Alzheimer's disease Parkinson's disease and stroke



Doing Fasting **C**orrectly

- Ensure hydration
- Eat nutrient-dense foods
- Monitor for dizziness, fatigue, energy loss





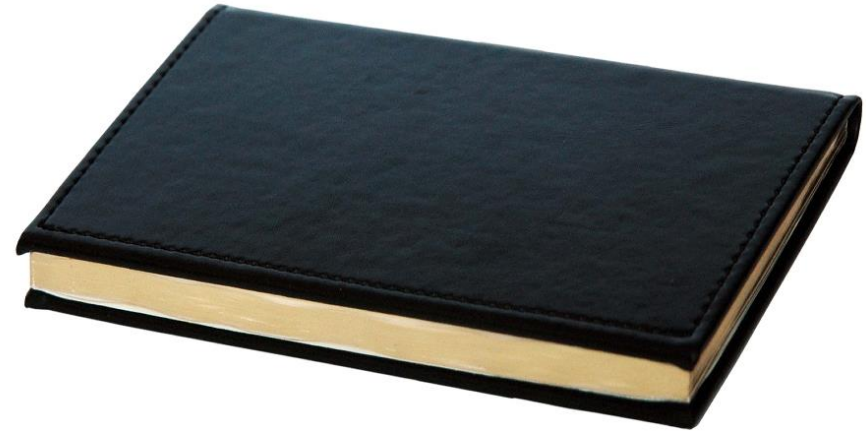
What Do You Do First?



Assess Diet and Lifestyle

Use a diet and lifestyle journal to evaluate over multiple days:

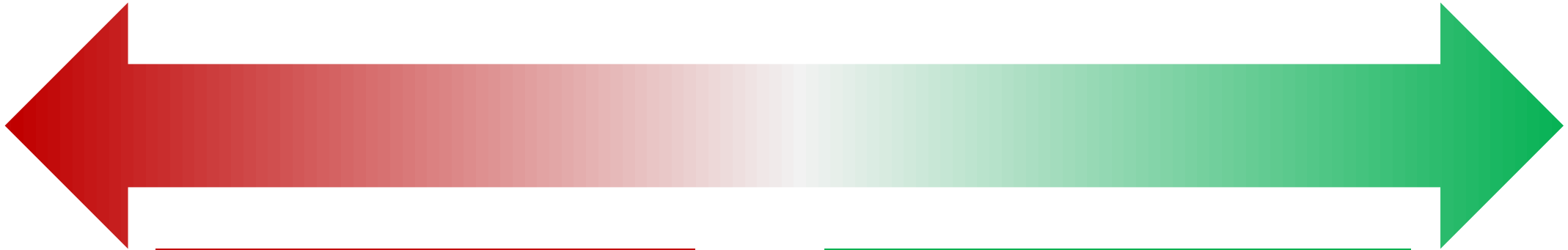
- Food & drink intake, times
- Stress-reducing practices
- Sleep quantity and quality
- Exercise/movement
- Relationships
- Mental/emotional/spiritual health





Where Is Your Patient's Diet on the Spectrum?

TOXICITY



DETOX

- GMOs
- Glyphosate
- Advanced Glycation Endproducts (AGEs)
- Heterocyclic amines
- Artificial sweeteners
- Hormones and antibiotics
- Preservatives
- Endocrine disruptors/plastics
- High heavy metals

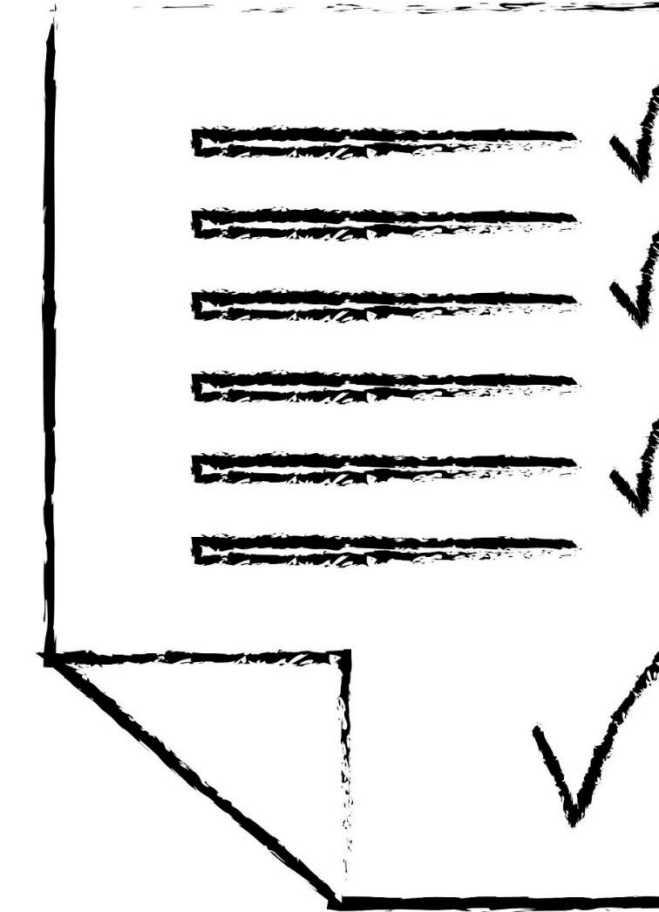
- High-fiber plant foods
- Phytonutrient-dense foods
- Vitamin and mineral cofactors
- Antioxidants for phase I protection
- High-quality proteins for phase II conjugation
- Plant-based methylating agents
- Hydrating foods and liquids
- Alkalizing plant foods



What is Toxic?

