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ROOT is a nutritional supplement company whose mission is to support and increase global wellness.

You can start with any of the products depending on your needs. Most people begin with our flagship detoxification product Clean Slate and progress to the Trinity Pack (Clean Slate, Zero-In, and Restore) and, in addition, add the ReLive Greens and Natural Barrier Support.

As you know, everyone is unique and has different requirements to maintain their health. The products are designed to work as a stand-alone or synergistically and can be tailor-made to your specific needs. They can be taken any time of the day, on an empty stomach or with food. It is important to listen to your body to decide what works best for you.

We do not give any medical advice or make any claims. You should always check with your health professional before starting any supplementation. We suggest taking the products 2-4 hours before or after prescribed medication and other supplements.

Remember: When taking Clean Slate, drink plenty of water to keep yourself hydrated.

Medical Disclaimer

The information provided is for educational purposes only and is not intended as medical advice or a substitute for the medical advice of a physician or other qualified health care professionals. This information is not to be used for self-diagnosis. Always consult your doctor for medical advice or information about diagnosis and treatment.

Statements have not been evaluated by the Food and Drug Administration (FDA). These products are not intended to diagnose, treat, cure, or prevent any disease. ROOT is a company founded on improving people's understanding of how toxins and chemicals can harm your health. Instead of focusing on symptoms, ROOT targets the underlying root cause with natural wellness.



Foundational Products



Clean Slate Ingredients

Ingredients in Clean Slate: Bioavailable silica (orthosilicic acid) vitamin C, and trace minerals.



Clean Slate: What is it?

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- Clinoptilolite acts as a molecular sieve designed explicitly for heavy metals, for example, mercury, lead, arsenic, viral particles, and others such as glyphosate, agent orange, and depleted uranium.
 - As Clean Slates passes through the body, it binds to toxins, heavy metals, allergens, viral and bacterial particles, and other harmful substances. The cage-like structure of Clean Slate allows for passive elimination from the body through urine.
 - Clean Slate is a proprietary formulation utilizing multiple patent-pending technologies and trade secrets of bioavailable silica, vitamin C, and trace minerals. The utilization of these processes and techniques assists the formula to be more efficacious.



How to take Clean Slate

- Take orally or in a glass of water.
- Start slow with 1-2 single drops twice daily for the first couple of days.
- Increase to 3-4 drops twice daily, building up to the recommended dosage of 10 single drops twice daily.
- Reduce the dosage if detoxification becomes uncomfortable.

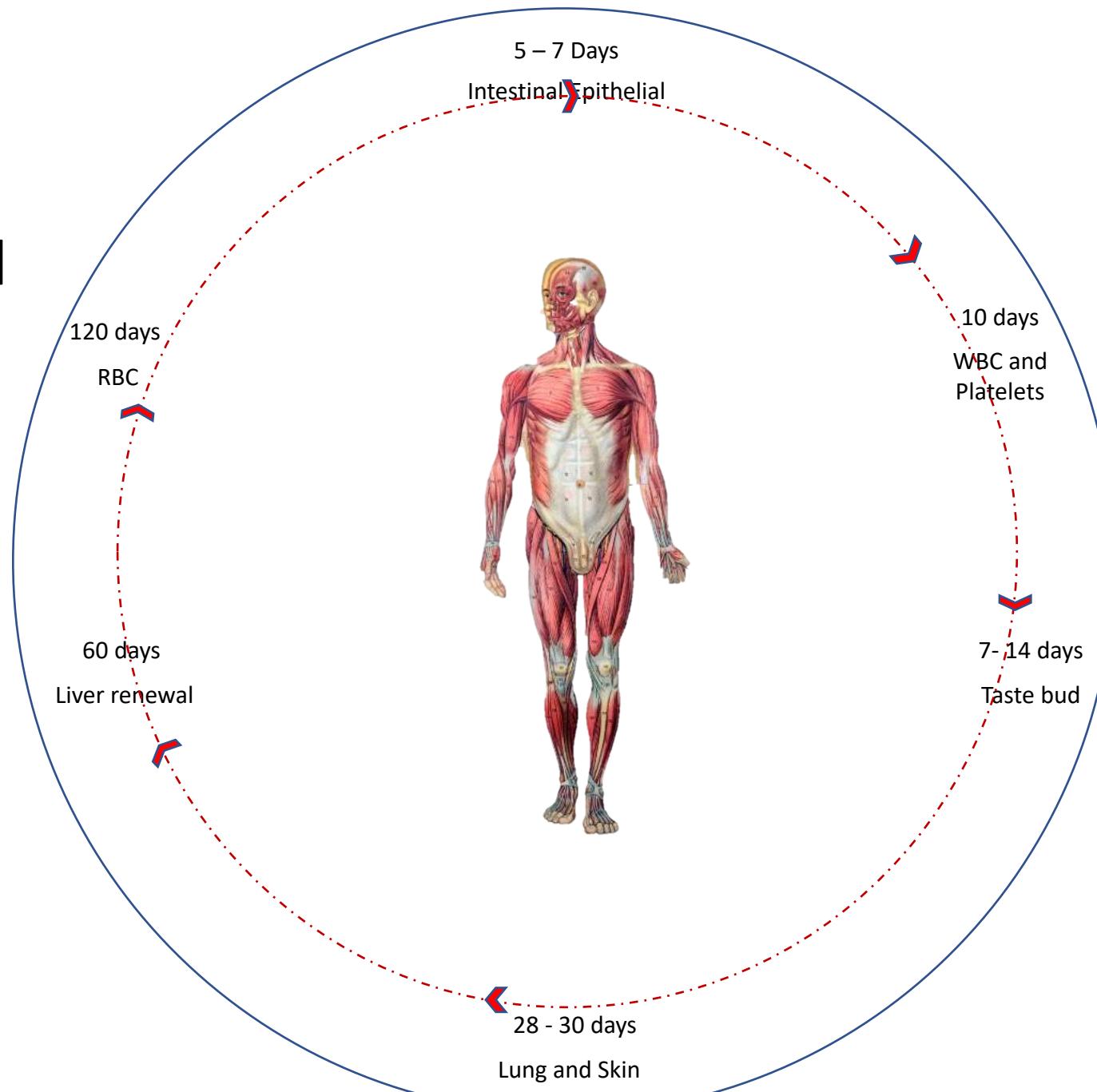
Don't Rush the Process .
Good Things Take Time

What to Expect

- Improved sleep
- Bowel regulations
- Energy
- Clear mind
- Better concentration
- Weight regulation
- Reduced cravings
- Passive Detoxification
- Clear and glowing skin
- Reduced body odor
- Increased hair and nail growth
- Increased collagen production
- Reduced body fat
- Reduced inflammation



120 Days for Cellular Renewal



Air Pollution

- Bleed air
- Disinsection
- Heavy metals
- Chemicals
- carbon monoxide
- lead
- nitrogen oxides
- ground-level ozone
- particle pollution
- sulphur oxides
- Emissions from factories, cars, planes
- Second-hand smoke
- Wildfires
- Smog
- Asbestos
- Benzene
- Creosote
- PAHs
- Petroleum Hydrocarbons

EMFs

- Cell phone
- Power lines
- Electrical appliances
- Smart meters
- Smart homes
- Radiation in medical procedures
- ElectroSmog
- Microwave radiation
- WIFI
- Bluetooth
- ↑ Cellular Damage
- ↑ ROS Damage
- ↑ Amalgam Microleakage
- Pineal gland and Melatonin
- Affects the brain
- Fertility
- Childhood leukaemia
- Glioblastoma

Heavy Metals

Mercury - Cadmium - Lead - Arsenic - Gadolinium - Aluminum - Strontium - Iron - Chromium - Thallium - Cobalt

Skeletal system

- Osteoarthritis
- Dental Fluorosis
- Skeletal fluorosis and fractures
- Glyphosate
- Vitamin D
- Stem Cells
- Fluoride

Integumentary System

- Collagen
- Derma
- Nails
- Cartilage
- Bone
- Connective Tissue
- Tattoo ink
- Heavy metals
- Psoriasis / Eczema

Autism Spectrum

- Transgenerational
- Premature
- Gestational Diabetes
- Vitamin D
- Neurotransmitters
- Vitamin A
- Pre-eclampsia
- Glyphosate
- Cytochrome P450
- Vitamin D
- Fertility
- IVF
- Gut Dysbiosis
- ADHD

Neurotransmitters

- Melatonin
- Serotonin
- Dopamine

Pulmonary

- Asthma
- COPD
- Vaping
- Second-hand smoke
- Airborne toxins

Urinary System

- Kidney Disease
- Prostate
- Urine

Lymphatic System

- Nf-kB activity
- Gut homeostasis
- Interstitial fluid
- Dietary lipids

Neurodegenerative

- Alzheimer's
- Parkinson
- Dementia

Eye Health

- Glaucoma
- AMD

Cardiovascular

- Blood pressure
- Stokes
- Dyslipidemia
- Heart Rate Variability
- Diabetes
- Metabolic Syndrome
- Sleep apnea
- Kidney disease

Digestive System

- Liver
- Vitamin D
- Gut Microbiota

Oxidant-antioxidant system

- Reactive Oxygen Species
- Antioxidant
- Vitamin A
- Vitamin D

Metabolic Dysfunction

- Obesity
- Metabolic Syndrome
- Non-Fatty Liver
- Hearing loss
- Tinnitus

+/-



Endocrine

- Diabetes
- Gestational Diabetes
- Thyroid
- Hypothalamus
- Pineal gland
- Sleep
- SAD
- Ovary
- Testis

Reproductive System

- Fertility
- IVF
- Menopause
- Andropause

Autoimmune

- Chronic Fatigue/ME
- Psoriasis / Eczema
- Fibromyalgia
- Lupus
- Vitiligo
- Hemolytic anemia
- Celiac disease /IBD
- Type 1 Diabetes
- Thyroid disease
- Guillain-Barre syndrome
- Rheumatoid
- Liver and Autoimmunity
- Multiple Sclerosis
- Vitamin D
- Arthritis

Glyphosate

- DNA damage
- Epigenetics
- Fertility
- Gut Microbiota
- Cancer
- Neurological
- Cardiovascular
- Autism
- Air, Food, Soil, Water
- Skeletal System
- ↓Liver detoxification
- ↓ cytochrome P450 (CYP)
- ↓downregulate enzymes

Fluoride

- Neurotransmitters
- Dementia
- Damage to the hippocampus
- Thyroid damage
- Collagen
- Osteoporosis
- Brain damage, and lowered IQ
- Damage to the purkinje cells
- Stem Cells in Deciduous teeth
- Impaired thyroid function
- DNA damage and cell death
- Fertility
- Muscle disorders
- Dental Fluorosis
- Skeletal fluorosis and fractures
- Formation of beta-amyloid plaques
- Bone Cancer
- Prostate cancer
- ↑ uptake of aluminium
- ↓ nicotinic acetylcholine receptors
- ↑heavy metal absorption
- ↑fluoride in the pineal gland
- Kidney damage
- DNA damage and cell death
- Arthritis
- Inhibits antibody production



Energy & Focus

- Takes you to your happy place
- Turmeric, pine bark, velvet bean seed, and vitamin D.





Ingredients in Zero-In

N-acetyl L-tyrosine, anhydrous caffeine, L-theanine, velvet bean seed, pine bark, curcumin, and vitamin D.



Zero-In- What is it?

An all-natural nootropic (as we like to call it) blend of five adaptogens and two catalysts. Zero-In triggers the gut to produce dopamine and serotonin neurotransmitters. Increased dopamine has been associated with improved mood, razer sharp focus, concentration, mental clarity, and cool, calm, and collected. Zero-In uses a proprietary formula that includes multiple patent-pending technologies and trade secrets. Zero-In utilizes various processes and techniques to enhance the formulation's efficacy.



How to take Zero-In

- Take 1 capsule in the morning (preferably on an empty stomach).
- You can take up to 4 capsules in a day. If a reduced dose is required, open the capsule and take as needed.
- If you have problems swallowing capsules, add to food, yogurt, smoothies or any liquids
- Some people find that taking two in the morning helps them throughout the day
- One pill can provide benefits for up to 5 hours



CERTIFIED DRUG FREE®
CERTIFIED QUALITY™
CERTIFIED GMP™
CERTIFIED CBD™

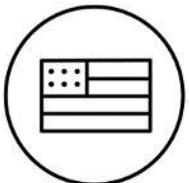
BANNED SUBSTANCES CONTROL GROUP



BSCG CERTIFIED DRUG FREE SEALS



BSCG CERTIFIED GMP SEALS



Made in the USA



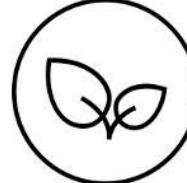
Cruelty Free



Soy Free



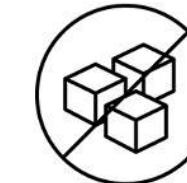
Keto



Vegan



Plant-Based



Sugar Free



Gluten Free



KOSHER



Halal

Restore

- QNET Delivery System
- Key Ingredients
- Bioscience Engineering,
Nanotechnology,
Manufacturing Process
- Cellular communication
- Virus, Bacteria, Fungus,
Parasites, Gut Health





Ingredients in Restore

Black seed oil, resveratrol, turmeric, raspberry ketone, apple cider vinegar, aloe vera, and d-ribose



Restore- What is it?

The ingredients in Restore are targeted to assist the body and its natural ability to support the immune system, gut health, healthy blood pressure, and bone health. In addition, Restore has anti-inflammatory and antioxidant properties. Restore aims to support the body, improve focus, and assist its overall innate immune system to do what it does best.

Further, the ingredients in Restore are designed to assist the gastrointestinal tract in promoting appropriate function. Restore uses a proprietary formula that includes multiple patent-pending technologies and trade secrets. Restore utilizes various processes and techniques to enhance its effectiveness.



How to take Restore

Restore is packaged in 15 sachets, a month's supply taken orally every other day or take half a sachet every day.

You could start with one-fourth of a sachet and build up to a whole sachet. Restore is not a meal replacement; it is a supplement. Heat exposure and direct sunlight can damage Restore.

Restore is best taken in the morning because it improves focus and increases energy.

Everyone is unique and has different requirements to maintain their health. It is important to listen to your body to decide what works best for you. Some people take up to 3 or 4 sachets a day because of how great it makes them feel.

- Take in the morning or evening with or without food
- Refrigerate for a nice chilled treat
- Add to smoothies or yogurt



Resveratrol/*Polygonum cuspidatum*
Protects the brain
Eases joint pain



Synergy of Restore

Metabolic System & Weight

Antiaging & Integumentary System

Bone & Cartilage

Reproductive System

Collagen

Stem Cells & Telomeres

Five Sensory Systems

Neurological System

Gut Health and Immune System

Cardiovascular & Respiratory System

Natural Barrier Support

154g



Adults
Store in a cool, dry place.

Supplement Facts

Vitamin C
Zinc sulfate
Vitamin D3
(Product of USA)

Daily value
not established.

Ingredients

Adults: Take 1.5g (1/3 tsp.) a day.
Store in a cool-dry place.

Supplement Facts

Serving Size: 1.5g (1/3tsp.) Servings per Container: 100

	Amount Per Serving	% DV
Vitamin C	1500mg	115 %
Zinc sulfate	40mg	363 %
Vitamin D3 (Product of USA)	125mcg	16 %

Daily value (DV) not established.

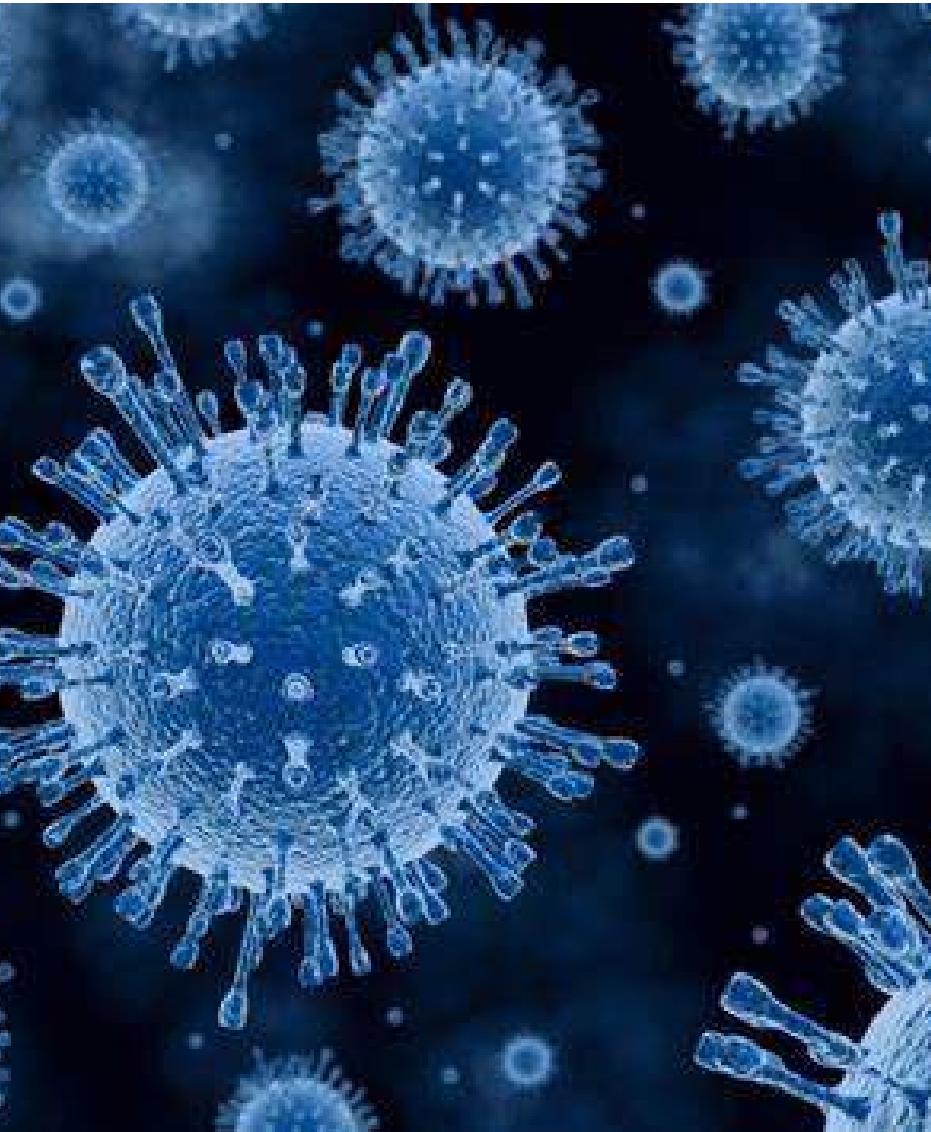
Ingredients: Vitamin C, Zinc sulfate, Vitamin D3

BANH1110112021 Best before 12/2023

NATURAL BARRIER SUPPORT

- Zinc, Vitamin D3, and Vitamin C are combined in ROOT's Natural Barrier Support to work as a blockade against infections, inflammatory diseases, and boost the immune system.





Zinc for the Common Cold

By [Meenu Singh](#) and [Rashmi R Da](#)

- In this assessment, zinc was evaluated to determine its potential in reducing the incidence, severity, and duration of common cold symptoms:
 - It was found that intake of zinc was associated with a significant reduction in the duration. After 7 days of treatment, participants that were symptomatic was significantly smaller than those of the controls.