The Checklist

- ✓ Are they eating heavily processed foods with a number of synthetic ingredients?
- ✓ Are they eating refined oils?
- ✓ Are they eating high amounts of refined sugar?
- ✓ Do they eat artificial sweeteners?
- ✓ Are they eating large, regular amounts of high-mercury fish?
- ✓ Are they eating more conventional than organic foods?
- ✓ Are they drinking contaminated water?
- ✓ Are they eating the same things over and over again?
- ✓ Are they eating food in plastic or cans?
- ✓ Are they overcooking or browning foods?

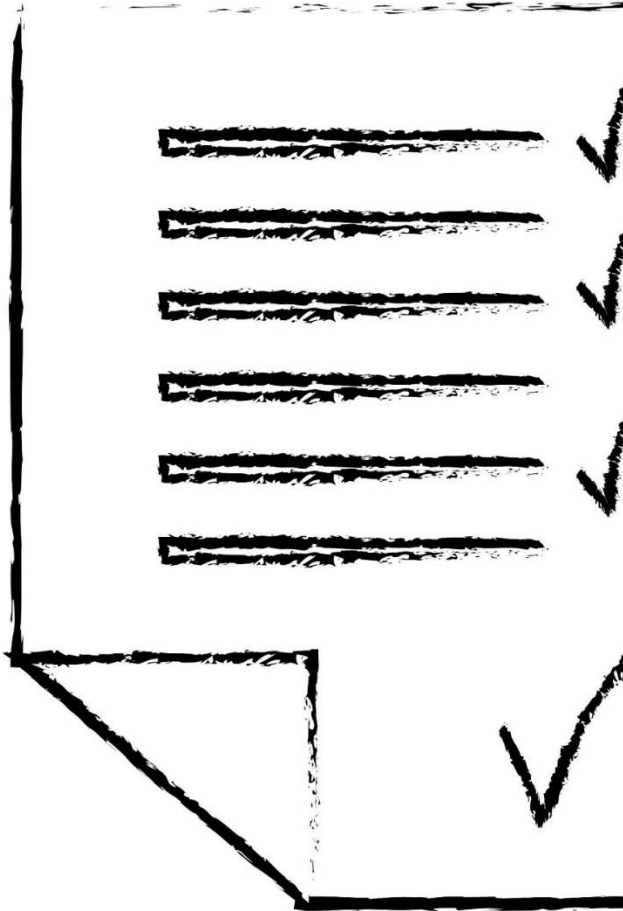




What is Detoxifying?

The Checklist

- ✓ They are eating organically grown fruits and vegetables
- ✓ They are eating varied colors of whole foods
- ✓ They are eating clean protein and fat sources
- ✓ They are drinking filtered water
- ✓ They are drinking from glass or stainless steel containers
- ✓ They are eating good quality protein sources throughout the day





Eat Organic:

Organic diets lower dietary exposure to organophosphorus pesticide in children

- N= 23 elementary school-age children
- Dietary organophosphorus pesticide exposure
- “We substituted most of children's conventional diets with organic food items for 5 consecutive days and collected two spot daily urine samples, first-morning and before-bedtime voids, throughout the 15-day study period.”
- “We found that the median urinary concentrations of the specific metabolites for malathion and chlorpyrifos decreased to the nondetect levels immediately after the introduction of organic diets and remained nondetectable until the conventional diets were reintroduced.”




Plants Are Essential to Human Health





What Do You Do with Food/Nutrients If Your Patient Has SNPs for CYPs?





63 Zillicoa Street
Asheville, NC 28801
© Genova Diagnostics

Patient: [REDACTED]

DOB: [REDACTED]

Sex: F

MRN: [REDACTED]

Order Number: [REDACTED]

Security Code: [REDACTED]

PHASE I Detoxification: The First Line of Defense


In Phase I detoxification, enzymes, known collectively as the cytochrome P-450 system, use oxygen to modify toxic compounds, drugs, or steroid hormones. Many toxins must undergo Phase II detoxification after a reactive site has been formed. Because there are many different toxic compounds the body might encounter, there are many variants of Phase I enzymes.

Cytochrome P-450	
Result	Gene
✓	CYP1A1 *
●	CYP1B1 *
✓	CYP2A6
●	CYP2C9 *
✓	CYP2C19 *
✓	CYP2D6
✓	CYP3A4 *

Your Results: Polymorphisms (SNPs) in the genes coding for a particular enzyme can increase or, more commonly, decrease the activity of that enzyme. Both increased and decreased activity may be harmful. Increased Phase I clearance without increased clearance in Phase II can lead to the formation of toxic intermediates that may be more toxic than the original toxin. Decreased Phase I clearance will cause toxic accumulation in the body. Adverse reactions to drugs are often due to a decreased capacity for clearing them from the system.

Key

- ✓ Optimal genomic potential - no polymorphism detected
- Polymorphism detected in this enzyme, increasing your susceptibility to toxins, if exposed
- * Multiple SNP locations were evaluated for these genes
- NR See commentary if applicable





Tailoring Foods to Detox Pathways

- Phase I Cytochrome Systems
- Phase II Conjugation Enzymes
- Antioxidant Response Element/Nrf2
- Metallothionein Response Element



7 Things to Know about SNPs When It Comes to Detox

- Strong research and clinical data are lacking
- SNPs go together with functional biomarkers for a complete biochemical picture
- SNPs are a qualitative rather than a quantitative marker
- They cannot be judged in isolation
- Epigenetics is often not taken into account when discussing genetic variants
- SNPs are typically not “on” or “off”
- Clinical symptoms should be main driver to treat rather than SNPs, although SNPs may provide insight on what to address



What If You Have Patients with SNPs in the Cytochrome P450s (CYPs)?

Fortify Using Basic Nutritional Cofactors

“Thus, 5-fold reducing of vitamin content in rat diet lead to significant changes in activity and inducibility of cytochrome P450 of CYP1A and 3A family, which play a key role in the detoxification and metabolism of drugs.”

Vopr Pitan. 2014;83(3):4-11.

The study has demonstrated that profound multi-vitamin deficiency is associated with a decrease in the expression of CYP1A2 and CYP3A1 mRNAs to 62 % and 79 %, respectively. These data indicated that a short-term but profound multi-vitamin deficiency in rats leads to a decrease in the activities and expression of the some XME that play an important role in detoxification of xenobiotics and metabolism of drugs and antioxidant protection.

Int J Vitam Nutr Res. 2013;83(1):5-13.

- **Nutrient-dense foods**
- **Daily full-spectrum MVM**



Provide Antioxidant Support to Those Patients Going through Toxic Stresses

Broad-spectrum antioxidants:

- Vitamin C and bioflavonoids
- Vitamin E and tocotrienols
- Mixed carotenoids

For patients who:

- Have SNPs in Phase II enzymes
- Have toxic jobs and hobbies
- Are under undue stress



Fish oil
Lycopene
Curcumin
Cruciferous vegetables
Garlic
Catechins
Resveratrol
Ginger
Purple sweet potato
Isoflavones
Coffee
Rosemary
Blueberry
Pomegranate
Naringenin
Ellagic acid
Astaxanthin
Gamma-tocopherol

Examples of Food and Food Bioactive INDUCERS of ARE Enzymes

Hodges RE, Minich DM. Modulation of Metabolic Detoxification Pathways Using Foods and Food-Derived Components: A Scientific Review with Clinical Application. *J Nutr Metab.* 2015;2015:760689. doi: 10.1155/2015/760689. Epub 2015 Jun 16.

Fermented Foods May Activate Nrf2 Due to the Presence of Alkyl Catechols

Senger DR, Li D, Jaminet SC, Cao S. (2016) Activation of the Nrf2 Cell Defense Pathway by Ancient Foods: Disease Prevention by Important Molecules and Microbes Lost from the Modern Western Diet. PLoS One. 2016 Feb 17;11(2):e0148042. doi: 10.1371/journal.pone.0148042. eCollection 2016.





Vitamin E and C Supplementation for Daily Job Toxin-Exposure

- Antioxidants (vitamin E 400 IU + vitamin C 1 g/day) supplemented for 1 year to 15 workers exposed to Pb compared with non-Pb exposed workers
- Pb intoxication = high oxidative damage
- Antioxidant supplementation decreased the oxidative damage



The Benefits of Beta-carotene Supplementation in Lead-Exposed Workers

- N=33 healthy male workers exposed to Pb
- N=49 control group
- Supplemented with beta-carotene at 10 mg/day/12 weeks
- MDA significantly decreased in supplemented group, compared to baseline, by 16%, and to the reference group
- When compared to the reference group, Hcy level was also significantly decreased
- The level of thiol groups was significantly higher after supplementation with beta-carotene compared to the reference group



What Do You Do with Food/Nutrients If Your Patient Has SNPs for Phase II Detox Enzymes?



What If You Have Patients with Multiple SNPs in the Phase II Enzymes?

Focus on amino acids/protein:

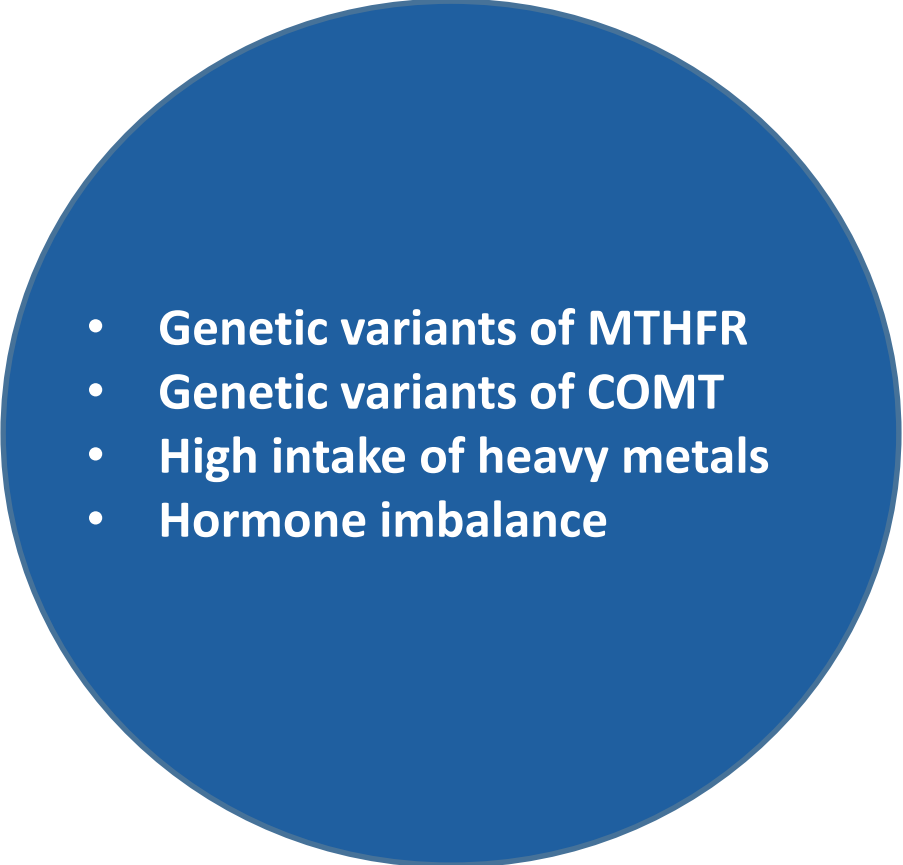
- Arginine
- Glutamine
- Glycine
- Methionine
- Ornithine
- Taurine

Be sure that patients are properly digesting their protein with betaine HCl and proteases



What If You Have Patients Who Need Support for Methylation?