Extra Dose of Vitamin C Based on a Daily Supplementation Shortens the Common Cold: A Meta-Analysis of 9 Randomized Controlled Trials

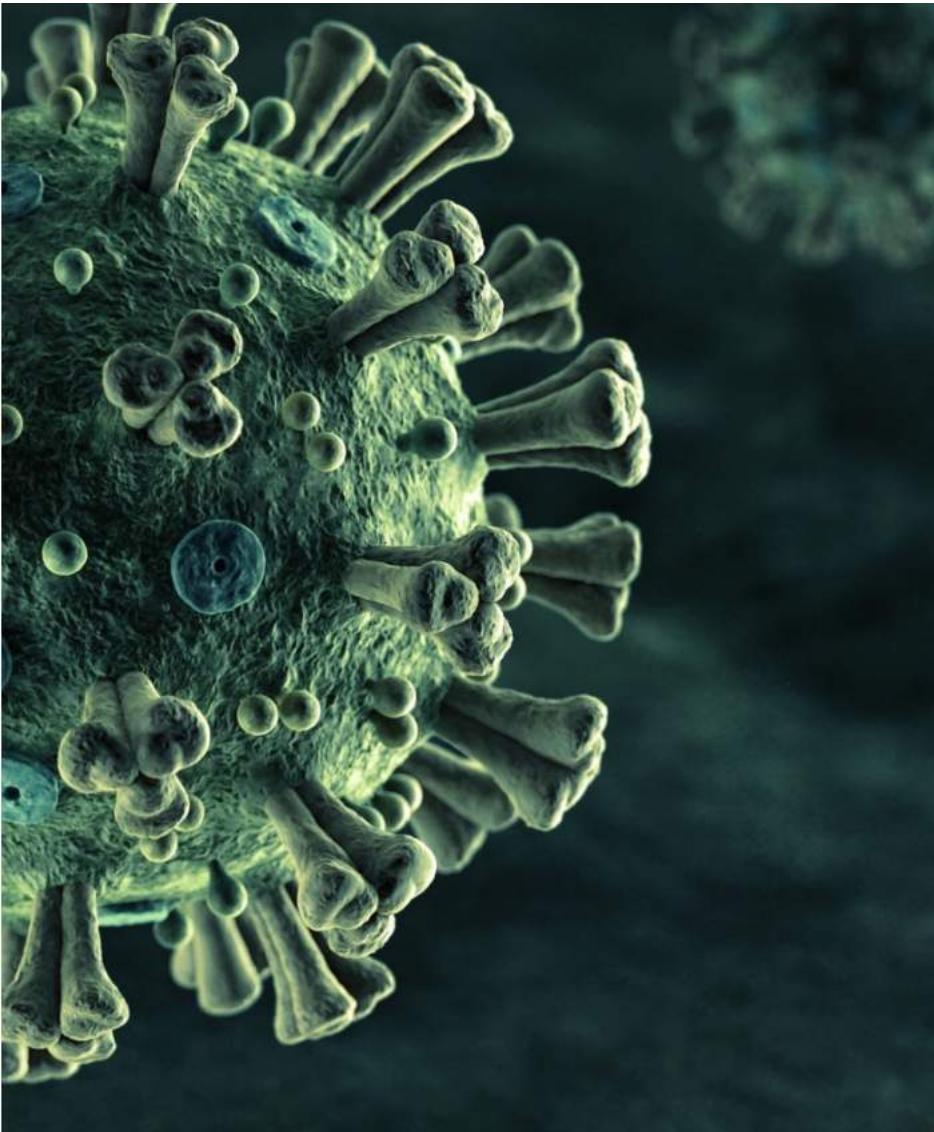
By Li Ran, Wenli Zhao, Jingxia Wang, Hongwu Wang, Ye Zhao, Yiider Tseng, and Huaien Bu

- In the evaluation of vitamin C, administration of extra therapeutic doses at the onset of cold despite routine supplementation was found to help reduce its duration, shorten the time of confinement indoors, and relieve the symptoms associated with it, including chest pain, fever, and chills.
- More than 1 g/day of vitamin C shortened the duration of colds in adults by 8% and in children by 18%

VITAMIN D3

- Vitamin D is a fat-soluble vitamin your body produces naturally when it's directly exposed to sunlight, certain foods, or supplements. Vitamin D3 has been shown to be more efficient than D2.
 - Regulate mood and reduce depression
 - Reduce the risk of multiple sclerosis
 - Decrease chance of developing heart disease
 - Prevent infections and decrease severity of illnesses
 - Support weight loss
 - Provide proper growth and development of bones and teeth





Evidence that Vitamin D Supplementation Could Reduce Risk of Influenza and COVID-19 Infections and Deaths

By William B. Grant, Henry Lahore, Sharon L. McDonnell, Carole A. Baggerly, Christine B. French, Jennifer L. Aliano, and Harjit P. Bhattoa

- To reduce the risk of infection, it is recommended that people at risk of influenza and/or COVID-19 consider taking 10,000 IU/d of vitamin D₃ for a few weeks to rapidly raise 25(OH)D concentrations, followed by 5000 IU/d.
- Administering vitamin D reduces the expression of pro-inflammatory cytokines and increases the expression of anti-inflammatory cytokines by macrophages
- D₃ suppresses responses mediated by the T helper cell type 1 (Th1), by primarily repressing production of inflammatory cytokines IL-2 and interferon gamma (INF γ)
- Ecological studies suggest that raising 25(OH)D concentrations through vitamin D supplementation in winter would reduce the risk of developing influenza.



Vitamin D and Depression: Where is all the Sunshine?

By Sue Penckofer, PhD, RN, Joanne Kouba, PhD, RD, Mary Byrn, BSN, RN, and Carol Estwing Ferrans, PhD, RN, FAAN

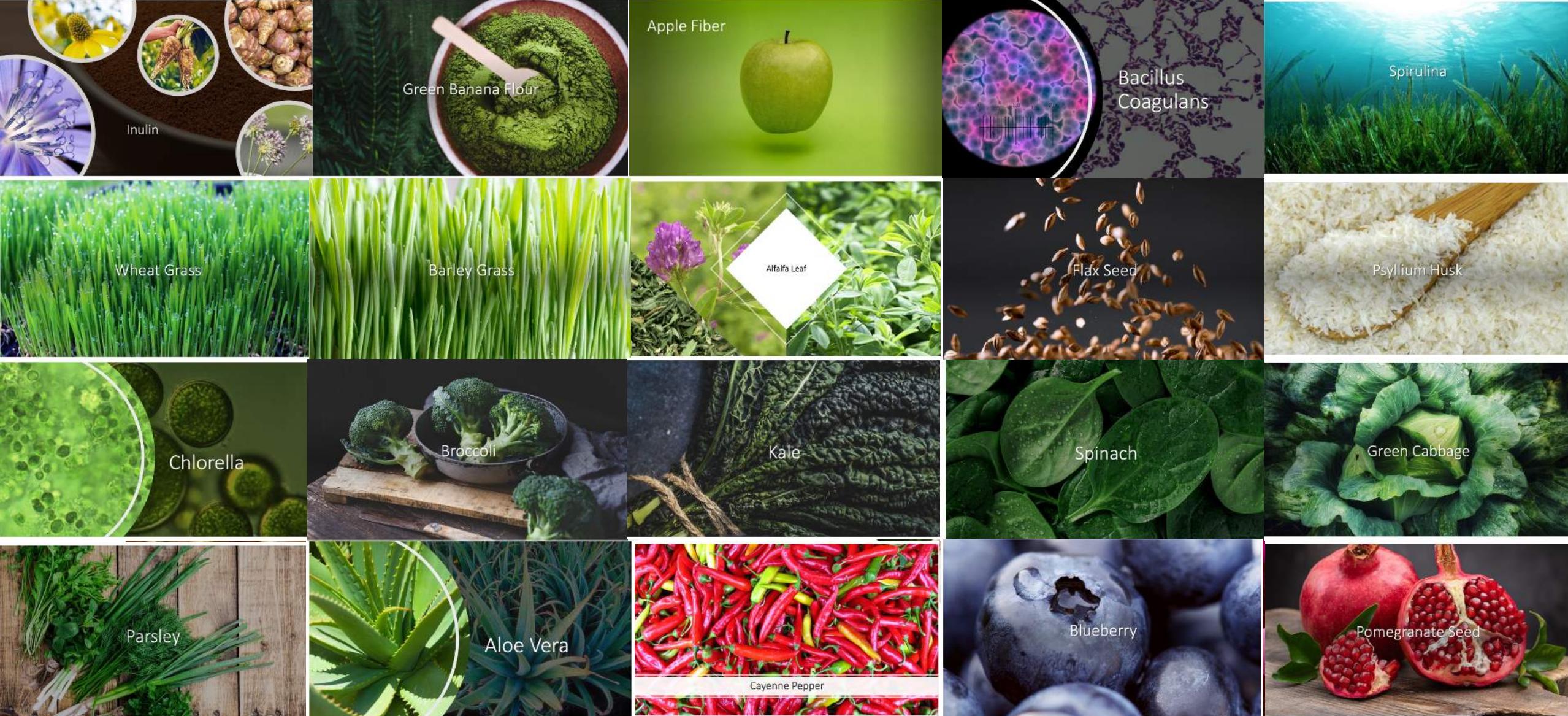
- In a cross sectional study of 80 older adults (40 mild Alzheimer and 40 nondemented), aged 60 to 92, more than half (58%) were noted to have vitamin D levels that were abnormally low. In addition, vitamin D deficiency was associated with the presence of an active mood disorder as assessed by the depressive symptoms inventory.
- In a prospective birth cohort that studied the intake of vitamin D supplements in the first year of life, it was noted that an intake of 2,000 IU or more per day was associated with a reduced risk of developing schizophrenia (RR = 0.23, CI = .06–.95) for males.



RELIVE GREENS

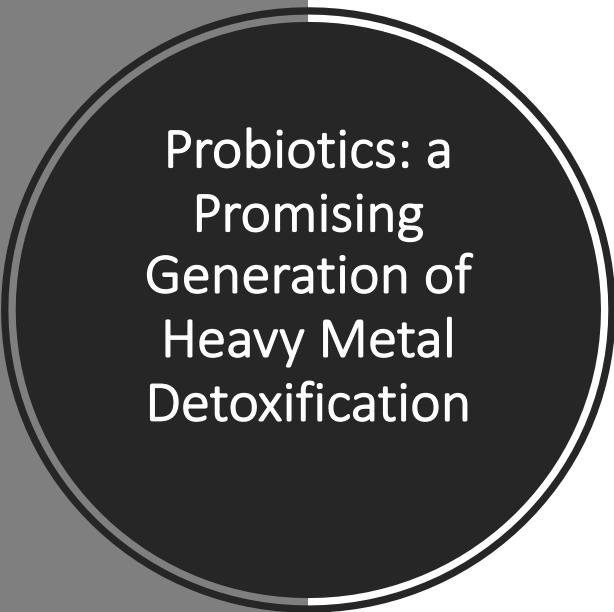
- Inulin
- Green Banana Flour
- Apple Fiber
- Bacillus Coagulans
- Spirulina
- Wheat Grass
- Barley Grass
- Alfalfa Leaf
- Flax Seed
- Psyllium Husk
- Chlorella
- Broccoli
- Kale
- Spinach
- Green Cabbage
- Parsley
- Aloe Vera
- Cayenne Pepper
- Blueberry
- Pomegranate Seed
- MCT Coconut Oil





MCT Coconut
Oil





Probiotics: a Promising Generation of Heavy Metal Detoxification

Abstract

Different environmental toxins especially heavy metals exist in soil, water, and air recording toxic effect on human, animal, and plant. These toxicant elements are widespread in environment causing various disturbances in biological systems. Numerous strategies have been applied recently to alleviate heavy metal contamination; however, most of these strategies were costly and seemed unfriendly to our environment. Probiotics are living cell bacteria with beneficial characteristics for human health. *Lactobacillus* and *Bifidobacterium* are the major probiotic groups; however, *Pediococcus*, *Lactococcus*, *Bacillus*, and yeasts are recorded as probiotic. The vital role of the probiotics on maintenance of body health was previously investigated. Probiotics were previously recorded to its powerful capacity to bind numerous targets and eliminate them with feces. These targets may be aluminum, cadmium, lead, or arsenic. The current review discusses the history of probiotics, detoxification role of probiotics caused by heavy metals, and mechanism of their action that modulate different signaling pathway disturbance associated with heavy metal accumulation in biological system.

Keywords: *Bifidobacterium*; Heavy metals; *Lactobacillus*; Probiotics.

- 1. Ackermann W, Coenen M, Schrödl W, Shehata AA, Krüger M. The influence of glyphosate on the microbiota and production of botulinum neurotoxin during ruminal fermentation. *Curr Microbiol.* Mar 2015;70(3):374-82. doi:10.1007/s00284-014-0732-3
- 2. Aitbali Y, Ba-M'hamed S, Elhidar N, Nafis A, Soraa N, Bennis M. Glyphosate based- herbicide exposure affects gut microbiota, anxiety and depression-like behaviors in mice. *Neurotoxicol Teratol.* 2018 May - Jun 2018;67:44-49. doi:10.1016/j.ntt.2018.04.002
- 3. Blot N, Veillat L, Rouzé R, Delatte H. Glyphosate, but not its metabolite AMPA, alters the honeybee gut microbiota. *PLoS One.* 2019;14(4):e0215466. doi:10.1371/journal.pone.0215466
- 4. Duke SO, Lydon J, Koskinen WC, Moorman TB, Chaney RL, Hammerschmidt R. Glyphosate effects on plant mineral nutrition, crop rhizosphere microbiota, and plant disease in glyphosate-resistant crops. *J Agric Food Chem.* Oct 2012;60(42):10375-97. doi:10.1021/jf302436u
- 5. Iori S, Rovere GD, Ezzat L, et al. The effects of glyphosate and AMPA on the mediterranean mussel *Mytilus galloprovincialis* and its microbiota. *Environ Res.* 03 2020;182:108984. doi:10.1016/j.envres.2019.108984
- 6. Krause JL, Haange SB, Schäpe SS, et al. The glyphosate formulation Roundup® LB plus influences the global metabolome of pig gut microbiota in vitro. *Sci Total Environ.* Jul 2020;745:140932. doi:10.1016/j.scitotenv.2020.140932
- 7. Mesnage R, Teixeira , Antoniou MN, et al. Shotgun metagenomics and metabolomics reveal glyphosate alters the gut microbiome of Sprague-Dawley rats by inhibiting the shikimate pathway. *BioRxiv.* Dec 2019. doi: <https://doi.org/10.1101/870105>
- 8. Motta EVS, Mak M, De Jong TK, et al. Oral or Topical Exposure to Glyphosate in Herbicide Formulation Impacts the Gut Microbiota and Survival Rates of Honey Bees. *Appl Environ Microbiol.* Sep 2020;86(18)doi:10.1128/AEM.01150-20
- 9. Motta EVS, Moran NA. Impact of Glyphosate on the Honey Bee Gut Microbiota: Effects of Intensity, Duration, and Timing of Exposure. *mSystems.* Jul 2020;5(4)doi:10.1128/mSystems.00268-20
- 10. Motta EVS, Raymann K, Moran NA. Glyphosate perturbs the gut microbiota of honey bees. *Proc Natl Acad Sci U S A.* 10 2018;115(41):10305-10310. doi:10.1073/pnas.1803880115
- 11. Peillex C, Pelletier M. The impact and toxicity of glyphosate and glyphosate-based herbicides on health and immunity. *J Immunotoxicol.* Dec 2020;17(1):163-174. doi:10.1080/1547691X.2020.1804492
- 12. Rueda-Ruzaña L, Cruz F, Roman P, Cardona D. Gut microbiota and neurological effects of glyphosate. *Neurotoxicology.* 12 2019;75:1-8. doi:10.1016/j.neuro.2019.08.006
- 13. Shehata AA, Schrödl W, Aldin AA, Hafez HM, Krüger M. The effect of glyphosate on potential pathogens and beneficial members of poultry microbiota in vitro. *Curr Microbiol.* Apr 2013;66(4):350-8. doi:10.1007/s00284-012-0277-2
- 14. Song Y, Song X, Wu M, et al. The protective effects of melatonin on survival, immune response, digestive enzymes activities and intestinal microbiota diversity in Chinese mitten crab (*Eriocheir sinensis*) exposed to glyphosate. *Comp Biochem Physiol C Toxicol Pharmacol.* Aug 2020;238:108845. doi:10.1016/j.cbpc.2020.108845
- 15. Tofío Rivera AP, Carbono Murgas RE, Melo Ríos AE, Merini LJ. [Effect of glyphosate on microbiota, soil quality and biofortified bean crop in Codazzi, department of Cesar, Colombia]. *Rev Argent Microbiol.* 2020 Jan - Mar 2020;52(1):61-71. doi:10.1016/j.ram.2019.01.006
- 16. Yang X, Song Y, Zhang C, et al. Effects of the glyphosate-based herbicide roundup on the survival, immune response, digestive activities and gut microbiota of the Chinese mitten crab, *Eriocheir sinensis*. *Aquat Toxicol.* Sep 2019;214:105243. doi:10.1016/j.aquatox.2019.105243

Psoriasis

- Afridi, H. I., Kazi, T. G., Kazi, N., Kandhro, G. A., Baig, J. A., Shah, A. Q., Khan, S., Kolachi, N. F., Wadhwa, S. K., Shah, F., Jamali, M. K., & Arain, M. B. (2011). Evaluation of cadmium, chromium, nickel, and zinc in biological samples of psoriasis patients living in Pakistani cement factory area. *Biol Trace Elem Res*, 142(3), 284-301. <https://doi.org/10.1007/s12011-010-8778-y>
- Cutrín Gómez, E., Anguiano Igea, S., Delgado-Charro, M. B., Gómez Amoza, J. L., & Otero Espinar, F. J. (2018). Microstructural alterations in the onychomycotic and psoriatic nail: Relevance in drug delivery. *Eur J Pharm Biopharm*, 128, 48-56. <https://doi.org/10.1016/j.ejpb.2018.04.012>
- Guo, T., Cheng, X. L., Li, H., Li, J. Y., Qiao, S. F., Nie, Z. H., Zhang, J. L., & Zhang, L. T. (2019). [A case of posoriasis aggraration and acute kidney injury caused mercury preparation]. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi*, 37(3), 228-229. <https://doi.org/10.3760/cma.j.issn.1001-9391.2019.03.017>
- Leppert, B., Havdahl, A., Riglin, L., Jones, H. J., Zheng, J., Davey Smith, G., Tilling, K., Thapar, A., Reichborn-Kjennerud, T., & Stergiakouli, E. (2019). Association of Maternal Neurodevelopmental Risk Alleles With Early-Life Exposures. *JAMA Psychiatry*, 76(8), 834-842. <https://doi.org/10.1001/jamapsychiatry.2019.0774>
- Liaw, F. Y., Chen, W. L., Kao, T. W., Chang, Y. W., & Huang, C. F. (2017). Exploring the link between cadmium and psoriasis in a nationally representative sample. *Sci Rep*, 7(1), 1723. <https://doi.org/10.1038/s41598-017-01827-9>
- Samejo, S., Kazi, A. G., Afridi, H. I., & Kazi, T. G. (2019). Evaluate the effect of cadmium on levels of zinc in scalp hair and blood samples of smoker and nonsmoker psoriatic patients at different stage. *Environ Sci Pollut Res Int*, 26(31), 31763-31769. <https://doi.org/10.1007/s11356-019-06226-3>
- Wacewicz-Muczyńska, M., Socha, K., Soroczyńska, J., Niczyporuk, M., & Borawska, M. H. (2020). Cadmium, lead and mercury in the blood of psoriatic and vitiligo patients and their possible associations with dietary habits. *Sci Total Environ*, 757, 143967. <https://doi.org/10.1016/j.scitotenv.2020.143967>