- COMT
- MTHFR (C677T, A1298G)
- Use functional biomarkers to support whether there is a need
- Evaluate symptoms
- Note that there are many methylation-related SNPs

- 
- **Genetic variants of MTHFR**
 - **Genetic variants of COMT**
 - **High intake of heavy metals**
 - **Hormone imbalance**



Methylation/MTHFR & COMT: Dietary Strategies

- High intake of folate-rich green vegetables
- Mediterranean diet may help to lower Hcy
- Ensure adequate intake of vitamins B2, B6, B12, and 5-MTHF, but not supraphysiological levels
- Betaine can help regenerate methionine from Hcy
- Avoid excessive coffee intake
- Avoid high alcohol intake

Exp Mol Med. 2004 Apr 30;36(2):116-21. Am J Clin Nutr. 2004 Oct;80(4):849-54. Proc Natl Acad Sci U S A. 2001 Dec 18;98(26):14853-8. Epub 2001 Dec 11. Arterioscler Thromb Vasc Biol. 1998 Mar;18(3):356-61. Arterioscler Thromb Vasc Biol. 1997 Jun;17(6):1157-62. Altern Med Rev. 1998 Jun;3(3):208-20. Am J Clin Nutr. 2002 Feb;75(2):275-82. Am J Clin Nutr. 2003 Mar;77(3):658-62. JIMD Rep. 2016 Feb 23. [Epub ahead of print] Altern Med Rev. 1998 Jun;3(3):208-20. Stroke. 2003 Jul;34(7):1628-33. Epub 2003 May 29. Atherosclerosis. 2004 Jun;174(2):315-22. Cancer Epidemiol Biomarkers Prev. 2003 Oct;12(10):970-9. Cancer Epidemiol Biomarkers Prev. 2003 Nov;12(11 Pt 1):1222-6.



What If You Have Patients Who Need Support for Glutathione Conjugation (GSTs)?

- Function is to add a glutathione group to a biotransformed metabolite
- Can be induced through ARE and XRE
- GST SNPs
- Check GGT activity

Patients with liver damage, alcohol abuse, oxidative stress



What If You Have Patients Who Need Support for Glutathione Conjugation (GSTs)?

Nutrient Inducers:

- Cruciferous vegetables, 5-10 servings/day
- Allium vegetables (chives, leeks, garlic, onion)
- Resveratrol
- Citrus
- Garlic oil
- Fish oil
- Anthocyanin extract from purple sweet potato
- Curcumin
- Green tea (4 cups/day)
- Rooibos tea
- Honeybush tea
- Ellagic acid
- Carnosic acid
- Ghee
- Genistein

Patients with liver damage, alcohol abuse, oxidative stress



What If You Have Patients Who Need Support for Glutathione Conjugation (GSTs)?

Nutrient Inhibitors:

- **Apiaceous vegetables (dill, celery, parsley, parsnips, carrots)**
- **Quercetin**
- **Genistein**

Patients with liver damage, alcohol abuse, oxidative stress



What If You Have Patients Who Need Support for Glucuronidation (UGTs)?

When to be thinking about it:

- 40-70% of all medications subject to glucuronidation
- UGTs metabolize phytochemicals
- Lack of proper bile flow
- Dysbiosis: look for elevated levels of beta-glucuronidase

Patients taking medications, lack of proper bile flow, dysbiosis, hormone imbalance



What If You Have Patients Who Need Support for Glucuronidation (UGTs)?

Nutrient Inducers

- **Cruciferous vegetables, 5-10 servings/day**
- **Resveratrol (only in those with low activity)**
- **Citrus fruits (1/2 serving or more/day for a specific SNP 1A1*28)**
- Dandelion tea
- Rooibos tea
- Honeybush tea
- Rosemary extract
- Soy extract
- Ellagic acid
- Ferulic acid
- Curcumin
- Astaxanthin
- D-glucaric acid

Patients taking medications, lack of proper bile flow, dysbiosis



D-Glucaric Acid Content in Plant Foods

Food	Amount (g/kg)
Grapefruit	3.60
Apple (Macintosh)	3.45
Alfalfa sprouts	3.45
Broccoli	3.40
Apple (Granny Smith)	3.36
Adzuki bean sprouts	2.78
Brussels sprouts	2.67
Apple (Red Delicious)	2.26
Tomato	2.09
Cauliflower	1.79
Mung bean sprouts	1.46



What Do You Do with Food/Nutrients If Your Patient Has Irregular Elimination of Toxins?



Ensure Proper Elimination and Gut Health

- Adequate fiber – 30 to 50 grams daily
- Adequate water
- Fermented foods
- Whole, plant-based foods
- Probiotics



Certain Probiotics Help to Eliminate Toxins

“Consumption of probiotic yogurt had a protective effect against further increases in mercury and arsenic blood levels in the pregnant women...

Elevated blood lead was associated with increases in Succinivibrionaceae and Gammaproteobacteria relative abundance levels in stool.”



Prevent Resorption of Estrogen With Fiber

“Serum oestrone sulphate fell with wheat bran (mean intake 19.8 g day⁻¹) and with senna;”

“In conclusion, speeding up intestinal transit can lower serum oestrogen concentrations.”

- Water intake essential
- Vitamin C and Mg can also reduce constipation



How Can I Use Nutrition to Support Patients Exposed to Heavy Metals?