- 1. Alarcón R, Rivera OE, Ingaramo PI, et al. Neonatal exposure to a glyphosate-based herbicide alters the uterine differentiation of prepubertal ewe lambs. *Environ Pollut.* Oct 2020;265(Pt B):114874. doi:10.1016/j.envpol.2020.114874
- 2. Anifandis G, Amiridis G, Dafopoulos K, et al. The In Vitro Impact of the Herbicide Roundup on Human Sperm Motility and Sperm Mitochondria. *Toxics.* Dec 2017;6(1)doi:10.3390/toxics6010002
- 3. Anifandis G, Katsanaki K, Lagodonti G, et al. The Effect of Glyphosate on Human Sperm Motility and Sperm DNA Fragmentation. *Int J Environ Res Public Health.* 05 2018;15(6)doi:10.3390/ijerph15061117
- 4. Cai W, Ji Y, Song X, et al. Effects of glyphosate exposure on sperm concentration in rodents: A systematic review and meta-analysis. *Environ Toxicol Pharmacol.* Oct 2017;55:148-155. doi:10.1016/j.etap.2017.07.015
- 5. Canosa IS, Zanitti M, Lonné N, Medesani DA, López Greco LS, Rodríguez EM. Imbalances in the male reproductive function of the estuarine crab *Neohelice granulata*, caused by glyphosate. *Ecotoxicol Environ Saf.* Oct 2019;182:109405. doi:10.1016/j.ecoenv.2019.109405
- 6. Dai P, Hu P, Tang J, Li Y, Li C. Effect of glyphosate on reproductive organs in male rat. *Acta Histochem.* Jun 2016;118(5):519-26. doi:10.1016/j.acthis.2016.05.009
- 7. de Liz Oliveira Cavalli VL, Cattani D, Heinz Rieg CE, et al. Roundup disrupts male reproductive functions by triggering calcium-mediated cell death in rat testis and Sertoli cells. *Free Radic Biol Med.* Dec 2013;65:335-346. doi:10.1016/j.freeradbiomed.2013.06.043
- 8. Gonçalves BB, Nascimento NF, Santos MP, Bertolini RM, Yasui GS, Giaquinto PC. Low concentrations of glyphosate-based herbicide cause complete loss of sperm motility of yellowtail tetra fish *Astyanax lacustris*. *J Fish Biol.* Apr 2018;92(4):1218-1224. doi:10.1111/jfb.13571
- 9. Guerrero Schimpf M, Milesi MM, Ingaramo PI, Luque EH, Varayoud J. Neonatal exposure to a glyphosate based herbicide alters the development of the rat uterus. *Toxicology.* Feb 2017;376:2-14. doi:10.1016/j.tox.2016.06.004
- 10. Ingaramo PI, Guerrero Schimpf M, Milesi MM, Luque EH, Varayoud J. Acute uterine effects and long-term reproductive alterations in postnatally exposed female rats to a mixture of commercial formulations of endosulfan and glyphosate. *Food Chem Toxicol.* Dec 2019;134:110832. doi:10.1016/j.fct.2019.110832
- 11. Ingaramo P, Alarcón R, Muñoz-de-Toro M, Luque EH. Are glyphosate and glyphosate-based herbicides endocrine disruptors that alter female fertility? *Mol Cell Endocrinol.* Jul 2020;110934. doi:10.1016/j.mce.2020.110934
- Pathologies and Sperm Epimutations: Generational Toxicology. *Sci Rep.* 04 2019;9(1):6372. doi:10.1038/s41598-019-42860-0
- 13. Nerozzi C, Recuero S, Galeati G, Bucci D, Spinaci M, Yeste M. Effects of Roundup and its main component, glyphosate, upon mammalian sperm function and survival. *Sci Rep.* Jul 2020;10(1):11026. doi:10.1038/s41598-020-67538-w
- 14. Nerozzi C, Recuero S, Galeati G, Bucci D, Spinaci M, Yeste M. Effects of Roundup and its main component, glyphosate, upon mammalian sperm function and survival. *Sci Rep.* Jul 2020;10(1):11026. doi:10.1038/s41598-020-67538-w
- 15. Owagboriaye FO, Dedeke GA, Ademolu KO, Olujimi OO, Ashidi JS, Adeyinka AA. Reproductive toxicity of Roundup herbicide exposure in male albino rat. *Exp Toxicol Pathol.* Sep 2017;69(7):461-468. doi:10.1016/j.etp.2017.04.007
- 16. Reno U, Gutierrez MF, Regaldo L, Gagneten AM. The impact of Eskoba, a glyphosate formulation, on the freshwater plankton community. *Water Environ Res.* Dec 2014;86(12):2294-300. doi:10.2175/106143014x13896437493580
- 17. Sanin LH, Carrasquilla G, Solomon KR, Cole DC, Marshall EJ. Regional differences in time to pregnancy among fertile women from five Colombian regions with different use of glyphosate. *J Toxicol Environ Health A.* 2009;72(15-16):949-60. doi:10.1080/15287390902929691
- 18. Shi Z, Zou S, Lu C, et al. Evaluation of the effects of feeding glyphosate-tolerant soybeans (CP4 EPSPS) on the testis of male Sprague-Dawley rats. *GM Crops Food.* 2019;10(3):181-190. doi:10.1080/21645698.2019.1649565
- 19. Teleken JL, Gomes ECZ, Marmentini C, et al. Glyphosate-based herbicide exposure during pregnancy and lactation malprograms the male reproductive morphofunction in F1 offspring. *J Dev Orig Health Dis.* 04 2020;11(2):146-153. doi:10.1017/S2040174419000382
- 20. Williams GM, Kroes R, Munro IC. Safety evaluation and risk assessment of the herbicide Roundup and its active ingredient, glyphosate, for humans. *Regul Toxicol Pharmacol.* Apr 2000;31(2 Pt 1):117-65. doi:10.1006/rtpb.1999.1371
- 21. Yahfoufi ZA, Bai D, Khan SN, et al. Glyphosate Induces Metaphase II Oocyte Deterioration and Embryo Damage by Zinc Depletion and Overproduction of Reactive Oxygen Species. *Toxicology.* 06 2020;439:152466. doi:10.1016/j.tox.2020.152466
- 22. Zebral YD, Lansini LR, Costa PG, Roza M, Bianchini A, Robaldo RB. A glyphosate-based herbicide reduces fertility, embryonic upper thermal tolerance and alters embryonic diapause of the threatened annual fish *Austrolebias nigrofasciatus*. *Chemosphere.* Apr 2018;196:260-269. doi:10.1016/j.chemosphere.2017.12.196

- 1. Agarwal S, Zaman T, Tuzcu EM, Kapadia SR. Heavy metals and cardiovascular disease: results from the National Health and Nutrition Examination Survey (NHANES) 1999-2006. *Angiology*. Jul 2011;62(5):422-9. doi:10.1177/000319710395562
- 2. Al Osman M, Yang F, Massey IY. Exposure routes and health effects of heavy metals on children. *Biometals*. 08 2019;32(4):563-573. doi:10.1007/s10534-019-00193-5
- 3. Alissa EM, Ferns GA. Heavy metal poisoning and cardiovascular disease. *J Toxicol*. 2011;2011:870125. doi:10.1155/2011/870125
- 4. Aranda N, Valls RM, Romeu M, et al. Consumption of seafood and its estimated heavy metals are associated with lipid profile and oxidative lipid damage on healthy adults from a Spanish Mediterranean area: A cross-sectional study. *Environ Res*. 07 2017;156:644-651. doi:10.1016/j.envres.2017.04.037
- 5. Ari E, Kaya Y, Demir H, Asicioglu E, Keskin S. The correlation of serum trace elements and heavy metals with carotid artery atherosclerosis in maintenance hemodialysis patients. *Biol Trace Elem Res*. Dec 2011;144(1-3):351-9. doi:10.1007/s12011-011-9103-0
- 6. Baek K, Chung I. Cadmium Exposure Is Associated with Monocyte Count and Monocyte to HDL Ratio, a Marker of Inflammation and Future Cardiovascular Disease in the Male Population. *J Korean Med Sci*. Sep 2017;32(9):1415-1422. doi:10.3346/jkms.2017.32.9.1415
- 7. Chowdhury R, Ramond A, O'Keeffe LM, et al. Environmental toxic metal contaminants and risk of cardiovascular disease: systematic review and meta-analysis. *BMJ*. Aug 2018;362:k3310. doi:10.1136/bmj.k3310
- 8. Glicklich D, Shin CT, Frishman WH. Heavy Metal Toxicity in Chronic Renal Failure and Cardiovascular Disease. Possible Role for Chelation Therapy. *Cardiol Rev*. Feb 2020;doi:10.1097/CRD.0000000000000304
- 9. Houston MC. The role of mercury and cadmium heavy metals in vascular disease, hypertension, coronary heart disease, and myocardial infarction. *Altern Ther Health Med*. 2007 Mar-Apr 2007;13(2):S128-33.
- 10. Houston MC. Role of mercury toxicity in hypertension, cardiovascular disease, and stroke. *J Clin Hypertens (Greenwich)*. Aug 2011;13(8):621-7. doi:10.1111/j.1751-7176.2011.00489.x
- 11. Kim DS, Lee EH, Yu SD, Cha JH, Ahn SC. [Heavy metal as risk factor of cardiovascular disease--an analysis of blood lead and urinary mercury]. *J Prev Med Public Health*. Nov 2005;38(4):401-7.
- 12. Lamas GA, Navas-Acien A, Mark DB, Lee KL. Heavy Metals, Cardiovascular Disease, and the Unexpected Benefits of Chelation Therapy. *J Am Coll Cardiol*. 05 2016;67(20):2411-2418. doi:10.1016/j.jacc.2016.02.066
- 13. Larsson SC, Wolk A. Urinary cadmium and mortality from all causes, cancer and cardiovascular disease in the general population: systematic review and meta-analysis of cohort studies. *Int J Epidemiol*. 06 2016;45(3):782-91. doi:10.1093/ije/dyv086
- 14. Lu F, Zhao F, Cai JY, Liu L, Shi XM. [Progress in research of relationship between heavy metal exposure and cardiovascular disease]. *Zhonghua Liu Xing Bing Xue Za Zhi*. Jan 2018;39(1):102-106. doi:10.3760/cma.j.issn.0254-6450.2018.01.022
- 15. Marzabadi MR, Jones CB. Heavy metals and lipofuscinogenesis. A study on myocardial cells cultured under varying oxidative stress. *Mech Ageing Dev*. Nov 1992;66(2):159-71. doi:10.1016/0047-6374(92)90133-x
- 16. Mitsiev AK. [Possibility of melatonin prevention of cardiovascular diseases caused by heavy metals in experiment]. *Med Tr Prom Ekol*. 2015;(5):39-43.

- 17. Mitsiev AK. [Role of activation of lipid peroxidation in the mechanisms of cardiovascular disease system under the action of heavy metals in the experiment]. *Patol Fiziol Eksp Ter.* 2015 Jan-Mar 2015;59(1):60-4.
- 18. Perry HM, Perry EF, Erlanger MW. Possible influence of heavy metals in cardiovascular disease: introduction and overview. *J Environ Pathol Toxicol.* Sep 1980;4(2-3):195-203.
- 19. Ramos-Treviño J, Bassol-Mayagoitia S, Ruiz-Flores P, et al. In Vitro Evaluation of Damage by Heavy Metals in Tight and Gap Junctions of Sertoli Cells. *DNA Cell Biol.* Oct 2017;36(10):829-836. doi:10.1089/dna.2017.3839
- 20. Rehman K, Fatima F, Waheed I, Akash MSH. Prevalence of exposure of heavy metals and their impact on health consequences. *J Cell Biochem.* 01 2018;119(1):157-184. doi:10.1002/jcb.26234
- 21. Reis AH. Towards a new understanding of the molecular mechanisms of cardiovascular disease. *Discov Med.* 10 2019;28(154):189-194.
- 22. Rosenman KD. Cardiovascular disease and environmental exposure. *Br J Ind Med.* May 1979;36(2):85-97. doi:10.1136/oem.36.2.85
- 23. Shiue I. Higher urinary heavy metal, arsenic, and phthalate concentrations in people with high blood pressure: US NHANES, 2009-2010. *Blood Press.* Dec 2014;23(6):363-9. doi:10.3109/08037051.2014.925228
- 24. Shiue I. Higher urinary heavy metal, phthalate, and arsenic but not parabens concentrations in people with high blood pressure, U.S. NHANES, 2011-2012. *Int J Environ Res Public Health.* Jun 2014;11(6):5989-99. doi:10.3390/ijerph110605989
- 25. Shiue I, Hristova K. Higher urinary heavy metal, phthalate and arsenic concentrations accounted for 3-19% of the population attributable risk for high blood pressure: US NHANES, 2009-2012. *Hypertens Res.* Dec 2014;37(12):1075-81. doi:10.1038/hr.2014.121
- 26. Vaintraub EA, Shraer DP, Ratgauz GL. [Resistance of the *Staphylococcus aureus* isolated from patients operated on for cardiovascular diseases to penicillins, cephalosporins and the salts of heavy metals, their lysogenicity and phagotype]. *Antibiotiki.* Jun 1975;20(6):526-9.
- 27. Virtanen JK, Rissanen TH, Voutilainen S, Tuomainen TP. Mercury as a risk factor for cardiovascular diseases. *J Nutr Biochem.* Feb 2007;18(2):75-85. doi:10.1016/j.jnutbio.2006.05.001
- 28. Wang X, Mukherjee B, Park SK. Does Information on Blood Heavy Metals Improve Cardiovascular Mortality Prediction? *J Am Heart Assoc.* Nov 2019;8(21):e013571. doi:10.1161/JAHA.119.013571
- 29. Wold LE, Ying Z, Hutchinson KR, et al. Cardiovascular remodeling in response to long-term exposure to fine particulate matter air pollution. *Circ Heart Fail.* Jul 2012;5(4):452-61. doi:10.1161/CIRCHEARTFAILURE.112.966580
- 30. Wang X, BM, aSKP. Does Information on Blood Heavy Metals Improve Cardiovascular Mortality Prediction? : Journal of the American Heart Association; 2017.
- 31. Zhang Y, Xu C, Fu Z, et al. Associations between total mercury and methyl mercury exposure and cardiovascular risk factors in US adolescents. *Environ Sci Pollut Res Int.* Mar 2018;25(7):6265-6272. doi:10.1007/s11356-017-0905-2
- 32. Zhu C, Wang B, Xiao L, et al. Mean platelet volume mediated the relationships between heavy metals exposure and atherosclerotic cardiovascular disease risk: A community-based study. *Eur J Prev Cardiol.* Feb 2019:2047487319830536. doi:10.1177/2047487319830536

- 1. Asgary S, Movahedian A, Keshvari M, Taleghani M, Sahebkar A, Sarrafzadegan N. Serum levels of lead, mercury and cadmium in relation to coronary artery disease in the elderly: A cross-sectional study. *Chemosphere*. Aug 2017;180:540-544. doi:10.1016/j.chemosphere.2017.03.069
- 2. Buhari O, Dayyab FM, Igbinoba O, Atanda A, Medhane F, Faillace RT. The association between heavy metal and serum cholesterol levels in the US population: National Health and Nutrition Examination Survey 2009-2012. *Hum Exp Toxicol*. Mar 2020;39(3):355-364. doi:10.1177/0960327119889654
- 3. Gallo L, Faniello MC, Canino G, et al. Serum Calcium Increase Correlates With Worsening of Lipid Profile: An Observational Study on a Large Cohort From South Italy. *Medicine (Baltimore)*. Feb 2016;95(8):e2774. doi:10.1097/MD.0000000000002774
- 4. Ledda C, Iavicoli I, Bracci M, et al. Serum lipid, lipoprotein and apolipoprotein profiles in workers exposed to low arsenic levels: Lipid profiles and occupational arsenic exposure. *Toxicol Lett*. Jan 2018;282:49-56. doi:10.1016/j.toxlet.2017.10.014
- 5. Zhang Y, Xu C, Fu Z, et al. Associations between total mercury and methyl mercury exposure and cardiovascular risk factors in US adolescents. *Environ Sci Pollut Res Int*. Mar 2018;25(7):6265-6272. doi:10.1007/s11356-017-0905-2

Increasing blood Pb, Hg, and Cd levels were associated with significantly increased odds of high total cholesterol after adjusting for age, sex, and socioeconomic status.

- 1. Heavy metals test heart's mettle. Mercury and lead may contribute to heart disease and hypertension. *Harv Heart Lett.* Jun 2003;13(10):6-7.
- 2. Asker S, Asker M, Yeltekin AC, et al. Serum levels of trace minerals and heavy metals in severe COPD patients with and without pulmonary hypertension. *Int J Chron Obstruct Pulmon Dis.* 2018;13:1803-1808. doi:10.2147/COPD.S164431
- 3. Bartunek J, Weinberg EO, Tajima M, et al. Chronic N(G)-nitro-L-arginine methyl ester-induced hypertension : novel molecular adaptation to systolic load in absence of hypertrophy. *Circulation.* Feb 2000;101(4):423-9. doi:10.1161/01.cir.101.4.423
- 4. Black HR. Nonpharmacologic therapy for hypertension in the elderly. *Geriatrics.* Oct 1989;44 Suppl B:20-9.
- 5. Borgman RF. Dietary factors in essential hypertension. *Prog Food Nutr Sci.* 1985;9(1-2):109-47.
- 6. Chisolm JC, Handorf CR. Zinc, cadmium, metallothionein, and progesterone: do they participate in the etiology of pregnancy induced hypertension? *Med Hypotheses.* Jul 1985;17(3):231-42. doi:10.1016/0306-9877(85)90128-8
- 7. Choi JW, Oh C, Shim SY, Jeong S, Kim HS, Kim MS. Reduction in Prevalence of Hypertension and Blood Heavy Metals among Curry-Consumed Korean. *Tohoku J Exp Med.* 03 2018;244(3):219-229. doi:10.1620/tjem.244.219
- 8. Davis MM, Jones DW. The role of lifestyle management in the overall treatment plan for prevention and management of hypertension. *Semin Nephrol.* Jan 2002;22(1):35-43.
- 9. Goch A. [Concentration of elements in plasma of patients with essential hypertension]. *Pol Arch Med Wewn.* Oct 2005;114(4):947-52.
- 10. Grossman E, Messerli FH. Secondary hypertension: interfering substances. *J Clin Hypertens (Greenwich).* Jul 2008;10(7):556-66. doi:10.1111/j.1751-7176.2008.07758.x
- 11. Houston MC. The role of mercury and cadmium heavy metals in vascular disease, hypertension, coronary heart disease, and myocardial infarction. *Altern Ther Health Med.* 2007 Mar-Apr 2007;13(2):S128-33.
- 12. Houston MC. The role of mercury and cadmium heavy metals in vascular disease, hypertension, coronary heart disease, and myocardial infarction. *Altern Ther Health Med.* 2007 Mar-Apr 2007;13(2):S128-33.
- 13. Houston MC. Role of mercury toxicity in hypertension, cardiovascular disease, and stroke. *J Clin Hypertens (Greenwich).* Aug 2011;13(8):621-7. doi:10.1111/j.1751-7176.2011.00489.x

- 14. Kim JW, Kim BG, Park JW, Yi JW, Kim JI, Hong YS. A study of relationship between blood mercury concentration and hypertension in residents living in old mine fields and related factors. *Ann Occup Environ Med.* 2019;31:e6. doi:10.35371/aoem.2019.31.e6
- 15. MERTENS HG. [On the pathogenesis of arterial hypertension in thallium poisoning; a contribution on the neurogenic origin of hypertension]. *Dtsch Z Nervenheilkd.* 1952;167(5):442-58.
- 16. Oliver-Williams C, Howard AG, Navas-Acien A, Howard BV, Tellez-Plaza M, Franceschini N. Cadmium body burden, hypertension, and changes in blood pressure over time: results from a prospective cohort study in American Indians. *J Am Soc Hypertens.* 06 2018;12(6):426-437.e9. doi:10.1016/j.jash.2018.03.002
- 17. Pedersen EB, Kornerup HJ, Larsen JS. Responsiveness of the renin-aldosterone system during exercise in young patients with essential hypertension. *Eur J Clin Invest.* Oct 1981;11(5):403-8. doi:10.1111/j.1365-2362.1981.tb02003.x
- 18. Perry HM, Perry EF, Erlanger MW. Possible influence of heavy metals in cardiovascular disease: introduction and overview. *J Environ Pathol Toxicol.* Sep 1980;4(2-3):195-203.
- 19. Perry IJ, Whincup PH, Shaper AG. Environmental factors in the development of essential hypertension. *Br Med Bull.* Apr 1994;50(2):246-59. doi:10.1093/oxfordjournals.bmb.a072890
- 20. Pfeiffer CC, Mailloux RJ. Hypertension: heavy metals, useful cations and melanin as a possible repository. *Med Hypotheses.* Jun 1988;26(2):125-30. doi:10.1016/0306-9877(88)90065-5
- 21. Poreba R, Gac P, Poreba M, et al. [Relationship between chronic exposure to lead, cadmium and manganese, blood pressure values and incidence of arterial hypertension]. *Med Pr.* 2010;61(1):5-14.
- 22. Thomas J, Neser WB, Semenza K, Green DR. Precursors of hypertension: a review. *J Natl Med Assoc.* Apr 1983;75(4):359-69.
- 23. Tomera JF, Lilford K, Kukulka SP, Friend KD, Harakal C. Divalent cations in hypertension with implications to heart disease: calcium, cadmium interactions. *Methods Find Exp Clin Pharmacol.* Mar 1994;16(2):97-107.
- 24. Torres AD, Rai AN, Hardiek ML. Mercury intoxication and arterial hypertension: report of two patients and review of the literature. *Pediatrics.* Mar 2000;105(3):E34. doi:10.1542/peds.105.3.e34
- 25. Wu W, Jiang S, Zhao Q, et al. Associations of environmental exposure to metals with the risk of hypertension in China. *Sci Total Environ.* May 2018;622-623:184-191. doi:10.1016/j.scitotenv.2017.11.343
- 26. Yang LE, Maunsbach AB, Leong PK, McDonough AA. Differential traffic of proximal tubule Na⁺ transporters during hypertension or PTH: NHE3 to base of microvilli vs. NaPi2 to endosomes. *Am J Physiol Renal Physiol.* Nov 2004;287(5):F896-906. doi:10.1152/ajprenal.00160.2004