Dietary Sources of Heavy Metal Chelators

- Fibers, notably insoluble fibers rather than soluble fibers
- Modified citrus pectin
- Chlorella
- Sulfur-containing foods like garlic
- Cilantro (mixed results)
- Coriander
- Green tea EGCG
- Quercetin
- Turmeric/curcumin
- Matcha
- Green vegetables/chlorophyll

Sears ME. Chelation: harnessing and enhancing heavy metal detoxification--a review. *ScientificWorldJournal*. 2013 Apr 18;2013:219840. Chung RT. Detoxification effects of phytonutrients against environmental toxicants and sharing of clinical experience on practical applications. *Environ Sci Pollut Res Int*. 2015 Aug 28. Morita et al. *Fukuoka Igaku Zasshi*. 1997 May;88(5):162-8. Morita et al. *Fukuoka Igaku Zasshi*. 1999 May;90(5):171-83.



High-Sulfur Diet Helps to Reduce Damage from Toxic Metals

- “Given that toxic metals have great affinity for sulphur-containing peptides, diets rich in sulphur-containing foods such as alliums (e.g. garlic) and brassicas (e.g., broccoli) have been suggested for effects on glutathione, with hopes for symptomatic improvement and enhanced excretion.
- Garlic prevented cadmium-induced kidney damage and decreased the oxidative damage due to lead in rats.”



Fiber Binds Metals:

Aim for a Variety

- Mainly *in vitro* studies: alginic acid ↑ Pb; pectin, agar, and carrageenan ↑ Cd
- Wheat bran binds Hg, Cd, Pb
- Encourage variety to prevent intolerance
- Aim for 35 grams in daily diet
- Use supplement if needed
- Ensure water intake





A Detox Dietary Oil: Sesame Oil for Heavy Metal Toxicity

- “Sesame oil (a natural edible oil) and sesamol (an active antioxidant) are potently beneficial for treating lead- and iron-induced hepatic and renal toxicity and have no adverse effects.”
- “...sesame oil is a potent inhibitor of proinflammatory mediators, and it attenuates lead-induced hepatic damage by inhibiting nitric oxide, tumor necrosis factor- α , and interleukin-1 β levels.”



Spirulina for Heavy Metal Detox

Spirulina has beneficially counteracted toxic effects from exposure to arsenic, cadmium, carbon tetrachloride, deltamethrin, fluoride, hexachlorocyclohexane, iron, lead, lindane, and mercury

“Spirulina could be a useful coadjuvant agent within clinical practice for treatment of these or other pollutants poisonings.”



“Riceabetes”

Postgrad Med. 2015;127(8):781-2.



“Riceabetes”

- “A high intake of rice is associated with a high incidence and prevalence of diabetes
- While this may be partially due to the high glycemic index carbohydrate content, it may also be due to a high arsenic level found in rice
- Arsenic increases insulin resistance and decreases beta-cell function through oxidative stress, high cytokine levels, activation of NF-kappa B and increased amyloid formation in the pancreatic beta cells.”



Folic Acid to Lower Blood Arsenic: A Randomized Controlled Trial

- We conducted a clinical trial in which 622 participants were randomized to receive 400 μg FA, 800 μg FA, 3 g creatine, 3 g creatine+400 μg FA, or placebo daily
- In this mixed folate-deficient/replete study population, 12- and 24-week treatment with 800 μg (but not 400 μg) FA lowered bAs to a greater extent than placebo; this was sustained 12 weeks after FA cessation



Curcumin as a Heavy Metal Binder

- Rat study, brain section analyzed for metals
- 30 mg/kg curcumin
- “These results imply that curcumin could be used therapeutically to chelate these toxic metals, thus potentially reducing their neurotoxicity and tissue damage.”





Toxins in Spices and Herbs

- “A total of 300 samples representing six condiments (black pepper, basil, oregano, nutmeg, paprika, and thyme) were analysed for 11 mycotoxins, 134 pesticides, and 4 heavy metals
- Mycotoxins were detected in 4%, 10%, and 30% of all nutmeg, basil, and thyme samples, respectively
- The residues of 24 pesticides were detected in 59% of the analysed condiments. The maximum residue levels of pesticides were exceeded in 10% of oregano and 46% of thyme samples.”





Cilantro Soup for Mercury Detox:

Female Dentist with Chronic Fatigue

- 54 yo female dentist with elevated Hg in hair and chronic fatigue
- Reports minimal fish consumption
- Contamination through occupational exposure
- Patient recommended to consume coriander soup, 50 g of washed and fresh coriander (cilantro) in boiling water for 15 min for at least 3 times per week
- Instead, she ate raw as salad
- After 6 months, retest for Hg, and no improvement
- Began consuming cooked in form of soup
- Retest at 12 months showed an 86% reduction in Hg



Sweating Reduces Metal Burden

Replenish with Mineral-Rich Foods

- Blood, urine, and sweat were collected from 20 individuals (10 healthy participants and 10 participants with various health problems) and analyzed for approximately 120 various compounds, including toxic elements
- Many toxic elements appeared to be preferentially excreted through sweat
- Induced sweating appears to be a potential method for elimination of many toxic elements from the human body

Sweating Leads to Excretion of Metals

Metals which were released more extensively in sweat compared with urine



Cd
Ni
Pb
Bi
Mn
Al
Co
Cr
U
Hg
Zn
Cu



Upregulation of Heavy Metal Excretion through Minerals

- Metallothionein as a cysteine-rich protein that sequesters metals and minerals
- In absence of heavy metals, primary role is to transport Zn and Cu
- Known to efficiently bind several toxic metals (particularly Cd and Hg) and act as transporter of toxic metals to the liver or kidneys for conjugation and excretion
- Prevents reaction of toxic metals with other biomolecules, thus attenuating their toxicity
- Inducible



Zinc Supplementation for Increasing Metallothionein

- 15 mg of Zn per day to human subjects
- “...increased MT mRNA abundance by up to 2-fold in RNA from leukocyte subsets”



How Can I use Nutrition to Support Patients Exposed to Persistent Pollutants?



Look to Dietary History

- Do you see more conventional rather than organic produce?
- Has the patient recently lost weight or yo-yo dieted throughout their lives?
- Look for these foods:
 - Non-organic butter (high in DDE, HCB)
 - Farmed Atlantic salmon and some lake-caught fish (DDE, dieldrin, HCB, mirex)
 - Non-organic greens, e.g., spinach, collards (DDE)
 - Non-organic cheeses, e.g., cream cheese, cheddar, American (DDE, dieldrin, HCB)
 - Non-organic fatty meats, e.g., lamb, ground beef (DDE, HCB)



Higher POPs with Greater Weight Loss



Serum concentrations of most POPs were higher in those with long-term weight loss, whereas they were lower in those with long-term weight gain



Gastric Bypass-Increased Plasma Concentrations of EDCs

- Plasma organochlorine concentration increased with weight loss and was related to magnitude of weight loss
- After surgery, 388.2% increase after 1 year



Organic Meat Isn't Free of POPs

- 76 samples of meat (beef, chicken, lamb)
- Organic and conventional
- 33 carcinogenic POPs assessed

“As expected, no sample was completely free of carcinogenic contaminants, and the differences between organically and conventionally produced meats were minimal.”



Reducing Pesticides of Fruits

- Washing with tap water, boiling, and sun drying reduced pesticides
- Peeling and juicing reduced pesticide residues only slightly
- Oven drying led to an increase in pesticides



Don't Forget Spirulina

Spirulina has beneficially counteracted toxic effects from exposure to arsenic, cadmium, **carbon tetrachloride, deltamethrin, fluoride, hexachlorocyclohexane, iron, lead, lindane, and mercury**

“Spirulina could be a useful coadjuvant agent within clinical practice for treatment of these or other pollutants poisonings.”



Vitamin C for POP Decreases

- 15 healthy women
- 2 months of vitamin C supplementation (1000 mg/day)
- Statistically significant decreases in 6 PCBs and 2 OCPs

“...vitamin C intervention may have important public health implications in protecting health by reducing body burdens of POPs.”



Chlorella Decreases Dioxin in Breast Milk: *Ensure a Safe Detox*

- Dioxin high in breast milk
- Measured dioxin levels in breast milk and maternal blood from 35 pregnant women in Japan
- 18 of the 35 took chlorella supplements during pregnancy
- “Toxic equivalents were significantly lower in the breast milk of women taking chlorella tablets than in the control group.”
- May increase IgA levels in breast milk



Rice Bran Fiber Binds Polychlorinated Compounds and Carcinogens

- Binding of rice bran fiber to PCBs, PCDFs, and PCDDs was greater than other dietary fibers, including corn, wheat bran, spinach, Hijiki, sweet potatoes, and burdock fibers
- Binding appears to be related to the lignin contents
- RBF capable of binding even conjugates containing mutagens such as glucuronides and sulfates, as well as metabolites in urine
- Suggested in Japan for those who suffered food poisoning due to rice oil contamination

Organic Honey Reverses Pesticide-Induced Genotoxicity

“In the present study, we evaluated the extracts from four organic honey varieties (acacia, chestnut, orange tree, woodland) for their polyphenol composition, antioxidant effects and effect on toxicity induced by pesticides. Even though the four honey extracts had different antioxidant activity, reflecting the different polyphenol content and profile, they showed comparable effect on cell genotoxicity induced by pesticide exposure.”





Chlorella Detoxes HCAs

- Chlorella supplement for 2 weeks to 6 women
- Reduced levels of certain heterocyclic amine metabolites





How Can I Use Nutrition to Support Patients Exposed to Plastics?



Going Plastic-Free Leads to Quick Drops in Body Plasticizers

- An organic, fresh (no cans or plastic) food diet dropped BPA levels by 66% and phthalate (DEHP) metabolites by 53-56% within 3 days



Don't Drink Out of Cans

- N= 60
- 3 study site visits:
 - 2 glass bottles
 - 2 cans
 - 1 glass bottle, 1 can
- Urinary BPA concentration, blood pressure, and HRV was measured 2 hours after the consumption of each beverage
- The urinary BPA concentration increased after consuming canned beverages by >1600% compared with that after consuming glass bottled beverages
- SBP increased by ≈ 4.5 mm Hg after consuming 2 canned beverages compared with that after consuming 2 glass bottled beverages, and the difference was statistically significant



Where to Start with a Basic Nutrition Protocol for Most Patients?



Basic Clinical Steps for Detox

- | | |
|-------------|---------------------------------------------------------------------|
| IDENTIFY | 1. Identify and remove the source of contamination |
| PROTECT | 2. Protect against toxicant damage |
| ELIMINATE | 3. Support proper elimination routes
(gut, kidneys, skin, lungs) |
| SUPPORT | 4. Enhance liver detox pathways |
| RE-EVALUATE | 5. Re-evaluate symptoms and labs |



What Is the Difference between Detox and an Elimination Diet?