- 1. Ananda Jayalal TB, Jayaruwan Bandara TWMA, Mahawithanage STC, Wansapala MAJ, Galappaththi SPL. A quantitative analysis of chronic exposure of selected heavy metals in a model diet in a CKD hotspot in Sri Lanka. *BMC Nephrol.* 06 2019;20(1):208. doi:10.1186/s12882-019-1371-5
- 2. Anupama YJ, Kiran SK, Hegde SN. Heavy Metals and Pesticides in Chronic Kidney Disease - Results from a Matched Case-Control Study from a Rural Population in Shivamogga District in South India. *Indian J Nephrol.* 2019 Nov-Dec 2019;29(6):402-409. doi:10.4103/ijn.IJN_325_18
- 3. Chávez-Gómez NL, Cabello-López A, Gopar-Nieto R, et al. [Chronic kidney disease in Mexico and its relation with heavy metals]. *Rev Med Inst Mex Seguro Soc.* 2017 Nov-Dec 2017;55(6):725-734.
- 4. Fernando TD, Jayawardena BM, Mathota Arachchige YLN. Variation of different metabolites and heavy metals in *Oryza sativa* L., related to chronic kidney disease of unknown etiology in Sri Lanka. *Chemosphere.* May 2020;247:125836. doi:10.1016/j.chemosphere.2020.125836
- 5. Franchini I, Alinovi R, Bergamaschi E, Mutti A. Contribution of studies on renal effects of heavy metals and selected organic compounds to our understanding of the progression of chronic nephropathies towards renal failure. *Acta Biomed.* 2005;76 Suppl 2:58-67.
- 6. Gruener N. Early detection of changes in kidney function in workers exposed to solvents and heavy metals. *Isr J Med Sci.* 1992 Aug-Sep 1992;28(8-9):605-7.
- 7. Houston MC. The role of mercury and cadmium heavy metals in vascular disease, hypertension, coronary heart disease, and myocardial infarction. *Altern Ther Health Med.* 2007 Mar-Apr 2007;13(2):S128-33.
- 8. Humudat YR, Al-Naseri SK. Heavy Metals in Dialysis Fluid and Blood Samples from Hemodialysis Patients in Dialysis Centers in Baghdad, Iraq. *J Health Pollut.* Sep 2020;10(27):200901. doi:10.5696/2156-9614-10.27.200901
- 9. Jayasumana C, Gunatilake S, Siribaddana S. Simultaneous exposure to multiple heavy metals and glyphosate may contribute to Sri Lankan agricultural nephropathy. *BMC Nephrol.* Jul 2015;16:103. doi:10.1186/s12882-015-0109-2
- 10. Mitsiev AK. [Change lipid peroxidation as a mechanism of renal disease under heavy metals]. *Patol Fiziol Eksp Ter.* 2015 Apr-Jun 2015;59(2):65-9.
- 11. Notarachille G, Arnesano F, Calò V, Meleleo D. Heavy metals toxicity: effect of cadmium ions on amyloid beta protein 1-42. Possible implications for Alzheimer's disease. *Biometals.* Apr 2014;27(2):371-88. doi:10.1007/s10534-014-9719-6
- 12. Raudenska M, Dvorakova V, Pacal L, et al. Levels of heavy metals and their binding protein metallothionein in type 2 diabetics with kidney disease. *J Biochem Mol Toxicol.* Jun 2017;31(6)doi:10.1002/jbt.21891
- 13. Sugawara A, Yokoyama H, Ohta M, Maeda T, Tanaka K, Fukushima T. The effect of heavy metals on nicotinamideN-methyltransferase activityin vitro relating to Parkinson's disease. *Environ Health Prev Med.* Jul 2005;10(4):180-3. doi:10.1007/BF02897708
- 14. Thomas LD, Hodgson S, Nieuwenhuijsen M, Jarup L. Early kidney damage in a population exposed to cadmium and other heavy metals. *Environ Health Perspect.* Feb 2009;117(2):181-4. doi:10.1289/ehp.11641
- 15. Wimalawansa SJ. The role of ions, heavy metals, fluoride, and agrochemicals: critical evaluation of potential aetiological factors of chronic kidney disease of multifactorial origin (CKDmfo/CKDu) and recommendations for its eradication. *Environ Geochem Health.* Jun 2016;38(3):639-78. doi:10.1007/s10653-015-9768-y
- 16. Wu W, Zhang K, Jiang S, et al. Association of co-exposure to heavy metals with renal function in a hypertensive population. *Environ Int.* 03 2018;112:198-206. doi:10.1016/j.envint.2017.12.023
- 17. Barbier O, Jacquotte G, Tauc M, Cougnon M, Poujeol P: Effect of Heavy Metals on, and Handling by, the Kidney. *Nephron Physiol* 2005;99:p105-p110. doi: 10.1159/000083981

- Shieue I. Urinary arsenic, pesticides, heavy metals, phthalates, polyaromatic hydrocarbons, and polyfluoroalkyl compounds are associated with sleep troubles in adults: USA NHANES, 2005-2006. *Environ Sci Pollut Res Int.* 2017;24(3):3108-3116. doi:10.1007/s11356-016-8054-6
- Asker, S., Asker, M., Yeltekin, A.C. *et al.* Serum levels of trace minerals and heavy metals in severe obstructive sleep apnea patients: correlates and clinical implications. *Sleep Breath* **19**, 547–552 (2015). <https://doi.org/10.1007/s11325-014-1045-2>
- Parmalee NL, Aschner M. Metals and Circadian Rhythms. *Adv Neurotoxicol.* 2017;1:119-130. doi:10.1016/bs.ant.2017.07.003

- 1. Argou-Cardozo I, Zeidán-Chuliá F. Clostridium Bacteria and Autism Spectrum Conditions: A Systematic Review and Hypothetical Contribution of Environmental Glyphosate Levels. *Med Sci (Basel)*. Apr 2018;6(2)doi:10.3390/medsci6020029
- 2. Fluegge Ba K. Zinc and Copper Metabolism and Risk of Autism: a reply to Sayehmiri et al. *Iran J Child Neurol*. 2017;11(3):66-69.
- 3. Fluegge K. Environmental factors in the development of autism spectrum disorders: A reply to Sealey et al. (2016). *Environ Int*. 12 2016;97:256-257. doi:10.1016/j.envint.2016.02.024
- 4. Gooautism epidemic initiated by acetaminophen (Tylenol) is aggravated by oral antibiotic amoxicillin/clavulanate (Augmentind P. Evidence the U.S.) and now exponentially by herbicide glyphosate (Roundup). *Clin Nutr ESPEN*. 02 2018;23:171-183. doi:10.1016/j.clnesp.2017.10.005
- 5. Nevison CD. A comparison of temporal trends in United States autism prevalence to trends in suspected environmental factors. *Environ Health*. Sep 2014;13:73. doi:10.1186/1476-069X-13-73
- 6. Ongono JS, Béranger R, Baghdadli A, Mortamais M. Pesticides used in Europe and autism spectrum disorder risk: can novel exposure hypotheses be formulated beyond organophosphates, organochlorines, pyrethroids and carbamates? - A systematic review. *Environ Res*. Aug 2020;187:109646. doi:10.1016/j.envres.2020.109646
- 7. Pu Y, Yang J, Chang L, et al. Maternal glyphosate exposure causes autism-like behaviors in offspring through increased expression of soluble epoxide hydrolase. *Proc Natl Acad Sci U S A*. 05 2020;117(21):11753-11759. doi:10.1073/pnas.1922287117
- 8. Sealey LA, Hughes BW, Sriskanda AN, et al. Environmental factors in the development of autism spectrum disorders. *Environ Int*. Mar 2016;88:288-298. doi:10.1016/j.envint.2015.12.021
- 9. von Ehrenstein OS, Ling C, Cui X, et al. Prenatal and infant exposure to ambient pesticides and autism spectrum disorder in children: population based case-control study. *BMJ*. 03 2019;364:l962. doi:10.1136/bmj.l962

- 1. Andreotti G, Koutros S, Hofmann JN, et al. Glyphosate Use and Cancer Incidence in the Agricultural Health Study. *J Natl Cancer Inst.* 05 2018;110(5):509-516. doi:10.1093/jnci/djx233
- 2. Arjó G, Portero M, Piñol C, et al. Plurality of opinion, scientific discourse and pseudoscience: an in depth analysis of the Séralini et al. study claiming that Roundup™ Ready corn or the herbicide Roundup™ cause cancer in rats. *Transgenic Res.* Apr 2013;22(2):255-67. doi:10.1007/s11248-013-9692-9
- 3. Davoren MJ, Schiestl RH. Glyphosate-based herbicides and cancer risk: a post-IARC decision review of potential mechanisms, policy and avenues of research. *Carcinogenesis.* 10 2018;39(10):1207-1215. doi:10.1093/carcin/bgy105
- 5. De Roos AJ, Blair A, Rusiecki JA, et al. Cancer incidence among glyphosate-exposed pesticide applicators in the Agricultural Health Study. *Environ Health Perspect.* Jan 2005;113(1):49-54. doi:10.1289/ehp.7340
- 6. Dragani TA. Difficulties in establishing a causal link between chemical exposures and cancer cannot be overcome by court assessments. *Hum Exp Toxicol.* Aug 2020;39(8):1095-1107. doi:10.1177/0960327120911426
- 7. Kass L, Gomez AL, Altamirano GA. Relationship between agrochemical compounds and mammary gland development and breast cancer. *Mol Cell Endocrinol.* 05 2020;508:110789. doi:10.1016/j.mce.2020.110789
- 8. Mink PJ, Mandel JS, Lundin JI, Sceurman BK. Epidemiologic studies of glyphosate and non-cancer health outcomes: a review. *Regul Toxicol Pharmacol.* Nov 2011;61(2):172-84. doi:10.1016/j.yrtph.2011.07.006
- 9. Mink PJ, Mandel JS, Sceurman BK, Lundin JI. Epidemiologic studies of glyphosate and cancer: a review. *Regul Toxicol Pharmacol.* Aug 2012;63(3):440-52. doi:10.1016/j.yrtph.2012.05.012
- 10. Nova P, Calheiros CSC, Silva M. Glyphosate in Portuguese Adults - A Pilot Study. *Environ Toxicol Pharmacol.* Aug 2020;80:103462. doi:10.1016/j.etap.2020.103462
- 11. Parajuli KR, Zhang Q, Liu S, You Z. Aminomethylphosphonic acid and methoxyacetic acid induce apoptosis in prostate cancer cells. *Int J Mol Sci.* May 2015;16(5):11750-65. doi:10.3390/ijms160511750
- 12. Parajuli KR, Zhang Q, Liu S, You Z. Aminomethylphosphonic acid inhibits growth and metastasis of human prostate cancer in an orthotopic xenograft mouse model. *Oncotarget.* Mar 2016;7(9):10616-26. doi:10.18632/oncotarget.7055
- 13. Portier CJ, Armstrong BK, Baguley BC, et al. Differences in the carcinogenic evaluation of glyphosate between the International Agency for Research on Cancer (IARC) and the European Food Safety Authority (EFSA). *J Epidemiol Community Health.* 08 2016;70(8):741-5. doi:10.1136/jech-2015-207005
- 14. Samet JM. Expert Review Under Attack: Glyphosate, Talc, and Cancer. *Am J Public Health.* 07 2019;109(7):976-978. doi:10.2105/AJPH.2019.305131
- 15. Sheppard L, Shaffer RM. Re: Glyphosate Use and Cancer Incidence in the Agricultural Health Study. *J Natl Cancer Inst.* 02 2019;111(2):214-215. doi:10.1093/jnci/djy200
- 16. Stur E, Aristizabal-Pachon AF, Peronni KC, et al. Glyphosate-based herbicides at low doses affect canonical pathways in estrogen positive and negative breast cancer cell lines. *PLoS One.* 2019;14(7):e0219610. doi:10.1371/journal.pone.0219610
- 17. Tarone RE. On the International Agency for Research on Cancer classification of glyphosate as a probable human carcinogen. *Eur J Cancer Prev.* 01 2018;27(1):82-87. doi:10.1097/CEJ.0000000000000289
- 18. Thongprakaisang S, Thiantanawat A, Rangkadilok N, Suriyo T, Satayavivad J. Glyphosate induces human breast cancer cells growth via estrogen receptors. *Food Chem Toxicol.* Sep 2013;59:129-36. doi:10.1016/j.fct.2013.05.057
- 19. Ward EM. Glyphosate Use and Cancer Incidence in the Agricultural Health Study: An Epidemiologic Perspective. *J Natl Cancer Inst.* 05 2018;110(5):446-447. doi:10.1093/jnci/djx247

CRIIGEN Study Links GM Maize and Roundup to Premature Death and Cancer

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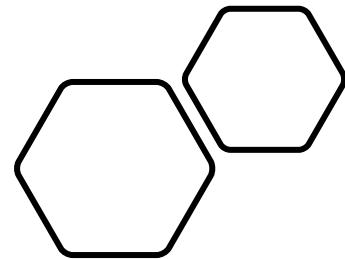
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In a study published in "Food and Chemical Toxicology", researchers led by Professor Gilles-Eric Seralini from CRIIGEN have found that rats fed on a diet containing NK603 Roundup tolerant GM maize or given water containing Roundup, at levels permitted in drinking water and GM crops in the US, developed cancers faster and died earlier than rats fed on a standard diet. They suffered breast cancer and severe liver and kidney damage.



In the first ever study to examine the long-term effects of Monsanto's Roundup herbicide and the NK603 Roundup-resistant GM maize also developed by Monsanto, the CRIIGEN scientists found that rats exposed to even the smallest amounts, developed mammary tumors and severe liver and kidney damage as early as four months in males, and seven months for females, compared with 23 and 14 months respectively for a control group.



Gilles-Éric Seralini is a French molecular biologist, political advisor and activist on genetically modified organisms and foods.

- 1. Chan YC, Chang SC, Hsuan SL, et al. Cardiovascular effects of herbicides and formulated adjuvants on isolated rat aorta and heart. *Toxicol In Vitro*. Jun 2007;21(4):595-603. doi:10.1016/j.tiv.2006.12.007
- 2. Gress S, Lemoine S, Séralini GE, Puddu PE. Glyphosate-based herbicides potently affect cardiovascular system in mammals: review of the literature. *Cardiovasc Toxicol*. Apr 2015;15(2):117-26. doi:10.1007/s12012-014-9282-y
- 3. Kimmel GL, Kimmel CA, Williams AL, DeSesso JM. Evaluation of developmental toxicity studies of glyphosate with attention to cardiovascular development. *Crit Rev Toxicol*. Feb 2013;43(2):79-95. doi:10.3109/10408444.2012.749834
- 4. Moon JM, Chun BJ, Cho YS, et al. Cardiovascular Effects and Fatality May Differ According to the Formulation of Glyphosate Salt Herbicide. *Cardiovasc Toxicol*. 02 2018;18(1):99-107. doi:10.1007/s12012-017-9418-y
- 5. Roy NM, Ochs J, Zambrzycka E, Anderson A. Glyphosate induces cardiovascular toxicity in *Danio rerio*. *Environ Toxicol Pharmacol*. Sep 2016;46:292-300. doi:10.1016/j.etap.2016.08.010
- 6. You Y, Jung WJ, Lee MJ. Effect of intravenous fat emulsion therapy on glyphosate-surfactant-induced cardiovascular collapse. *Am J Emerg Med*. Nov 2012;30(9):2097.e1-2. doi:10.1016/j.ajem.2011.06.042

- 1. Alleva R, Manzella N, Gaetani S, et al. Organic honey supplementation reverses pesticide-induced genotoxicity by modulating DNA damage response. *Mol Nutr Food Res.* 10 2016;60(10):2243-2255. doi:10.1002/mnfr.201600005
- 2. Anifandis G, Katsanaki K, Lagodonti G, et al. The Effect of Glyphosate on Human Sperm Motility and Sperm DNA Fragmentation. *Int J Environ Res Public Health.* 05 2018;15(6)doi:10.3390/ijerph15061117
- 3. Avdatek F, Birdane YO, Türkmen R, Demirel HH. Ameliorative effect of resveratrol on testicular oxidative stress, spermatological parameters and DNA damage in glyphosate-based herbicide-exposed rats. *Andrologia.* Sep 2018;50(7):e13036. doi:10.1111/and.13036
- 4. Bellé R, Le Bouffant R, Morales J, Cosson B, Cormier P, Mulner-Lorillon O. [Sea urchin embryo, DNA-damaged cell cycle checkpoint and the mechanisms initiating cancer development]. *J Soc Biol.* 2007;201(3):317-27. doi:10.1051/jbio:2007030
- 5. Hao Y, Chen H, Xu W, et al. Roundup. *Environ Pollut.* Sep 2019;252(Pt A):917-923. doi:10.1016/j.envpol.2019.05.128
- 6. Jennings JC, Kolwyck DC, Kays SB, et al. Determining whether transgenic and endogenous plant DNA and transgenic protein are detectable in muscle from swine fed Roundup Ready soybean meal. *J Anim Sci.* Jun 2003;81(6):1447-55. doi:10.2527/2003.8161447x
- 7. Kašuba V, Milić M, Rozgaj R, et al. Effects of low doses of glyphosate on DNA damage, cell proliferation and oxidative stress in the HepG2 cell line. *Environ Sci Pollut Res Int.* Aug 2017;24(23):19267-19281. doi:10.1007/s11356-017-9438-y
- 8. Kim G, Clarke CR, Larose H, et al. Herbicide injury induces DNA methylome alterations in. *PeerJ.* 2017;5:e3560. doi:10.7717/peerj.3560
- 9. Koller VJ, Fürhacker M, Nersesyan A, Mišík M, Eisenbauer M, Knasmüller S. Cytotoxic and DNA-damaging properties of glyphosate and Roundup in human-derived buccal epithelial cells. *Arch Toxicol.* May 2012;86(5):805-13. doi:10.1007/s00204-012-0804-8
- 10. Koo DH, Molin WT, Saski CA, et al. Extrachromosomal circular DNA-based amplification and transmission of herbicide resistance in crop weed. *Proc Natl Acad Sci U S A.* 03 2018;115(13):3332-
- 11. Kwiatkowska M, Reszka E, Woźniak K, Jabłońska E, Michałowicz J, Bukowska B. DNA damage and methylation induced by glyphosate in human peripheral blood mononuclear cells (in vitro study). *Food Chem Toxicol.* Jul 2017;105:93-98. doi:10.1016/j.fct.2017.03.051
- 12. Lerat S, Gulden RH, Hart MM, et al. Quantification and persistence of recombinant DNA of Roundup Ready corn and soybean in rotation. *J Agric Food Chem.* Dec 2007;55(25):10226-31. doi:10.1021/jf072457z
- 13. Lueken A, Juhl-Strauss U, Krieger G, Witte I. Synergistic DNA damage by oxidative stress (induced by H₂O₂) and nongenotoxic environmental chemicals in human fibroblasts. *Toxicol Lett.* Feb 2004;147(1):35-43. doi:10.1016/j.toxlet.2003.10.020
- 14. Milić M, Žunec S, Micek V, et al. Oxidative stress, cholinesterase activity, and DNA damage in the liver, whole blood, and plasma of Wistar rats following a 28-day exposure to glyphosate. *Arh Hig Rada Toksikol.* Jun 2018;69(2):154-168. doi:10.2478/aiht-2018-69-3114
- 15. Schnabel K, Schmitz R, Frahm J, Meyer U, Breves G, Dänicke S. Functionality and DNA-damage properties of blood cells in lactating cows exposed to glyphosate contaminated feed at different feed energy levels. *Arch Anim Nutr.* Apr 2020;74(2):87-106. doi:10.1080/1745039X.2020.1718474
- 16. Woźniak E, Sicińska P, Michałowicz J, et al. The mechanism of DNA damage induced by Roundup 360 PLUS, glyphosate and AMPA in human peripheral blood mononuclear cells - genotoxic risk assessment. *Food Chem Toxicol.* Oct 2018;120:510-522. doi:10.1016/j.fct.2018.07.035