- Start with food first
- Remove the offending toxic agents through an elimination diet
- Add in nourishing foods to assist the detox pathways





Remove From Diet

- Processed foods
- Highly refined sugars and fats
- Energy drinks, soft drinks, reduce caffeinated drinks
- Overly cooked, browned or fried foods
- Plastic and cans
- Potential allergens and intolerances



Add to Diet

- High quality protein throughout the day
- Colorful phytonutrients – eat the rainbow
- Cruciferous vegetables
- Spices



Detox Eating According to the Body Rhythms

- Smoothie
- Raw lunch
- Cooked dinner





Food Preparation Guidelines

- You can make a food toxic through cooking
- Use proper cookware
- Slow, low, and moist methods of cooking preferred to dry heat methods
- Combination of raw and lightly steamed
- Use water instead of oil
- Fermentation



Watch For Scuffed Pans



Avoid Plastic in All Forms

“Diisobutyl phthalate and dibutyl phthalate were found in the samples of spices and roasted chicken meat. The highest concentrations of plasticisers were found in the spices used to cook the chicken meat.”





Food or beverage

- Allium vegetables
- Apiaceous vegetables
- Black raspberry
- Black tea
- Blueberry
- Chamomile tea
- Chicory root
- Citrus
- Coffee
- Cruciferous vegetables
- Dandelion tea
- Garlic
- Ghee
- Ginger
- Grapefruit
- Green tea
- Honeybush tea
- Peppermint tea
- Pomegranate
- Purple sweet potato
- Rooibos tea
- Rosemary
- Soybean/black soybean
- Turmeric

Nutrient Bioactives

- Astaxanthin
- Caffeic acid
- Catechins
- Chrysin
- Curcumin
- Daidzein
- Ellagic acid
- Ferulic acid
- Fish oil
- Genistein
- Luteolin
- Lycopene
- MCTs
- Myricetin
- N-Acetylcysteine
- Naringenin
- Resveratrol
- Retinoic acid

Top Plant Foods for Detox and Their Bioactives



WHOLE DETOX RAINBOW FOOD TRACKER



INSTRUCTIONS: Each day during Whole Detox, try to eat the full spectrum of colors in your meals. To track your colors, check the box to indicate that you've eaten a certain color that day. Use the notes section to track specific foods, how they made you feel, or your thoughts about this colorful experience!

DAY	RED	ORANGE	YELLOW	GREEN	AQUAMARINE	BLUE-PURPLE	WHITE	NOTES
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								

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For More Complex Patients, Consider Supplementation

What about Supplements in the Absence of Dietary Change?





When It's Patient-Appropriate:

- Patients who are not dietary compliant
- Need demonstrated relief of symptoms





Toxins in Natural Health Products and Pharmaceutical Preparations

“Toxic element contamination was found in many supplements and pharmaceuticals...Some NHPs demonstrated contamination levels above preferred daily endpoints for mercury, cadmium, lead, arsenic or aluminum. NHPs manufactured in China generally had higher levels of mercury and aluminum.”



Case Study

Dietary Supplement Powder Intervention

- 68 yo Caucasian male, urban dweller
- HTN, arrhythmia, amalgams
- No dietary change
- 54% reduction in MDQ after 1 week introduction of dietary supplement powder
- Reported some sinus congestion, frequent urination
- 4.4# weight loss at Day 14
- BP steady, no change
- Two amalgams loosened while taking product



What I Have Found Detoxes to Do for Patients

- Remove the cloud of brain fog
- Get rid of pain
- Heal the gut
- Help them figure out which foods they should be eating
- Stop making them sick all the time
- Give them energy
- Clear up their skin
- Help them reduce their medications
- Help them regulate their emotions
- Reduce stress
- Help them reduce inflammation
- Help them recover from illnesses



*One simple change is
full of great, big, huge
potential.*

– Deanna Minich





WHOLE DETOX

Results from Large Online Whole Detox Program Using Elimination Diet, Whole Foods (No Supplements) + Lifestyle

- N=2,902
- N=682 total pre- and post-survey responses



WHOLE DETOX

Whole Detox: Summary of Percent Change MSQ

Summary of Findings

Of 2902 participants in the Detox Challenge, 682 completed both the pre- and post-survey. Those in the survey sample reported an average Medical Symptoms Questionnaire (MSQ) score improvement of 30.2 points. The highest reported change in MSQ score was 130 points improvement in symptoms, while the lowest reported change in MSQ score was -51 points worsening of symptoms.

Of all the category/function areas on the MSQ, emotions saw the highest average percent improvement over the course of the Detox Challenge, followed by Energy and Weight.

Statistical Measures for Change in MSQ Score:

Mean (average) - 30
Median (middle value in a list of numbers) - 28
Mode (the value that occurs most often) - 26

# Participants in Survey Sam..	% of Total Detox Challenge Participan..	Avg. Change in MSQ Score	Max. Change in MSQ Score	Min. Change in MSQ Score
682	24%	30.2	130	-51