- 1. Alarcón R, Rivera OE, Ingaramo PI, et al. Neonatal exposure to a glyphosate-based herbicide alters the uterine differentiation of prepubertal ewe lambs. *Environ Pollut.* Oct 2020;265(Pt B):114874. doi:10.1016/j.envpol.2020.114874
- 2. Anifandis G, Amiridis G, Dafopoulos K, et al. The In Vitro Impact of the Herbicide Roundup on Human Sperm Motility and Sperm Mitochondria. *Toxics.* Dec 2017;6(1)doi:10.3390/toxics6010002
- 3. Anifandis G, Katsanaki K, Lagodonti G, et al. The Effect of Glyphosate on Human Sperm Motility and Sperm DNA Fragmentation. *Int J Environ Res Public Health.* 05 2018;15(6)doi:10.3390/ijerph15061117
- 4. Cai W, Ji Y, Song X, et al. Effects of glyphosate exposure on sperm concentration in rodents: A systematic review and meta-analysis. *Environ Toxicol Pharmacol.* Oct 2017;55:148-155. doi:10.1016/j.etap.2017.07.015
- 5. Canosa IS, Zanitti M, Lonné N, Medesani DA, López Greco LS, Rodríguez EM. Imbalances in the male reproductive function of the estuarine crab *Neohelice granulata*, caused by glyphosate. *Ecotoxicol Environ Saf.* Oct 2019;182:109405. doi:10.1016/j.ecoenv.2019.109405
- 6. Dai P, Hu P, Tang J, Li Y, Li C. Effect of glyphosate on reproductive organs in male rat. *Acta Histochem.* Jun 2016;118(5):519-26. doi:10.1016/j.acthis.2016.05.009
- 7. de Liz Oliveira Cavalli VL, Cattani D, Heinz Rieg CE, et al. Roundup disrupts male reproductive functions by triggering calcium-mediated cell death in rat testis and Sertoli cells. *Free Radic Biol Med.* Dec 2013;65:335-346. doi:10.1016/j.freeradbiomed.2013.06.043
- 8. Gonçalves BB, Nascimento NF, Santos MP, Bertolini RM, Yasui GS, Giaquinto PC. Low concentrations of glyphosate-based herbicide cause complete loss of sperm motility of yellowtail tetra fish *Astyanax lacustris*. *J Fish Biol.* Apr 2018;92(4):1218-1224. doi:10.1111/jfb.13571
- 9. Guerrero Schimpf M, Milesi MM, Ingaramo PI, Luque EH, Varayoud J. Neonatal exposure to a glyphosate based herbicide alters the development of the rat uterus. *Toxicology.* Feb 2017;376:2-14. doi:10.1016/j.tox.2016.06.004
- 10. Ingaramo PI, Guerrero Schimpf M, Milesi MM, Luque EH, Varayoud J. Acute uterine effects and long-term reproductive alterations in postnatally exposed female rats to a mixture of commercial formulations of endosulfan and glyphosate. *Food Chem Toxicol.* Dec 2019;134:110832. doi:10.1016/j.fct.2019.110832
- 11. Ingaramo P, Alarcón R, Muñoz-de-Toro M, Luque EH. Are glyphosate and glyphosate-based herbicides endocrine disruptors that alter female fertility? *Mol Cell Endocrinol.* Jul 2020;110934. doi:10.1016/j.mce.2020.110934
- Pathologies and Sperm Epimutations: Generational Toxicology. *Sci Rep.* 04 2019;9(1):6372. doi:10.1038/s41598-019-42860-0
- 13. Nerozzi C, Recuero S, Galeati G, Bucci D, Spinaci M, Yeste M. Effects of Roundup and its main component, glyphosate, upon mammalian sperm function and survival. *Sci Rep.* Jul 2020;10(1):11026. doi:10.1038/s41598-020-67538-w
- 14. Nerozzi C, Recuero S, Galeati G, Bucci D, Spinaci M, Yeste M. Effects of Roundup and its main component, glyphosate, upon mammalian sperm function and survival. *Sci Rep.* Jul 2020;10(1):11026. doi:10.1038/s41598-020-67538-w
- 15. Owagboriaye FO, Dedeke GA, Ademolu KO, Olujimi OO, Ashidi JS, Adeyinka AA. Reproductive toxicity of Roundup herbicide exposure in male albino rat. *Exp Toxicol Pathol.* Sep 2017;69(7):461-468. doi:10.1016/j.etp.2017.04.007
- 16. Reno U, Gutierrez MF, Regaldo L, Gagneten AM. The impact of Eskoba, a glyphosate formulation, on the freshwater plankton community. *Water Environ Res.* Dec 2014;86(12):2294-300. doi:10.2175/106143014x13896437493580
- 17. Sanin LH, Carrasquilla G, Solomon KR, Cole DC, Marshall EJ. Regional differences in time to pregnancy among fertile women from five Colombian regions with different use of glyphosate. *J Toxicol Environ Health A.* 2009;72(15-16):949-60. doi:10.1080/15287390902929691
- 18. Shi Z, Zou S, Lu C, et al. Evaluation of the effects of feeding glyphosate-tolerant soybeans (CP4 EPSPS) on the testis of male Sprague-Dawley rats. *GM Crops Food.* 2019;10(3):181-190. doi:10.1080/21645698.2019.1649565
- 19. Teleken JL, Gomes ECZ, Marmentini C, et al. Glyphosate-based herbicide exposure during pregnancy and lactation malprograms the male reproductive morphofunction in F1 offspring. *J Dev Orig Health Dis.* 04 2020;11(2):146-153. doi:10.1017/S2040174419000382
- 20. Williams GM, Kroes R, Munro IC. Safety evaluation and risk assessment of the herbicide Roundup and its active ingredient, glyphosate, for humans. *Regul Toxicol Pharmacol.* Apr 2000;31(2 Pt 1):117-65. doi:10.1006/rtpb.1999.1371
- 21. Yahfoufi ZA, Bai D, Khan SN, et al. Glyphosate Induces Metaphase II Oocyte Deterioration and Embryo Damage by Zinc Depletion and Overproduction of Reactive Oxygen Species. *Toxicology.* 06 2020;439:152466. doi:10.1016/j.tox.2020.152466
- 22. Zebral YD, Lansini LR, Costa PG, Roza M, Bianchini A, Robaldo RB. A glyphosate-based herbicide reduces fertility, embryonic upper thermal tolerance and alters embryonic diapause of the threatened annual fish *Austrolebias nigrofasciatus*. *Chemosphere.* Apr 2018;196:260-269. doi:10.1016/j.chemosphere.2017.12.196

- 1. Ackermann W, Coenen M, Schrödl W, Shehata AA, Krüger M. The influence of glyphosate on the microbiota and production of botulinum neurotoxin during ruminal fermentation. *Curr Microbiol.* Mar 2015;70(3):374-82. doi:10.1007/s00284-014-0732-3
- 2. Aitbali Y, Ba-M'hamed S, Elhidar N, Nafis A, Soraa N, Bennis M. Glyphosate based- herbicide exposure affects gut microbiota, anxiety and depression-like behaviors in mice. *Neurotoxicol Teratol.* 2018 May - Jun 2018;67:44-49. doi:10.1016/j.ntt.2018.04.002
- 3. Blot N, Veillat L, Rouzé R, Delatte H. Glyphosate, but not its metabolite AMPA, alters the honeybee gut microbiota. *PLoS One.* 2019;14(4):e0215466. doi:10.1371/journal.pone.0215466
- 4. Duke SO, Lydon J, Koskinen WC, Moorman TB, Chaney RL, Hammerschmidt R. Glyphosate effects on plant mineral nutrition, crop rhizosphere microbiota, and plant disease in glyphosate-resistant crops. *J Agric Food Chem.* Oct 2012;60(42):10375-97. doi:10.1021/jf302436u
- 5. Iori S, Rovere GD, Ezzat L, et al. The effects of glyphosate and AMPA on the mediterranean mussel *Mytilus galloprovincialis* and its microbiota. *Environ Res.* 03 2020;182:108984. doi:10.1016/j.envres.2019.108984
- 6. Krause JL, Haange SB, Schäpe SS, et al. The glyphosate formulation Roundup® LB plus influences the global metabolome of pig gut microbiota in vitro. *Sci Total Environ.* Jul 2020;745:140932. doi:10.1016/j.scitotenv.2020.140932
- 7. Mesnage R, Teixeira , Antoniou MN, et al. Shotgun metagenomics and metabolomics reveal glyphosate alters the gut microbiome of Sprague-Dawley rats by inhibiting the shikimate pathway. *BioRxiv.* Dec 2019. doi: <https://doi.org/10.1101/870105>
- 8. Motta EVS, Mak M, De Jong TK, et al. Oral or Topical Exposure to Glyphosate in Herbicide Formulation Impacts the Gut Microbiota and Survival Rates of Honey Bees. *Appl Environ Microbiol.* Sep 2020;86(18)doi:10.1128/AEM.01150-20
- 9. Motta EVS, Moran NA. Impact of Glyphosate on the Honey Bee Gut Microbiota: Effects of Intensity, Duration, and Timing of Exposure. *mSystems.* Jul 2020;5(4)doi:10.1128/mSystems.00268-20
- 10. Motta EVS, Raymann K, Moran NA. Glyphosate perturbs the gut microbiota of honey bees. *Proc Natl Acad Sci U S A.* 10 2018;115(41):10305-10310. doi:10.1073/pnas.1803880115
- 11. Peillex C, Pelletier M. The impact and toxicity of glyphosate and glyphosate-based herbicides on health and immunity. *J Immunotoxicol.* Dec 2020;17(1):163-174. doi:10.1080/1547691X.2020.1804492
- 12. Rueda-Ruzaña L, Cruz F, Roman P, Cardona D. Gut microbiota and neurological effects of glyphosate. *Neurotoxicology.* 12 2019;75:1-8. doi:10.1016/j.neuro.2019.08.006
- 13. Shehata AA, Schrödl W, Aldin AA, Hafez HM, Krüger M. The effect of glyphosate on potential pathogens and beneficial members of poultry microbiota in vitro. *Curr Microbiol.* Apr 2013;66(4):350-8. doi:10.1007/s00284-012-0277-2
- 14. Song Y, Song X, Wu M, et al. The protective effects of melatonin on survival, immune response, digestive enzymes activities and intestinal microbiota diversity in Chinese mitten crab (*Eriocheir sinensis*) exposed to glyphosate. *Comp Biochem Physiol C Toxicol Pharmacol.* Aug 2020;238:108845. doi:10.1016/j.cbpc.2020.108845
- 15. Tofío Rivera AP, Carbono Murgas RE, Melo Ríos AE, Merini LJ. [Effect of glyphosate on microbiota, soil quality and biofortified bean crop in Codazzi, department of Cesar, Colombia]. *Rev Argent Microbiol.* 2020 Jan - Mar 2020;52(1):61-71. doi:10.1016/j.ram.2019.01.006
- 16. Yang X, Song Y, Zhang C, et al. Effects of the glyphosate-based herbicide roundup on the survival, immune response, digestive activities and gut microbiota of the Chinese mitten crab, *Eriocheir sinensis*. *Aquat Toxicol.* Sep 2019;214:105243. doi:10.1016/j.aquatox.2019.105243

- 1. Argou-Cardozo I, Zeidán-Chuliá F. Clostridium Bacteria and Autism Spectrum Conditions: A Systematic Review and Hypothetical Contribution of Environmental Glyphosate Levels. *Med Sci (Basel)*. Apr 2018;6(2)doi:10.3390/medsci6020029
- 2. de Souza JS, Laureano-Melo R, Herai RH, et al. Maternal glyphosate-based herbicide exposure alters antioxidant-related genes in the brain and serum metabolites of male rat offspring. *Neurotoxicology*. 09 2019;74:121-131. doi:10.1016/j.neuro.2019.06.004
- 3. Faria MA. Glyphosate, neurological diseases - and the scientific method. *Surg Neurol Int*. 2015;6:132. doi:10.4103/2152-7806.162550
- 4. Fluegge Ba K. Zinc and Copper Metabolism and Risk of Autism: a reply to Sayehmiri et al. *Iran J Child Neurol*. 2017;11(3):66-69.
- 5. Martinez A, Al-Ahmad AJ. Effects of glyphosate and aminomethylphosphonic acid on an isogenic model of the human blood-brain barrier. *Toxicol Lett*. Apr 2019;304:39-49. doi:10.1016/j.toxlet.2018.12.013
- 6. Morley WA, Seneff S. Diminished brain resilience syndrome: A modern day neurological pathology of increased susceptibility to mild brain trauma, concussion, and downstream neurodegeneration. *Surg Neurol Int*. 2014;5:97. doi:10.4103/2152-7806.134731
- 7. Pereira AG, Jaramillo ML, Remor AP, et al. Low-concentration exposure to glyphosate-based herbicide modulates the complexes of the mitochondrial respiratory chain and induces mitochondrial hyperpolarization in the Danio rerio brain. *Chemosphere*. Oct 2018;209:353-362. doi:10.1016/j.chemosphere.2018.06.075
- 8. Richardson JR, Fitsanakis V, Westerink RHS, Kanthasamy AG. Neurotoxicity of pesticides. *Acta Neuropathol*. 09 2019;138(3):343-362. doi:10.1007/s00401-019-02033-9
- 9. Rueda-Ruzafa L, Cruz F, Roman P, Cardona D. Gut microbiota and neurological effects of glyphosate. *Neurotoxicology*. 12 2019;75:1-8. doi:10.1016/j.neuro.2019.08.006
- 10. Samsel A, Seneff S. Glyphosate, pathways to modern diseases III: Manganese, neurological diseases, and associated pathologies. *Surg Neurol Int*. 2015;6:45. doi:10.4103/2152-7806.153876

ADHD and Heavy Metal Connection

- Forns, J., Fort, M., Casas, M., Cáceres, A., Guxens, M., Gascon, M., García-Estebar, R., Julvez, J., Grimalt, J. O., & Sunyer, J. (2014). Exposure to metals during pregnancy and neuropsychological development at the age of 4 years. *Neurotoxicology*, 40, 16-22. <https://doi.org/10.1016/j.neuro.2013.10.006>
- Kim, S., Arora, M., Fernandez, C., Landero, J., Caruso, J., & Chen, A. (2013). Lead, mercury, and cadmium exposure and attention deficit hyperactivity disorder in children. *Environ Res*, 126, 105-110. <https://doi.org/10.1016/j.envres.2013.08.008>
- Lee, M. J., Chou, M. C., Chou, W. J., Huang, C. W., Kuo, H. C., Lee, S. Y., & Wang, L. J. (2018). Heavy Metals' Effect on Susceptibility to Attention-Deficit/Hyperactivity Disorder: Implication of Lead, Cadmium, and Antimony. *Int J Environ Res Public Health*, 15(6). <https://doi.org/10.3390/ijerph15061221>
- Li, Y., Cha, C., Lv, X., Liu, J., He, J., Pang, Q., Meng, L., Kuang, H., & Fan, R. (2020). Association between 10 urinary heavy metal exposure and attention deficit hyperactivity disorder for children. *Environ Sci Pollut Res Int*, 27(25), 31233-31242. <https://doi.org/10.1007/s11356-020-09421-9>
- Monro, J. A., Leon, R., & Puri, B. K. (2013). The risk of lead contamination in bone broth diets. *Med Hypotheses*, 80(4), 389-390. <https://doi.org/10.1016/j.mehy.2012.12.026>
- Muñoz, M. P., Rubilar, P., Valdés, M., Muñoz-Quezada, M. T., Gómez, A., Saavedra, M., & Iglesias, V. (2020). Attention deficit hyperactivity disorder and its association with heavy metals in children from northern Chile. *Int J Hyg Environ Health*, 226, 113483. <https://doi.org/10.1016/j.ijeh.2020.113483>
- Palomo, T., Beninger, R. J., Kostrzewa, R. M., & Archer, T. (2003). Brain sites of movement disorder: genetic and environmental agents in neurodevelopmental perturbations. *Neurotox Res*, 5(1-2), 1-26. <https://doi.org/10.1007/BF03033369>
- Polańska, K., Jurewicz, J., & Hanke, W. (2012). Exposure to environmental and lifestyle factors and attention-deficit / hyperactivity disorder in children - a review of epidemiological studies. *Int J Occup Med Environ Health*, 25(4), 330-355. <https://doi.org/10.2478/S13382-012-0048-0>
- RísovÁ, V. (2019). The pathway of lead through the mother's body to the child. *Interdiscip Toxicol*, 12(1), 1-6. <https://doi.org/10.2478/intox-2019-0001>
- Scassellati, C., Bonvicini, C., Faraone, S. V., & Gennarelli, M. (2012). Biomarkers and attention-deficit/hyperactivity disorder: a systematic review and meta-analyses. *J Am Acad Child Adolesc Psychiatry*, 51(10), 1003-1019.e1020. <https://doi.org/10.1016/j.jaac.2012.08.015>
- Schug, T. T., Blawas, A. M., Gray, K., Heindel, J. J., & Lawler, C. P. (2015). Elucidating the links between endocrine disruptors and neurodevelopment. *Endocrinology*, 156(6), 1941-1951. <https://doi.org/10.1210/en.2014-1734>
- Sears, C. G., & Zierold, K. M. (2017). Health of Children Living Near Coal Ash. *Glob Pediatr Health*, 4, 2333794X17720330. <https://doi.org/10.1177/2333794X17720330>
- Sioen, I., Den Hond, E., Nelen, V., Van de Mieroop, E., Croes, K., Van Larebeke, N., Nawrot, T. S., & Schoeters, G. (2013). Prenatal exposure to environmental contaminants and behavioural problems at age 7-8years. *Environ Int*, 59, 225-231. <https://doi.org/10.1016/j.envint.2013.06.014>
- Szkuł-Jabłońska, M., Karakiewicz, B., Grochans, E., Jurczak, A., Nowak-Starz, G., Rotter, I., & Prokopowicz, A. (2012). Effects of blood lead and cadmium levels on the functioning of children with behaviour disorders in the family environment. *Ann Agric Environ Med*, 19(2), 241-246.
- Tabatadze, T., Kherkheulidze, M., Kandelaki, E., Kavlashvili, N., & Ivanashvili, T. (2018). ATTENTION DEFICIT HYPERACTIVITY DISORDER AND HAIR HEAVY METAL AND ESSENTIAL TRACE ELEMENT CONCENTRATIONS. IS THERE A LINK? *Georgian Med News*(284), 88-92.
- Tong, J., Liang, C. M., Huang, K., Xiang, H. Y., Qi, J., Feng, L. L., Lai, Y. P., Shao, S. S., Wu, X. Y., & Tao, F. B. (2020). Prenatal serum thallium exposure and 36-month-old children's attention-deficit/hyperactivity disorder symptoms: Ma'anshan birth cohort study. *Chemosphere*, 244, 125499. <https://doi.org/10.1016/j.chemosphere.2019.125499>
- Tran, N. Q. V., & Miyake, K. (2017). Neurodevelopmental Disorders and Environmental Toxicants: Epigenetics as an Underlying Mechanism. *Int J Genomics*, 2017, 7526592. <https://doi.org/10.1155/2017/7526592>
- Vrijheid, M., Casas, M., Gascon, M., Valvi, D., & Nieuwenhuijsen, M. (2016). Environmental pollutants and child health-A review of recent concerns. *Int J Hyg Environ Health*, 219(4-5), 331-342. <https://doi.org/10.1016/j.ijeh.2016.05.001>
- Yousef, S., Adem, A., Zoubeidi, T., Kosanovic, M., Mabrouk, A. A., & Eapen, V. (2011). Attention deficit hyperactivity disorder and environmental toxic metal exposure in the United Arab Emirates. *J Trop Pediatr*, 57(6), 457-460. <https://doi.org/10.1093/tropej/fmq121>

Diabetes + Heavy Metals

- Barregard, L., Bergström, G., & Fagerberg, B. (2013). Cadmium exposure in relation to insulin production, insulin sensitivity and type 2 diabetes: a cross-sectional and prospective study in women. *Environ Res*, 121, 104-109. <https://doi.org/10.1016/j.envres.2012.11.005>
- Barregard, L., Bergström, G., & Fagerberg, B. (2014). Cadmium, type 2 diabetes, and kidney damage in a cohort of middle-aged women. *Environ Res*, 135, 311-316. <https://doi.org/10.1016/j.envres.2014.09.017>
- Chen, Y. W., Yang, C. Y., Huang, C. F., Hung, D. Z., Leung, Y. M., & Liu, S. H. (2009). Heavy metals, islet function and diabetes development. *Islets*, 1(3), 169-176. <https://doi.org/10.4161/isl.1.3.9262>
- Edwards, J., & Ackerman, C. (2016). A Review of Diabetes Mellitus and Exposure to the Environmental Toxicant Cadmium with an Emphasis on Likely Mechanisms of Action. *Curr Diabetes Rev*, 12(3), 252-258. <https://doi.org/10.2174/1573399811666150812142922>
- Edwards, J. R., & Prozialeck, W. C. (2009). Cadmium, diabetes and chronic kidney disease. *Toxicol Appl Pharmacol*, 238(3), 289-293. <https://doi.org/10.1016/j.taap.2009.03.007>
- Futatsuka, M., Kitano, T., & Wakamiya, J. (1996). An epidemiological study on diabetes mellitus in the population living in a methyl mercury polluted area. *J Epidemiol*, 6(4), 204-208. <https://doi.org/10.2188/jea.6.204>
- Gandhi, S., Srinivasan, B. P., & Akarte, A. S. (2013). An experimental assessment of toxic potential of nanoparticle preparation of heavy metals in streptozotocin induced diabetes. *Exp Toxicol Pathol*, 65(7-8), 1127-1135. <https://doi.org/10.1016/j.etp.2013.05.004>
- He, K., Xun, P., Liu, K., Morris, S., Reis, J., & Guallar, E. (2013). Mercury exposure in young adulthood and incidence of diabetes later in life: the CARDIA Trace Element Study. *Diabetes Care*, 36(6), 1584-1589. <https://doi.org/10.2337/dc12-1842>
- Hendryx, M., Luo, J., Chojenta, C., & Byles, J. E. (2019). Exposure to heavy metals from point pollution sources and risk of incident type 2 diabetes among women: a prospective cohort analysis. *Int J Environ Health Res*, 1-12. <https://doi.org/10.1080/09603123.2019.1668545>
- Hildebrand, J., Thakar, S., Watts, T. L., Banfield, L., Thabane, L., Macri, J., Hill, S., & Samaan, M. C. (2019). The impact of environmental cadmium exposure on type 2 diabetes risk: a protocol for an overview of systematic reviews. *Syst Rev*, 8(1), 309. <https://doi.org/10.1186/s13643-019-1246-7>
- Li, X., Huang, Y., Xing, Y., Hu, C., Zhang, W., Tang, Y., Su, W., Huo, X., Zhou, A., Xia, W., Xu, S., Chen, D., & Li, Y. (2020). Association of urinary cadmium, circulating fatty acids, and risk of gestational diabetes mellitus: A nested case-control study in China. *Environ Int*, 137, 105527. <https://doi.org/10.1016/j.envint.2020.105527>
- Li, Y., Zhang, Y., Wang, W., & Wu, Y. (2017). Association of urinary cadmium with risk of diabetes: a meta-analysis. *Environ Sci Pollut Res Int*, 24(11), 10083-10090. <https://doi.org/10.1007/s11356-017-8610-8>
- Liu, W., Zhang, B., Huang, Z., Pan, X., Chen, X., Hu, C., Liu, H., Jiang, Y., Sun, X., Peng, Y., Xia, W., Xu, S., & Li, Y. (2018). Cadmium Body Burden and Gestational Diabetes Mellitus: A Prospective Study. *Environ Health Perspect*, 126(2), 027006. <https://doi.org/10.1289/EHP2716>
- Ludvigsson, J., Andersson-White, P., & Guerrero-Bosagna, C. (2019). Toxic metals in cord blood and later development of Type 1 diabetes. *Pediatr Dimens*, 4(2). <https://doi.org/10.15761/PD.1000186>

- Madrigal, J. M., Ricardo, A. C., Persky, V., & Turyk, M. (2019). Associations between blood cadmium concentration and kidney function in the U.S. population: Impact of sex, diabetes and hypertension. *Environ Res*, 169, 180-188. <https://doi.org/10.1016/j.envres.2018.11.009>
- Moon, S. S. (2013). Association of lead, mercury and cadmium with diabetes in the Korean population: the Korea National Health and Nutrition Examination Survey (KNHANES) 2009-2010. *Diabet Med*, 30(4), e143-148. <https://doi.org/10.1111/dme.12103>
- Oguri, T., Ebara, T., Nakayama, S. F., Sugiura-Ogasawara, M., Kamijima, M., & Group, J. E. a. C. s. S. (2019). Association between maternal blood cadmium and lead concentrations and gestational diabetes mellitus in the Japan Environment and Children's Study. *Int Arch Occup Environ Health*, 92(2), 209-217. <https://doi.org/10.1007/s00420-018-1367-7>
- Romano, M. E., Enquobahrie, D. A., Simpson, C. D., Checkoway, H., & Williams, M. A. (2015). A Case-Cohort Study of Cadmium Body Burden and Gestational Diabetes Mellitus in American Women. *Environ Health Perspect*, 123(10), 993-998. <https://doi.org/10.1289/ehp.1408282>
- Romano, M. E., Gallagher, L. G., Jackson, B. P., Baker, E., & Karagas, M. R. (2019). Maternal urinary cadmium, glucose intolerance and gestational diabetes in the New Hampshire Birth Cohort Study. *Environ Res*, 179(Pt A), 108733. <https://doi.org/10.1016/j.envres.2019.108733>
- Satarug, S., Vesey, D. A., & Gobe, G. C. (2017). Kidney Cadmium Toxicity, Diabetes and High Blood Pressure: The Perfect Storm. *Tohoku J Exp Med*, 241(1), 65-87. <https://doi.org/10.1620/tjem.241.65>
- Schwartz, G. G., Il'yasova, D., & Ivanova, A. (2003). Urinary c, impaired fasting glucose, and diabetes in the NHANES III. *Diabetes Care*, 26(2), 468-470. <https://doi.org/10.2337/diacare.26.2.468>
- Soomro, M. H., Baiz, N., Huel, G., Yazbeck, C., Botton, J., Heude, B., Bornehag, C. G., Annesi-Maesano, I., & group, E. m.-c. c. s. (2019). Exposure to heavy metals during pregnancy related to gestational diabetes mellitus in diabetes-free mothers. *Sci Total Environ*, 656, 870-876. <https://doi.org/10.1016/j.scitotenv.2018.11.422>
- Tinkov, A. A., Filippini, T., Ajtsuvakova, O. P., Aaseth, J., Gluhcheva, Y. G., Ivanova, J. M., Bjørklund, G., Skalnaya, M. G., Gatiatulina, E. R., Popova, E. V., Nemereshina, O. N., Vinceti, M., & Skalny, A. V. (2017). The role of cadmium in obesity and diabetes. *Sci Total Environ*, 601-602, 741-755. <https://doi.org/10.1016/j.scitotenv.2017.05.224>
- Valcke, M., Ouellet, N., Dubé, M., Laouan Sidi, E. A., LeBlanc, A., Normandin, L., Balion, C., & Ayotte, P. (2019). Biomarkers of cadmium, lead and mercury exposure in relation with early biomarkers of renal dysfunction and diabetes: Results from a pilot study among aging Canadians. *Toxicol Lett*, 312, 148-156. <https://doi.org/10.1016/j.toxlet.2019.05.014>
- Wu, M., Song, J., Zhu, C., Wang, Y., Yin, X., Huang, G., Zhao, K., Zhu, J., Duan, Z., & Su, L. (2017). Association between cadmium exposure and diabetes mellitus risk: a prisma-compliant systematic review and meta-analysis. *Oncotarget*, 8(68), 113129-113141. <https://doi.org/10.18632/oncotarget.21991>
- Yang, A. M., Hu, X. B., Liu, S., Cheng, N., Zhang, D. S., Li, J. S., Li, H. Y., Ren, X. W., Li, N., Sheng, X. P., Ding, J., Zheng, S., Wang, M. Z., Zheng, T. Z., & Bai, Y. N. (2019). Occupational exposure to heavy metals, alcohol intake, and risk of type 2 diabetes and prediabetes among Chinese male workers. *Chronic Dis Transl Med*, 5(2), 97-104. <https://doi.org/10.1016/j.cdtm.2019.05.002>

Metabolic Syndrome

R
O
T

- 1. De Long NE, Holloway AC. Early-life chemical exposures and risk of metabolic syndrome. *Diabetes Metab Syndr Obes.* 2017;10:101-109. doi:10.2147/DMSO.S95296
- 2. Fatima G, Raza AM, Hadi N, Nigam N, Mahdi AA. Cadmium in Human Diseases: It's More than Just a Mere Metal. *Indian J Clin Biochem.* Oct 2019;34(4):371-378. doi:10.1007/s12291-019-00839-8
- 3. Guo X, Yang Q, Zhang W, Chen Y, Ren J, Gao A. Associations of blood levels of trace elements and heavy metals with metabolic syndrome in Chinese male adults with microRNA as mediators involved. *Environ Pollut.* May 2019;248:66-73. doi:10.1016/j.envpol.2019.02.015
- 4. Jia G, Aroor AR, Martinez-Lemus LA, Sowers JR. Mitochondrial functional impairment in response to environmental toxins in the cardiorenal metabolic syndrome. *Arch Toxicol.* Feb 2015;89(2):147-53. doi:10.1007/s00204-014-1431-3
- 5. Kim JT, Lee HK. Metabolic syndrome and the environmental pollutants from mitochondrial perspectives. *Rev Endocr Metab Disord.* Dec 2014;15(4):253-62. doi:10.1007/s11154-014-9297-5
- 6. Kirmizi DA, Baser E, Turksoy VA, Kara M, Yalvac ES, Gocmen AY. Are Heavy Metal Exposure and Trace Element Levels Related to Metabolic and Endocrine Problems in Polycystic Ovary Syndrome? *Biol Trace Elem Res.* Jun 2020;doi:10.1007/s12011-020-02220-w
- 7. Moon SS. Additive effect of heavy metals on metabolic syndrome in the Korean population: the Korea National Health and Nutrition Examination Survey (KNHANES) 2009-2010. *Endocrine.* Jun 2014;46(2):263-71. doi:10.1007/s12020-013-0061-5
- 8. Planchart A, Green A, Hoyo C, Mattingly CJ. Heavy Metal Exposure and Metabolic Syndrome: Evidence from Human and Model System Studies. *Curr Environ Health Rep.* 03 2018;5(1):110-124. doi:10.1007/s40572-018-0182-3
- 9. Podzolkov VI, Korolyova TV, Kudryavtseva MG. [Abnormal values of trace elements and blood metals in patients with metabolic syndrome, depending on its components]. *Ter Arkh.* Oct 2019;91(10):70-75. doi:10.26442/00403660.2019.10.000342
- 10. Poursafa P, Ataee E, Motlagh ME, et al. Association of serum lead and mercury level with cardiometabolic risk factors and liver enzymes in a nationally representative sample of adolescents: the CASPIAN-III study. *Environ Sci Pollut Res Int.* Dec 2014;21(23):13496-502. doi:10.1007/s11356-014-3238-4
- 11. Rhee SY, Hwang YC, Woo JT, et al. Blood lead is significantly associated with metabolic syndrome in Korean adults: an analysis based on the Korea National Health and Nutrition Examination Survey (KNHANES), 2008. *Cardiovasc Diabetol.* Jan 2013;12:9. doi:10.1186/1475-2840-12-9
- 12. Rotter I, Kosik-Bogacka D, Dotęgowska B, Safranow K, Lubkowska A, Laszczyńska M. Relationship between the concentrations of heavy metals and bioelements in aging men with metabolic syndrome. *Int J Environ Res Public Health.* Apr 2015;12(4):3944-61. doi:10.3390/ijerph120403944
- 13. Shim YH, Ock JW, Kim YJ, Kim Y, Kim SY, Kang D. Association between Heavy Metals, Bisphenol A, Volatile Organic Compounds and Phthalates and Metabolic Syndrome. *Int J Environ Res Public Health.* 02 2019;16(4)doi:10.3390/ijerph16040671
- 14. Spalding A, Kernan J, Lockette W. The metabolic syndrome: a modern plague spread by modern technology. *J Clin Hypertens (Greenwich).* Dec 2009;11(12):755-60. doi:10.1111/j.1751-7176.2009.00191.x
- 15. Tinkov AA, Ajsvakova OP, Skalnaya MG, et al. Mercury and metabolic syndrome: a review of experimental and clinical observations. *Biometals.* Apr 2015;28(2):231-54. doi:10.1007/s10534-015-9823-2
- 16. Wen WL, Wang CW, Wu DW, Chen SC, Hung CH, Kuo CH. Associations of Heavy Metals with Metabolic Syndrome and Anthropometric Indices. *Nutrients.* Sep 2020;12(9)doi:10.3390/nu12092666
- 17. Yang Q, Guo X, Chen Y, et al. Blood levels of perfluoroalkyl substances (PFASs), elements and their associations with metabolic syndrome (MetS) in Chinese male adults mediated by metabolic-related risk factors. *Sci Total Environ.* Nov 2020;742:140595. doi:10.1016/j.scitotenv.2020.140595

Psoriasis

- Afridi, H. I., Kazi, T. G., Kazi, N., Kandhro, G. A., Baig, J. A., Shah, A. Q., Khan, S., Kolachi, N. F., Wadhwa, S. K., Shah, F., Jamali, M. K., & Arain, M. B. (2011). Evaluation of cadmium, chromium, nickel, and zinc in biological samples of psoriasis patients living in Pakistani cement factory area. *Biol Trace Elem Res*, 142(3), 284-301. <https://doi.org/10.1007/s12011-010-8778-y>
- Cutrín Gómez, E., Anguiano Igea, S., Delgado-Charro, M. B., Gómez Amoza, J. L., & Otero Espinar, F. J. (2018). Microstructural alterations in the onychomycotic and psoriatic nail: Relevance in drug delivery. *Eur J Pharm Biopharm*, 128, 48-56. <https://doi.org/10.1016/j.ejpb.2018.04.012>
- Guo, T., Cheng, X. L., Li, H., Li, J. Y., Qiao, S. F., Nie, Z. H., Zhang, J. L., & Zhang, L. T. (2019). [A case of posoriasis aggraration and acute kidney injury caused mercury preparation]. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi*, 37(3), 228-229. <https://doi.org/10.3760/cma.j.issn.1001-9391.2019.03.017>
- Leppert, B., Havdahl, A., Riglin, L., Jones, H. J., Zheng, J., Davey Smith, G., Tilling, K., Thapar, A., Reichborn-Kjennerud, T., & Stergiakouli, E. (2019). Association of Maternal Neurodevelopmental Risk Alleles With Early-Life Exposures. *JAMA Psychiatry*, 76(8), 834-842. <https://doi.org/10.1001/jamapsychiatry.2019.0774>
- Liaw, F. Y., Chen, W. L., Kao, T. W., Chang, Y. W., & Huang, C. F. (2017). Exploring the link between cadmium and psoriasis in a nationally representative sample. *Sci Rep*, 7(1), 1723. <https://doi.org/10.1038/s41598-017-01827-9>
- Samejo, S., Kazi, A. G., Afridi, H. I., & Kazi, T. G. (2019). Evaluate the effect of cadmium on levels of zinc in scalp hair and blood samples of smoker and nonsmoker psoriatic patients at different stage. *Environ Sci Pollut Res Int*, 26(31), 31763-31769. <https://doi.org/10.1007/s11356-019-06226-3>
- Wacewicz-Muczyńska, M., Socha, K., Soroczyńska, J., Niczyporuk, M., & Borawska, M. H. (2020). Cadmium, lead and mercury in the blood of psoriatic and vitiligo patients and their possible associations with dietary habits. *Sci Total Environ*, 757, 143967. <https://doi.org/10.1016/j.scitotenv.2020.143967>

Vitiligo

- Das, D., Akhtar, S., Kurra, S., Gupta, S., & Sharma, A. (2019). Emerging role of immune cell network in autoimmune skin disorders: An update on pemphigus, vitiligo and psoriasis. *Cytokine Growth Factor Rev*, 45, 35-44. <https://doi.org/10.1016/j.cytogfr.2019.01.001>
- Wacewicz-Muczyńska, M., Socha, K., Soroczyńska, J., Niczyporuk, M., & Borawska, M. H. (2020). Cadmium, lead and mercury in the blood of psoriatic and vitiligo patients and their possible associations with dietary habits. *Sci Total Environ*, 757, 143967. <https://doi.org/10.1016/j.scitotenv.2020.143967>

Haemolytic anaemia

- Horiguchi, H. (2007). [Anemia induced by cadmium intoxication]. *Nihon Eiseigaku Zasshi*, 62(3), 888-904. <https://doi.org/10.1265/jjh.62.888>
- Kossmann, S., Kośmider, S., & Dabrowski, Z. (1968). Hematologic changes in experimental poisoning with mercury vapor. *Acta Med Pol*, 9(1), 95-100.
- Koçak, M., & Akçil, E. (2006a). The effects of chronic cadmium toxicity on the hemostatic system. *Pathophysiol Haemost Thromb*, 35(6), 411-416. <https://doi.org/10.1159/000102047>
- Nakamura, S., Yasunaga, Y., Ikuta, Y., Shimogaki, K., Hamada, N., & Takata, N. (1997). Autoantibodies to red cells associated with metallosis--a case report. *Acta Orthop Scand*, 68(5), 495-496. <https://doi.org/10.3109/17453679708996269>
- Raval, G., Straughen, J. E., McMillin, G. A., & Bornhorst, J. A. (2011). Unexplained hemolytic anemia with multiorgan failure. *Clin Chem*, 57(11), 1485-1488. <https://doi.org/10.1373/clinchem.2010.160119>
- ROBERTS, R. H. (1956). Hemolytic anemia associated with copper sulfate poisoning. *Miss Doct*, 33(10), 292-294.
- Yachie, A., Niida, Y., Wada, T., Igarashi, N., Kaneda, H., Toma, T., Ohta, K., Kasahara, Y., & Koizumi, S. (1999). Oxidative stress causes enhanced endothelial cell injury in human heme oxygenase-1 deficiency. *J Clin Invest*, 103(1), 129-135. <https://doi.org/10.1172/JCI4165>

Celiac Disease

- Barnett, J. A., & Gibson, D. L. (2020). Separating the Empirical Wheat From the Pseudoscientific Chaff: A Critical Review of the Literature Surrounding Glyphosate, Dysbiosis and Wheat-Sensitivity. *Front Microbiol*, 11, 556729. <https://doi.org/10.3389/fmicb.2020.556729>
- Delamore, I. W. (1972). Gastrointestinal diseases. *Clin Haematol*, 1(3), 507-531.
- Elli, L., Pigatto, P. D., & Guzzi, G. (2018). Evaluation of Metals Exposure in Adults on a Gluten-Free Diet. *Clin Gastroenterol Hepatol*, 16(1), 152. <https://doi.org/10.1016/j.cgh.2017.07.035>
- Kamycheva, E., Goto, T., & Camargo, C. A. (2017). Blood levels of lead and mercury and celiac disease seropositivity: the US National Health and Nutrition Examination Survey. *Environ Sci Pollut Res Int*, 24(9), 8385-8391. <https://doi.org/10.1007/s11356-017-8545-0>
- McNamee, T., Hyland, T., Harrington, J., Cadogan, S., Honari, B., Perera, K., Fitzgerald, A. P., Perry, I. J., & Cahill, M. R. (2013). Haematinic deficiency and macrocytosis in middle-aged and older adults. *PLoS One*, 8(11), e77743. <https://doi.org/10.1371/journal.pone.0077743>
- Meftaul, I. M., Venkateswarlu, K., Dharmarajan, R., Annamalai, P., Asaduzzaman, M., Parven, A., & Megharaj, M. (2020). Controversies over human health and ecological impacts of glyphosate: Is it to be banned in modern agriculture? *Environ Pollut*, 263(Pt A), 114372. <https://doi.org/10.1016/j.envpol.2020.114372>
- Patel, N. K., & Lacy, B. E. (2018). Another Reason to Avoid the Gluten-Free Fad? *Clin Gastroenterol Hepatol*, 16(2), 184-185. <https://doi.org/10.1016/j.cgh.2017.10.002>
- Raehsler, S. L., Choung, R. S., Marietta, E. V., & Murray, J. A. (2018). Accumulation of Heavy Metals in People on a Gluten-Free Diet. *Clin Gastroenterol Hepatol*, 16(2), 244-251. <https://doi.org/10.1016/j.cgh.2017.01.034>
- Samsel, A., & Seneff, S. (2013). Glyphosate, pathways to modern diseases II: Celiac sprue and gluten intolerance. *Interdiscip Toxicol*, 6(4), 159-184. <https://doi.org/10.2478/intox-2013-0026>

Inflammatory Bowel Disease

- Borghini R, Donato G, Alvaro D, Picarelli A. New insights in IBS-like disorders: Pandora's box has been opened; a review. *Gastroenterol Hepatol Bed Bench.* 2017;10(2):79-89.
- Breton J, Daniel C, Vignal C, et al. Does oral exposure to cadmium and lead mediate susceptibility to colitis? The dark-and-bright sides of heavy metals in gut ecology. *Sci Rep.* 2016;6:19200. Published 2016 Jan 11. doi:10.1038/srep19200
- Legaki E, Gazouli M. Influence of environmental factors in the development of inflammatory bowel diseases. *World J Gastrointest Pharmacol Ther.* 2016;7(1):112-125. doi:10.4292/wjgpt.v7.i1.112
- Wang, P., Hu, J., Ghadermarzi, S. *et al.* Smoking and Inflammatory Bowel Disease: A Comparison of China, India, and the USA. *Dig Dis Sci* **63**, 2703–2713 (2018). <https://doi.org/10.1007/s10620-018-5142-0>

Type 1 Diabetes

Insulin
receptor

- Bodin, J., Bølling, A. K., Becher, R., Kuper, F., Løvik, M., & Nygaard, U. C. (2014). Transmaternal bisphenol A exposure accelerates diabetes type 1 development in NOD mice. *Toxicol Sci*, 137(2), 311-323. <https://doi.org/10.1093/toxsci/kft242>
- Bodin, J., Kocbach Bølling, A., Wendt, A., Eliasson, L., Becher, R., Kuper, F., Løvik, M., & Nygaard, U. C. (2015). Exposure to bisphenol A, but not phthalates, increases spontaneous diabetes type 1 development in NOD mice. *Toxicol Rep*, 2, 99-110. <https://doi.org/10.1016/j.toxrep.2015.02.010>
- Bodin, J., Stene, L. C., & Nygaard, U. C. (2015). Can exposure to environmental chemicals increase the risk of diabetes type 1 development? *Biomed Res Int*, 2015, 208947. <https://doi.org/10.1155/2015/208947>
- Kretowski, A., Kowalska, I., Peczyńska, J., Urban, M., & Kinalska, I. (1999). [Epidemiology of diabetes type 1 in the 0 to 29 year-old age group in Northeastern Poland, 1994-1998--prospective observations]. *Pol Arch Med Wewn*, 101(6), 509-515.
- Ludvigsson, J., Andersson-White, P., & Guerrero-Bosagna, C. (2019). Toxic metals in cord blood and later development of Type 1 diabetes. *Pediatr Dimens*, 4(2). <https://doi.org/10.15761/PD.1000186>
- Michalska, M., Wąż, P., Zorena, K., Bartoszewicz, M., Korzeniowska, K., Krawczyk, S., Beń-Skowronek, I., & Myśliwiec, M. (2019). Potential effects of microbial air quality on the number of new cases of diabetes type 1 in children in two regions of Poland: a pilot study. *Infect Drug Resist*, 12, 2323-2334. <https://doi.org/10.2147/IDR.S207138>
- Samuelsson, U., & Löfman, O. (2014). Geochemical correlates to type 1 diabetes incidence in southeast Sweden: an environmental impact? *J Environ Health*, 76(6), 146-154.
- Songini, M., Mannu, C., Targhetta, C., & Bruno, G. (2017). Type 1 diabetes in Sardinia: facts and hypotheses in the context of worldwide epidemiological data. *Acta Diabetol*, 54(1), 9-17. <https://doi.org/10.1007/s00592-016-0909-2>
- Vaktskjold, A., Arild, V., Paulsen, E. E., Elise, P. E., Talykova, L., Ljudmila, T., Nieboer, E., Evert, N., Odland, J., & Øyvind, O. J. (2004). The prevalence of selected pregnancy outcome risk factors in the life-style and medical history of the delivering population in north-western Russia. *Int J Circumpolar Health*, 63(1), 39-60. <https://doi.org/10.3402/ijch.v63i1.17647>