Average Percent Change in MSQ Score by Category/Function

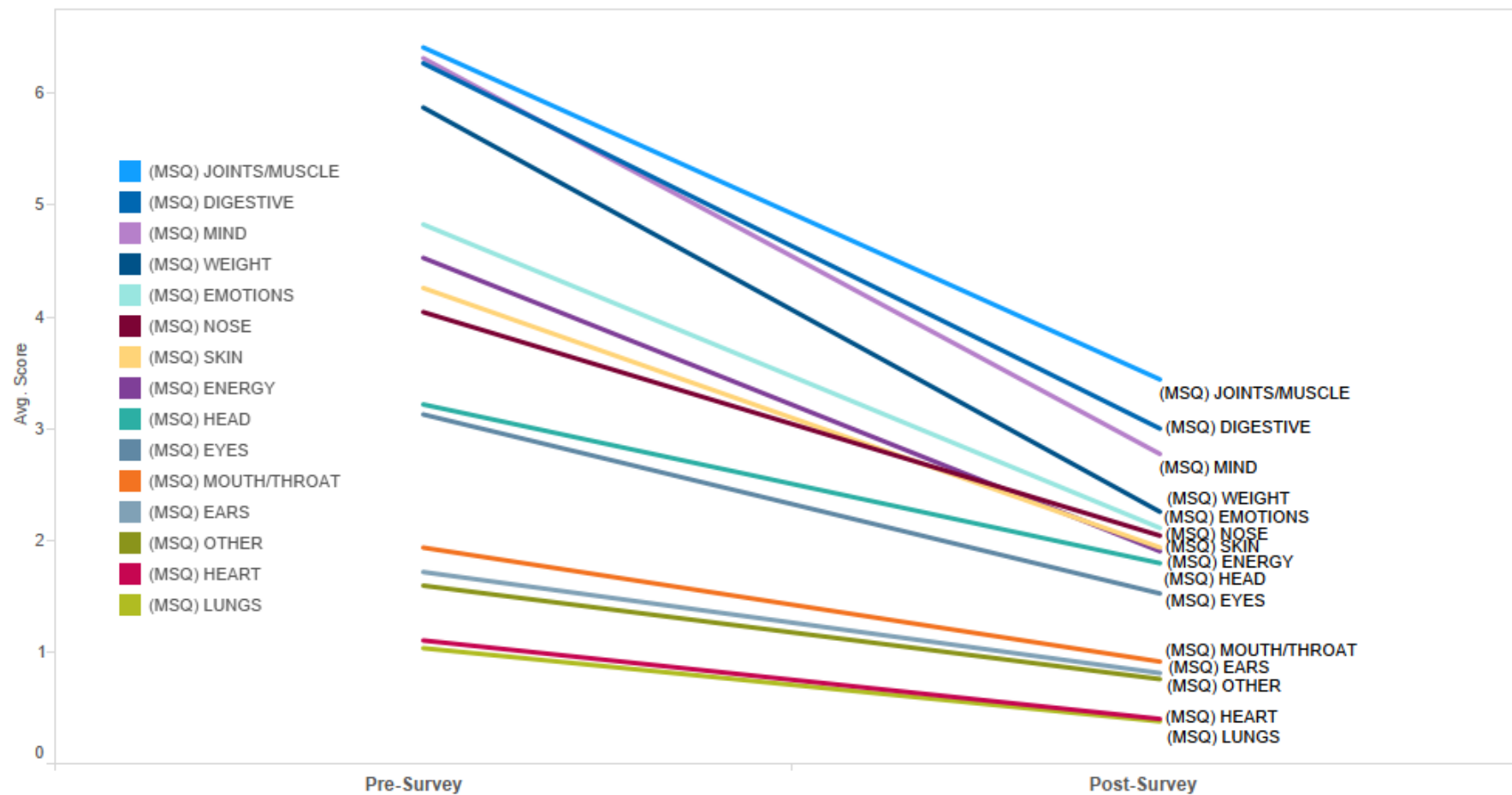
EMOTIONS - ▲ MSQ Score	17.0%
ENERGY ▲ MSQ Score	16.4%
WEIGHT ▲ MSQ Score	15.1%
JOINTS/MUSCLE ▲ MSQ Score	14.9%
DIGESTIVE ▲ MSQ Score	11.68%
SKIN ▲ MSQ Score	11.6%
MIND ▲ MSQ Score	11.1%
EYES ▲ MSQ Score	10.0%
NOSE ▲ MSQ Score	10.0%
HEAD ▲ MSQ Score	8.9%
OTHER ▲ MSQ Score	7.0%
HEART ▲ MSQ Score	5.9%
EARS ▲ MSQ Score	5.65%
MOUTH/THROAT ▲ MSQ Score	5.1%
LUNGS ▲ MSQ Score	4.1%



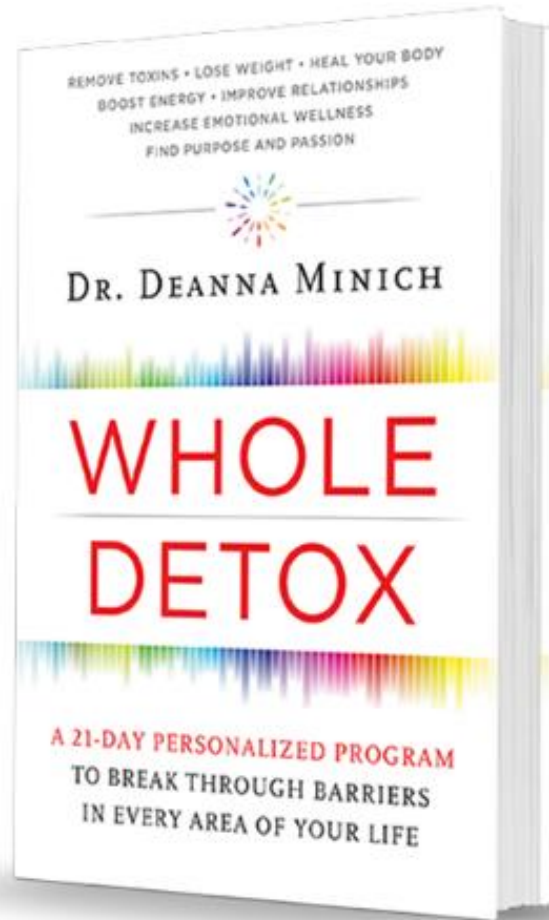
WHOLE DETOX

Whole Detox: MSQ Changes

Pre-Post Survey Change in Average Score* By Symptom



*Please note that total possible scores differ across symptom categories. Please refer to the survey questions document to see which choices were offered in each symptom category.



WHOLE DETOX™

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Michael Chapman



Presenter:
Deanna Minich, PhD,
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Questions?



Additional Questions?

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- Review a profile that has already been completed on one of your patients

We look forward to hearing from you!



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Diet and Lifestyle Strategies for Detoxification SNPs

Deanna Minich, PhD



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