Glucose

Autoimmune Thyroid Disease

- Błazewicz, A., Dolliver, W., Sivsammye, S., Deol, A., Randhawa, R., Orlicz-Szczesna, G., & Błazewicz, R. (2010). Determination of cadmium, cobalt, copper, iron, manganese, and zinc in thyroid glands of patients with diagnosed nodular goitre using ion chromatography. *J Chromatogr B Analyt Technol Biomed Life Sci*, 878(1), 34-38. <https://doi.org/10.1016/j.jchromb.2009.11.014>
- Chen, A., Kim, S. S., Chung, E., & Dietrich, K. N. (2013). Thyroid hormones in relation to lead, mercury, and cadmium exposure in the National Health and Nutrition Examination Survey, 2007-2008. *Environ Health Perspect*, 121(2), 181-186. <https://doi.org/10.1289/ehp.1205239>
- Chung, S. M., Moon, J. S., Yoon, J. S., Won, K. C., & Lee, H. W. (2019). Sex-specific effects of blood cadmium on thyroid hormones and thyroid function status: Korean nationwide cross-sectional study. *J Trace Elem Med Biol*, 53, 55-61. <https://doi.org/10.1016/j.jtemb.2019.02.003>
- Dillmann, W. (2010). Cardiac hypertrophy and thyroid hormone signaling. *Heart Fail Rev*, 15(2), 125-132. <https://doi.org/10.1007/s10741-008-9125-7>
- Hybenova, M., Hrda, P., Procházková, J., Stejskal, V., & Sterzl, I. (2010). The role of environmental factors in autoimmune thyroiditis. *Neuro Endocrinol Lett*, 31(3), 283-289.
- Luo, J., & Hendryx, M. (2014). Relationship between blood cadmium, lead, and serum thyroid measures in US adults - the National Health and Nutrition Examination Survey (NHANES) 2007-2010. *Int J Environ Health Res*, 24(2), 125-136. <https://doi.org/10.1080/09603123.2013.800962>
- Nie, X., Chen, Y., Chen, C., Han, B., Li, Q., Zhu, C., Xia, F., Zhai, H., Wang, N., & Lu, Y. (2017). Lead and cadmium exposure, higher thyroid antibodies and thyroid dysfunction in Chinese women. *Environ Pollut*, 230, 320-328. <https://doi.org/10.1016/j.envpol.2017.06.052>
- Petrosino, V., Motta, G., Tenore, G., Coletta, M., Guariglia, A., & Testa, D. (2018). The role of heavy metals and polychlorinated biphenyls (PCBs) in the oncogenesis of head and neck tumors and thyroid diseases: a pilot study. *Biometals*, 31(2), 285-295. <https://doi.org/10.1007/s10534-018-0091-9>
- Schell, L. M., & Gallo, M. V. (2010). Relationships of putative endocrine disruptors to human sexual maturation and thyroid activity in youth. *Physiol Behav*, 99(2), 246-253. <https://doi.org/10.1016/j.physbeh.2009.09.015>
- Sterzl, I., Hrdá, P., Matucha, P., Potuzníková, B., & Procházková, J. (2006). [Autoimmune thyroiditis--selected etiopathogenic mechanisms]. *Vnitr Lek*, 52(10), 891-896, 898-899.
- Stojasavljević, A., Rovčanin, B., Krstić, Đ., Jagodić, J., Borković-Mitić, S., Paunović, I., Živaljević, V., Mitić, B., Gavrović-Jankulović, M., & Manojlović, D. (2019a). Cadmium as main endocrine disruptor in papillary thyroid carcinoma and the significance of Cd/Se ratio for thyroid tissue pathophysiology. *J Trace Elem Med Biol*, 55, 190-195. <https://doi.org/10.1016/j.jtemb.2019.06.009>
- Sun, X., Liu, W., Zhang, B., Shen, X., Hu, C., Chen, X., Jin, S., Jiang, Y., Liu, H., Cao, Z., Xia, W., Xu, S., & Li, Y. (2019). Maternal Heavy Metal Exposure, Thyroid Hormones, and Birth Outcomes: A Prospective Cohort Study. *J Clin Endocrinol Metab*, 104(11), 5043-5052. <https://doi.org/10.1210/jc.2018-02492>
- Yorita Christensen, K. L. (2013). Metals in blood and urine, and thyroid function among adults in the United States 2007-2008. *Int J Hyg Environ Health*, 216(6), 624-632. <https://doi.org/10.1016/j.ijheh.2012.08.005>

Multiple sclerosis (MS)

- Aliomrani, M., Sahraian, M. A., Shirkhanloo, H., Sharifzadeh, M., Khoshayand, M. R., & Ghahremani, M. H. (2016). Blood Concentrations of Cadmium and Lead in Multiple Sclerosis Patients from Iran. *Iran J Pharm Res*, 15(4), 825-833.
- Aliomrani, M., Sahraian, M. A., Shirkhanloo, H., Sharifzadeh, M., Khoshayand, M. R., & Ghahremani, M. H. (2017). Correlation between heavy metal exposure and GSTM1 polymorphism in Iranian multiple sclerosis patients. *Neurol Sci*, 38(7), 1271-1278. <https://doi.org/10.1007/s10072-017-2934-5>
- Aminzadeh, K. K., & Etminan, M. (2007). Dental amalgam and multiple sclerosis: a systematic review and meta-analysis. *J Public Health Dent*, 67(1), 64-66. <https://doi.org/10.1111/j.1752-7325.2007.00011.x>
- Attar, A. M., Kharkhaneh, A., Etemadifar, M., Keyhanian, K., Davoudi, V., & Saadatnia, M. (2012). Serum mercury level and multiple sclerosis. *Biol Trace Elem Res*, 146(2), 150-153. <https://doi.org/10.1007/s12011-011-9239-y>
- Cabral Pinto, M. M. S., Marinho-Reis, A. P., Almeida, A., Ordens, C. M., Silva, M. M. V. G., Freitas, S., Simões, M. R., Moreira, P. I., Dinis, P. A., Diniz, M. L., Ferreira da Silva, E. A., & Condesso de Melo, M. T. (2018). Human predisposition to cognitive impairment and its relation with environmental exposure to potentially toxic elements. *Environ Geochem Health*, 40(5), 1767-1784. <https://doi.org/10.1007/s10653-017-9928-3>
- Dehghanifiroozabadi, M., Noferesti, P., Amirabadizadeh, A., Nakhaee, S., Aaseth, J., Noorbakhsh, F., & Mehrpour, O. (2019). Blood lead levels and multiple sclerosis: A case-control study. *Mult Scler Relat Disord*, 27, 151-155. <https://doi.org/10.1016/j.msard.2018.10.010>
- Etemadifar, M., Mehrabi, B., Kiani-Peykani, R., Abtahi, S. H., Nekouie-Isfahani, K., Ramagopalan, S. V., & Fereidan-Esfahani, M. (2016). Soil heavy metals are associated with the distribution of multiple sclerosis in Isfahan, Iran. *Acta Neurol Scand*, 134(4), 292-299. <https://doi.org/10.1111/ane.12543>
- Forte, G., Fadda, C., Bocca, B., Erre, G. L., Passiu, G., & Madeddu, R. (2019). Association Between Exposure to Heavy Metals and Systemic Sclerosis: the Levels of Al, Cd, Hg, and Pb in Blood and Urine of Patients. *Biol Trace Elem Res*, 190(1), 1-10. <https://doi.org/10.1007/s12011-018-1509-5>
- Fulgenzi, A., Zanella, S. G., Mariani, M. M., Vietti, D., & Ferrero, M. E. (2012). A case of multiple sclerosis improvement following removal of heavy metal intoxication: lessons learnt from Matteo's case. *Biometals*, 25(3), 569-576. <https://doi.org/10.1007/s10534-012-9537-7>
- Giacoppo, S., Galuppo, M., Calabrò, R. S., D'Aleo, G., Marra, A., Sessa, E., Bua, D. G., Potortì, A. G., Dugo, G., Bramanti, P., & Mazzon, E. (2014). Heavy metals and neurodegenerative diseases: an observational study. *Biol Trace Elem Res*, 161(2), 151-160. <https://doi.org/10.1007/s12011-014-0094-5>
- Hachim, M. Y., Eleman, N. M., & Maghazachi, A. A. (2019). The Beneficial and Debilitating Effects of Environmental and Microbial Toxins, Drugs, Organic Solvents and Heavy Metals on the Onset and Progression of Multiple Sclerosis. *Toxins (Basel)*, 11(3). <https://doi.org/10.3390/toxins11030147>

Multiple sclerosis (MS)

- Ingalls, T. H. (1989). Clustering of multiple sclerosis in Galion, Ohio, 1982-1985. *Am J Forensic Med Pathol*, 10(3), 213-215. <https://doi.org/10.1097/00000433-198909000-00008>
- Komatsu, F., Kagawa, Y., Kawabata, T., Kaneko, Y., Kudoh, H., Purvee, B., Otgon, J., & Chimedregzen, U. (2012). Influence of essential trace minerals and micronutrient insufficiencies on harmful metal overload in a Mongolian patient with multiple sclerosis. *Curr Aging Sci*, 5(2), 112-125. <https://doi.org/10.2174/1874609811205020112>
- Monti, M. C., Guido, D., Montomoli, C., Sardu, C., Sanna, A., Petti, S., Lorefice, L., Marrosu, M. G., Valera, P., & Cocco, E. (2016). Is Geo-Environmental Exposure a Risk Factor for Multiple Sclerosis? A Population-Based Cross-Sectional Study in South-Western Sardinia. *PLoS One*, 11(9), e0163313. <https://doi.org/10.1371/journal.pone.0163313>
- Moradi, A., Honarjoo, N., Etemadifar, M., & Fallahzade, J. (2016). Bio-accumulation of some heavy metals in blood serum of residents in Isfahan and Shiraz, Iran. *Environ Monit Assess*, 188(5), 269. <https://doi.org/10.1007/s10661-016-5217-3>
- Napier, M. D., Poole, C., Satten, G. A., Ashley-Koch, A., Marrie, R. A., & Williamson, D. M. (2016). Heavy metals, organic solvents, and multiple sclerosis: An exploratory look at gene-environment interactions. *Arch Environ Occup Health*, 71(1), 26-34. <https://doi.org/10.1080/19338244.2014.937381>
- Paknejad, B., Shirkhanloo, H., & Aliomrani, M. (2019). Is There Any Relevance Between Serum Heavy Metal Concentration and BBB Leakage in Multiple Sclerosis Patients? *Biol Trace Elem Res*, 190(2), 289-294. <https://doi.org/10.1007/s12011-018-1553-1>
- Pamphlett, R., & Kum Jew, S. (2018). Inorganic mercury in human astrocytes, oligodendrocytes, corticomotoneurons and the locus ceruleus: implications for multiple sclerosis, neurodegenerative disorders and gliomas. *Biometals*, 31(5), 807-819. <https://doi.org/10.1007/s10534-018-0124-4>
- Phaniendra, A., Jestadi, D. B., & Periyasamy, L. (2015). Free radicals: properties, sources, targets, and their implication in various diseases. *Indian J Clin Biochem*, 30(1), 11-26. <https://doi.org/10.1007/s12291-014-0446-0>
- Tsai, C. P., & Lee, C. T. (2013). Multiple sclerosis incidence associated with the soil lead and arsenic concentrations in Taiwan. *PLoS One*, 8(6), e65911. <https://doi.org/10.1371/journal.pone.0065911>
- Waterman, S. J., el-Fawal, H. A., & Snyder, C. A. (1994). Lead alters the immunogenicity of two neural proteins: a potential mechanism for the progression of lead-induced neurotoxicity. *Environ Health Perspect*, 102(12), 1052-1056. <https://doi.org/10.1289/ehp.941021052>
-

Guillain-Barre syndrome

- Berlot, G., Viviani, M., & Bussani, R. (2000). An uncommon cause of lower limb weakness. *Intensive Care Med*, 26(1), 128-130. <https://doi.org/10.1007/s001340050025>
- Evans, S., Smith, J., & Caron, E. (2018). A Case of **Mercury Toxicity** Complicated by Acute Inflammatory Demyelinating Polyneuropathy. *J Child Neurol*, 33(13), 817-819. <https://doi.org/10.1177/0883073818790408>
- Gaioli, G. M., González, D. E., Areny, G., Grela, M., & Amoedo, D. (2020). [**Heavy metals in the environment**: Guillain-Barre like syndrome]. *Arch Argent Pediatr*, 118(1), e48-e52. <https://doi.org/10.5546/aap.2020.e48>
- Gaul, C., Leonhardt, G., Spens, A., Schneyer, U., & Zierz, S. (2005). [**Hypokalemic thyrotoxic periodic paralysis (HTPP)**. Rare differential diagnosis in case of acute tetraparesis in Europe]. *Med Klin (Munich)*, 100(9), 583-586. <https://doi.org/10.1007/s00063-005-1080-7>
- Katona, I., & Weis, J. (2017). Diseases of the peripheral nerves. *Handb Clin Neurol*, 145, 453-474. <https://doi.org/10.1016/B978-0-12-802395-2.00031-6>
- Kim, S., Takeuchi, A., Kawasumi, Y., Endo, Y., Lee, H., & Kim, Y. (2012). A Guillain-Barré syndrome-like neuropathy associated with **arsenic exposure**. *J Occup Health*, 54(4), 344-347. <https://doi.org/10.1539/joh.12-0023-cs>
- Levin, K. H. (2004). Variants and mimics of Guillain Barré Syndrome. *Neurologist*, 10(2), 61-74. <https://doi.org/10.1097/01.nrl.0000117821.35196.0b>
- Misra, U. K., Kalita, J., Yadav, R. K., & Ranjan, P. (2003). Thallium poisoning: emphasis on early diagnosis and response to haemodialysis. *Postgrad Med J*, 79(928), 103-105. <https://doi.org/10.1136/pmj.79.928.103>
- Olsson, Y. (1990). Microenvironment of the peripheral nervous system under normal and pathological conditions. *Crit Rev Neurobiol*, 5(3), 265-311.
- PEREYRA KAFER, J., POCH, G. F., & MONTEVECHIO, B. (1957). [**Thallium neuropathy** with encephalitic manifestations & polyneuritis]. *Prensa Med Argent*, 44(36), 2777-2780.
- Pigatto, P. D., Scaioli, V., & Guzzi, G. (2020). Guillain-Barré Syndrome After **Exposure to Mercury**. *J Child Neurol*, 35(1), 84-85. <https://doi.org/10.1177/0883073819872913>
- Scelsi, R., & Candura, S. M. (2012). [Occupational toxic neuropathies: morphology in peripheral nerve biopsies]. *G Ital Med Lav Ergon*, 34(4), 410-419.
- WIECK, H. H. (1964). [ACUTE POLYNEURITIS AND ITS TREATMENT]. *Med Welt*, 17, 946-951.

Rheumatoid Arthritis

- Aridi, H. I., Kazi, T. G., Brabazon, D., & Naher, S. (2011). Association between essential trace and toxic elements in scalp hair samples of smokers rheumatoid arthritis subjects. *Sci Total Environ*, 412-413, 93-100. <https://doi.org/10.1016/j.scitotenv.2011.09.033>
- Afridi, H. I., Kazi, T. G., Talpur, F. N., Naher, S., & Brabazon, D. (2014). **Relationship between toxic metals exposure via cigarette smoking and rheumatoid arthritis.** *Clin Lab*, 60(10), 1735-1745. <https://doi.org/10.7754/clin.lab.2014.131117>
- Afridi, H. I., Talpur, F. N., Kazi, T. G., & Brabazon, D. (2015). Estimation of toxic elements in the samples of different cigarettes and their effect on the essential elemental status in the biological samples of **Irish smoker rheumatoid arthritis consumers.** *Environ Monit Assess*, 187(4), 157. <https://doi.org/10.1007/s10661-015-4353-5>
- Dodge, G. R., Pidoux, I., & Poole, A. R. (1991). The degradation of type II collagen in rheumatoid arthritis: an immunoelectron microscopic study. *Matrix*, 11(5), 330-338. [https://doi.org/10.1016/s0934-8832\(11\)80204-0](https://doi.org/10.1016/s0934-8832(11)80204-0)
- Irfan, S., Rani, A., Riaz, N., Arshad, M., & Kashif Nawaz, S. (2017). Comparative Evaluation of **Heavy Metals in Patients with Rheumatoid Arthritis** and Healthy Control in Pakistani Population. *Iran J Public Health*, 46(5), 626-633.
- Joo, S. H., Lee, J., Hutchinson, D., & Song, Y. W. (2019). **Prevalence of rheumatoid arthritis in relation to serum cadmium concentrations:** cross-sectional study using Korean National Health and Nutrition Examination Survey (KNHANES) data. *BMJ Open*, 9(1), e023233. <https://doi.org/10.1136/bmjopen-2018-023233>
- Koryem, H. K., Taha, K. M., Ibrahim, I. K., & Younes, L. K. (1998). Liver toxicity profile in gold-treated Egyptian rheumatoid arthritis patients. *Int J Clin Pharmacol Res*, 18(1), 31-37.
- MEYER, W. (1952). [Indications for heavy metal therapy of rheumatoid arthritis]. *Med Tech (Stuttgart)*, 9, 289-291.
- Sun, J., Li, L., Ding, L., Liu, X., Chen, X., Zhang, J., Qi, X., Du, J., & Huang, Z. (2018). Metallothionein-1 suppresses rheumatoid arthritis pathogenesis by shifting the Th17/Treg balance. *Eur J Immunol*, 48(9), 1550-1562. <https://doi.org/10.1002/eji.201747151>
- Yang, T. H., Yuan, T. H., Hwang, Y. H., Lian, I. B., Meng, M., & Su, C. C. (2016). **Increased inflammation in rheumatoid arthritis patients living where farm soils contain high levels of copper.** *J Formos Med Assoc*, 115(11), 991-996. <https://doi.org/10.1016/j.jfma.2015.10.001>
- Yingsung, W., Zhuo, L., Morgelin, M., Yoneda, M., Kida, D., Watanabe, H., Ishiguro, N., Iwata, H., & Kimata, K. (2003). Molecular heterogeneity of the SHAP-hyaluronan complex. Isolation and characterization of the complex in synovial fluid from patients with rheumatoid arthritis. *J Biol Chem*, 278(35), 32710-32718. <https://doi.org/10.1074/jbc.M303658200>
- Zeidler, H. (2012). Great artists with rheumatoid arthritis. What did their disease and coping teach? Part II. Raoul Dufy and Niki de Saint Phalle. *J Clin Rheumatol*, 18(8), 431-436. <https://doi.org/10.1097/RHU.0b013e31827bf916>

Systemic Lupus Erythematosus (SLE)

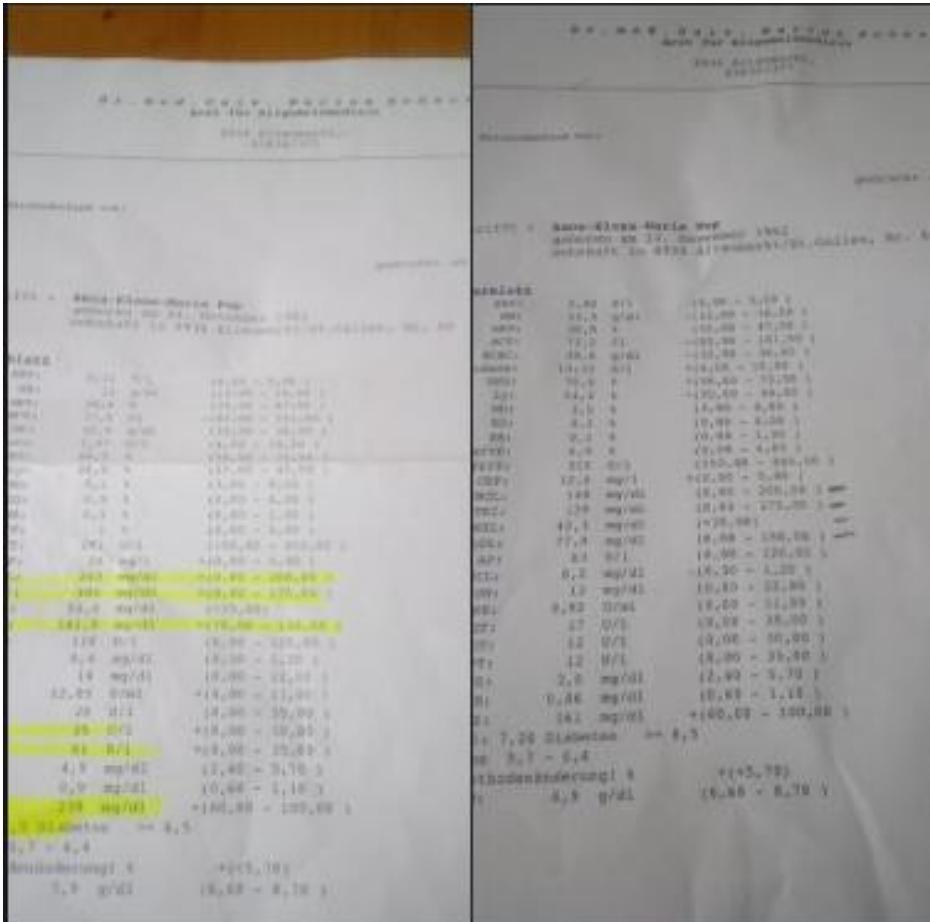
- Barbhaiya, M., & Costenbader, K. H. (2016). Environmental exposures and the development of systemic lupus erythematosus. *Curr Opin Rheumatol*, 28(5), 497-505. <https://doi.org/10.1097/BOR.0000000000000318>
- Bjørklund, G., Dadar, M., & Aaseth, J. (2018). Delayed-type hypersensitivity to metals in connective tissue diseases and fibromyalgia. *Environ Res*, 161, 573-579. <https://doi.org/10.1016/j.envres.2017.12.004>
- Brown, J. M., Pfau, J. C., Pershouse, M. A., & Holian, A. (2005). Silica, apoptosis, and autoimmunity. *J Immunotoxicol*, 1(3), 177-187. <https://doi.org/10.1080/15476910490911922>
- Cooper, G. S., Parks, C. G., Treadwell, E. L., St Clair, E. W., Gilkeson, G. S., & Dooley, M. A. (2004). Occupational risk factors for the development of systemic lupus erythematosus. *J Rheumatol*, 31(10), 1928-1933.
- Crowe, W., Doherty, L., Watson, G., Armstrong, D., Ball, E., Magee, P., Allsopp, P., Bell, A., Strain, J. J., & McSorley, E. (2015). Mercury in Hair Is Inversely Related to Disease Associated Damage in Systemic Lupus Erythematosus. *Int J Environ Res Public Health*, 13(1), ijerph13010075. <https://doi.org/10.3390/ijerph13010075>
- Dahlgren, J., Takhar, H., Anderson-Mahoney, P., Kotlerman, J., Tarr, J., & Warshaw, R. (2007). Cluster of systemic lupus erythematosus (SLE) associated with an oil field waste site: a cross sectional study. *Environ Health*, 6, 8. <https://doi.org/10.1186/1476-069X-6-8>
- Kozlova, L. K., Bagirova, V. V., & Setko, N. P. (2000a). [Characteristics of cardiac and nervous system impairment in patients with systemic lupus erythematosus from regions with various levels of environmental pollution]. *Ter Arkh*, 72(12), 43-47.
- Pan, Q., Guo, Y., Guo, L., Liao, S., Zhao, C., Wang, S., & Liu, H. F. (2019). Mechanistic Insights of Chemicals and Drugs as Risk Factors for Systemic Lupus Erythematosus. *Curr Med Chem*. <https://doi.org/10.2174/0929867326666190404140658>
- Pan, Q., Guo, Y., Guo, L., Liao, S., Zhao, C., Wang, S., & Liu, H. F. (2020). Mechanistic Insights of Chemicals and Drugs as Risk Factors for Systemic Lupus Erythematosus. *Curr Med Chem*, 27(31), 5175-5188. <https://doi.org/10.2174/0929867326666190404140658>
- Parks, C. G., & De Roos, A. J. (2014). Pesticides, chemical and industrial exposures in relation to systemic lupus erythematosus. *Lupus*, 23(6), 527-536. <https://doi.org/10.1177/0961203313511680>
- Parks, C. G., de Souza Espindola Santos, A., Barbhaiya, M., & Costenbader, K. H. (2017). Understanding the role of environmental factors in the development of systemic lupus erythematosus. *Best Pract Res Clin Rheumatol*, 31(3), 306-320. <https://doi.org/10.1016/j.bepr.2017.09.005>
- Pedro, E. M., da Rosa Franchi Santos, L. F., Scavuzzi, B. M., Iriyoda, T. M. V., Peixe, T. S., Lozovoy, M. A. B., Reiche, E. M. V., Dichi, I., Simão, A. N. C., & Santos, M. J. (2019). Trace Elements Associated with Systemic Lupus Erythematosus and Insulin Resistance. *Biol Trace Elem Res*, 191(1), 34-44. <https://doi.org/10.1007/s12011-018-1592-7>
- Stejskal, V., Reynolds, T., & Bjørklund, G. (2015). Increased frequency of delayed type hypersensitivity to metals in patients with connective tissue disease. *J Trace Elem Med Biol*, 31, 230-236. <https://doi.org/10.1016/j.jtemb.2015.01.001>
- Vasoo, S. (2006). Drug-induced lupus: an update. *Lupus*, 15(11), 757-761. <https://doi.org/10.1177/0961203306070000>

Liver and Autoimmunity

- Terzioli Beretta-Piccoli, B., Invernizzi, P., Gershwin, M. E., & Mainetti, C. (2017). Skin Manifestations Associated with Autoimmune Liver Diseases: a Systematic Review. *Clinical reviews in allergy & immunology*, 53(3), 394–412. <https://doi.org/10.1007/s12016-017-8649-9>
- Prussick, R., Prussick, L., & Nussbaum, D. (2015). Nonalcoholic Fatty liver disease and psoriasis: what a dermatologist needs to know. *The Journal of clinical and aesthetic dermatology*, 8(3), 43–45.
- Salem GI, Abdulrahman AA. Evaluation of liver function tests in scleroderma patients. *Rheumatol Int*. 2012;32(8):2371-2375. doi:10.1007/s00296-011-1963-2
- Khemichian, S., & Fong, T. L. (2011). Hepatic dysfunction in hyperthyroidism. *Gastroenterology & hepatology*, 7(5), 337–339.
- R. MALIK, H. HODGSON, The relationship between the thyroid gland and the liver, *QJM: An International Journal of Medicine*, Volume 95, Issue 9, September 2002, Pages 559–569, <https://doi.org/10.1093/qjmed/95.9.559>
- Oomes PG, van der Meché FG, Kleyweg RP. Liver function disturbances in Guillain-Barré syndrome: a prospective longitudinal study in 100 patients. Dutch Guillain-Barré Study Group. *Neurology*. 1996;46(1):96-100. doi:10.1212/wnl.46.1.96
- Arnold A 2017 Primary hyperparathyroidism: molecular genetic insights and clinical implications. Presented at Society for Endocrinology BES 2017, Harrogate, UK. *Endocrine Abstracts* **50** PL1
- Selmi, C., De Santis, M. & Gershwin, M.E. Liver involvement in subjects with rheumatic disease. *Arthritis Res Ther* **13**, 226 (2011). <https://doi.org/10.1186/ar3319>
- Nadhem ON, Janabi MA, Omer AR, Wan B. Autoimmune hepatitis with multiple sclerosis and graves disease: coincidence or association?. *Case Rep Gastroenterol*. 2014;8(2):319-323. Published 2014 Oct 8. doi:10.1159/000368551
- Barros BSV, Santos DC, Pizarro MH, del Melo LGN, Gomes MB. Type 1 Diabetes and Non-Alcoholic Fatty Liver Disease: When Should We Be Concerned? A Nationwide Study in Brazil. *Nutrients*. 2017;9(8):878. Published 2017 Aug 15. doi:10.3390/nu9080878
- van Hoek B. The spectrum of liver disease in systemic lupus erythematosus. *Neth J Med*. 1996;48(6):244-253. doi:10.1016/0300-2977(96)00003-4



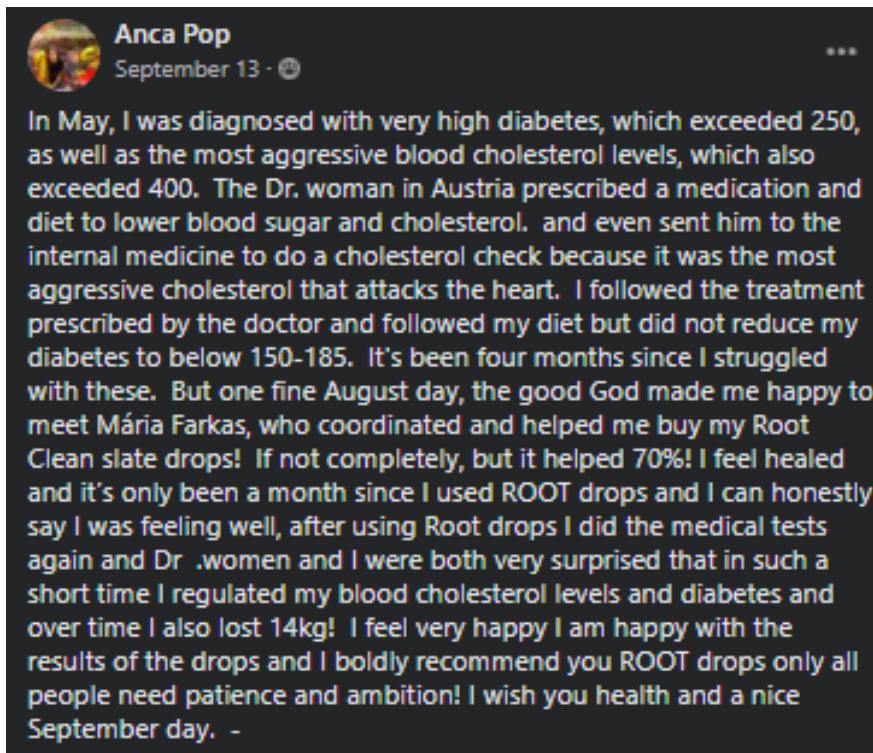
Testimonials
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EXPERIENCE: High diabetes, cholesterol, weight loss ...





Mark Eddison

August 1 · 🌎

...

Hi all fellow "Rooters" ...i just wanted to share some exciting news with you ...for over 10 years i have suffered with what is medically diagnosed as medium /aggressive Psoriasis ..mainly on my legs ..last year it took a severe twist ..it became infected and i had Cellulitis which could have lead to possible amputation ..i think you will find the photographs will outline where i was ...it was a very worrying time and as i am sure you can appreciate i genuinely did not know what my future held. I was put on a course of Methotrexate and i have to say it saved the day and i started to improve . But the scars and scaly skin remained ...As most people who suffer with Psoriasis will tell you its not just the physical scarring you live with its the Psychological scars ..living in Sunny Cyprus i was not able to wear shorts and sunbathe ...as people do not understand this dreadful disease ..creams ointments ..constant visits to Dermatologists ..all with different interpretations of how to address the issue !! Expensive applications and even a trip to the dead sea in Israel...as this is supposed to offer a healing mineral ...so after all these years and realising i was actually dealing with a auto immune problem so started using Keto diets ..vitamins and minerals which have helped but still the scarring remained and had to lean on steroid ointments to keep under control ..so a life of steroid and methotrexate was now a reality .. then i was introduced to you lovely people ..Clean Slate . WOW ...Following the instructions 2 x 10 drops per day for 3 weeks and i think you will see the changes ..no itching ..scratching ..no ointments apart from moisturising ..i have stopped taking methotrexate and at last i can see light at the end of this dreadful 10 year tunnelso please approach anyone you know with Psoriasis and share my story ..thank you ROOT for life ..Clayton for your product and informative videos and testimonials ...you have me i am hooked ..and i will be promoting Clean Slate ...even to the Dermatologists that merely offer lip service and expensive rubbish...i hope these photographs don't offend but felt you really have to understand my journey ..thank you... Mark

EXPERIENCE: Psoriasis



R | O
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EXPERIENCE: Mark Eddison - Psoriasis After 2.5 months





Miki Ettore
August 1 ·

...

Hi everyone my lovely new friend [Leanne Littlewood](#) recommended Root for my Autistic son (he is 13 years old). When he was 18 months old he was vaccine injured and regressed into severe Autism. Hair tests showed he was full of heavy metals (in particular aluminium, mercury and lead). I have done various things over the years to clear the metals but don't feel I've ever fully resolved it.

I've only been giving Fin 2 drops a day (he is very sensitive) for the past few days but I can already see a huge difference in him!

One of my biggest goals for Fin is independence which he has always lacked. I have to help him a lot.

Today I was shocked as when we got home from shopping he went to get the bags out of the car and helped me carry them to the kitchen totally unprompted! Normally he would never do something like this so I was really surprised!

He also made his own toast and buttered it, went upstairs to have a shower and then took himself off to bed by himself with no help from me at all!

Today I picked him up from club and one of his Autistic traits is he doesn't see the point of waving good bye to people. Today he waved goodbye to one of organisers at his summer sports club.

Another new thing was we were driving somewhere in car and Fin decided to turn up the volume as he wanted to hear his favourite song louder.

All of these changes have happened in his first week of taking the drops so at first I didn't link it with the drops but now it has dawned on me that there is a connection.

I'm excited to see how he progresses as one of the key areas I want to work on is speech.

Thanks again Leanne you are a star for reaching out to me ❤️

163

96 Comments

EXPERIENCE : Autism



Birgit Boesche

This is so amazing and the thought of how many people we will be able to help is just mind blowing. Well done [Leanne Littlewood](#) for reaching out to Miki.

...



Anna Mira-Ellis

I love hearing this ~ I have a nephew, exact same issue, he was a normal toddler, then he got vaccinated, and won't look at ppl, looks up at sky, won't talk (he was just starting to talk before being vaccinated, and then boom, autistic- he is now 4, I wonder if this would work, but would have to convince his mom - thank you for sharing 😊❤️ gives me hope

1 2 3



Toni Lemons

[Anna Mira-Ellis](#) anna....invite his mom to this group and tag her in this post. If i can help let me know my beautiful friend. ❤️😊❤️

1 2



Kellie Fett Valenti

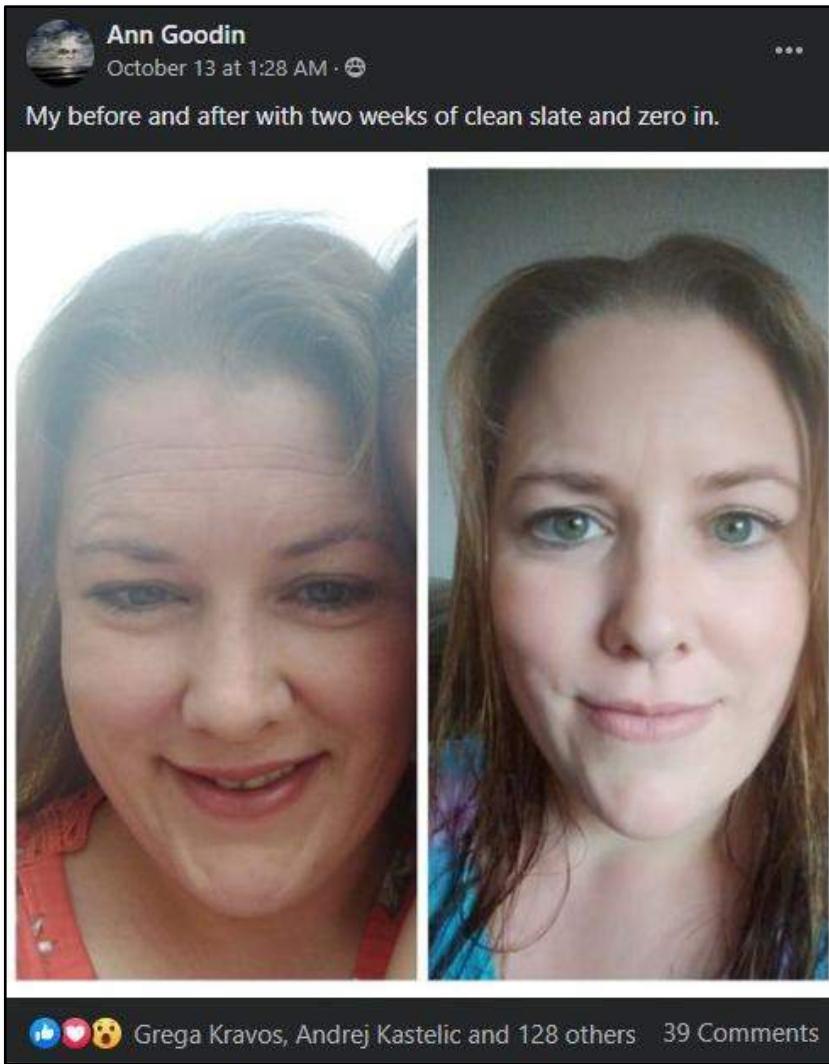
What a fantastic journey. Excited to see how your son keeps improving in his journey 😊😊

...

Like · Reply · 12w

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EXPERIENCE: Skin, No Inflammation, Brain Fog

**Wenche Anett Henriksen**

August 13 ·

...

I am so happy 😊 I have no cravings for sugar anymore, I don't get hungry all the time. So I know that I will loose weight 😊

I have fibromyalgia and was allways in pain. Now I feel so much better, no pain, I sleep all night. And my hip, that was so painful day and night, is not a problem anymore 😊



91

34 Comments

EXPERIENCE: Fibromyalgia, no sugar cravings, better sleep, no more painful hip

**Melanie Leithoff**

August 28 ·

...

Hello Rooters, I quickly wanted to give me experience with Clean Skate and Zero In. I am 38 and had Fibromyalgia for over 20 year. There has been times that I could hardly walk. Sleepless nights due to the severe pain. About a 3 weeks ago my friend [Birgit Boesche](#) recommended the Root products to me. Within a week I felt great improvement, less pain and I sleep so much better. I am looking forward to see more improvement in the month to come. Will post again.



73

16 Comments

EXPERIENCE : Better focus, energy, less depression, nails, hair, loose weight



Andie Lloyd Girard

September 30 at 5:05 AM · 🌟

I cannot say enough about Root Brands Zeroin and Clean Slate... the changes are remarkable inside and out. I think better, feel more energized, less depressed, their is definitely a smaller tummy, and my nails and hair are growing. Love it!



1 like, 1 heart, 1 wow, 58

10 Comments

EXPERIENCE : Personal trainer and nutrition coach, Anxiety, Energy, Feeling, Calmness...



Gary Pasek

May 18 · 🌟

I just started root yesterday and have 2 testimonies. I have had in the past anxiety and ptsd from being in combat. After my first 2 doses of zero in i had a calming that was not felt for 20 plus years. It was amazing last night and this morning.

I am also a Personal trainer and nutrition coach and had to try this before my workout which I did today. The workout I got today and the energy was incredible. I didnt want to stop lifting. I felt amazing vascular flow and increased atp. So thankful I have found this product.

It works on so many levels. Thanks Clayton Thomas great product!!

1 like, 1 heart, 1 wow, Janez Krašna, Clayton Thomas and 61 others 31 Comments

**Silvia Baumeister**

October 17 at 9:32 PM ·

...

Hi everybody from Canada. I am beyond thrilled with my experience with ROOT Detox

Love it and I had no major incidence like some people taking this for the first time.

On my first day just to make sure, I started with twice 5 drops, did feel not reaction at all, so the second day I went to 10 drops twice daily. My skin got better I feel like I can breathe better and the energy is great! Also it helped my second stage in my weight-loss. Down 16 kg now. I will add before and after pictures later as I have to get my after picture taken 😊

Love it and only can recommend this to everybody! Best product to date that I did experience to remove toxins out of my body!

Hope this will help for all who are still on the sideline debating if they should get it - Just Get It!



35

9 Comments

EXPERIENCE: Better skin, weight loss, more energy

EXPERIENCE: Abdominal pain gone, calmness, more energy, better skin, hair...

**Mieke Galiart-kwarten**

May 21 ·

...

Testimonial Mieke update 6-8 -2020

My name is Mieke Galiart

I'm from Holland. My whole life I have had abdominal pain, I have had thyroid cancer so my thyroid has been removed (so unfortunately I swallow a lot of junk) I must also mention that I was quite addicted to paracetamol, because I always had a headache 😞 ... I certainly used a box in the month ... big box,

Afther 1 month using Clean slate it was gone and never got back! How happy 😊 I am for Clean slate

I have always been busy in my head and since January of this year I have found out that I have old age ADHD. Since April this year 2020 I use Clean Slate 2x 10 drops per day and Zeroln 2x... and what happened is that my abdominal pain is gone and I've lost 10 pounds... And what I like so much is that I react much calmer to everything. And I also have more energy.

And I sleep 😊 that's great.

I also notice that my skin looks so beautiful and so soft, besides that my nails are so strong and nicely refreshed.

I also see changes in my hair that grow harder but they don't break so fast anymore...

How beautiful that is.

Thank you so much for these great products !

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Diana van Bakel
July 16 · 82

An update

Can you tell the difference? Left 4 weeks ago, right is today. And you're only talking about my skin, my migraine is much less, I sleep well again since a few days and all that after a few weeks. I had to go through it for a while but the result is all due to clean slate which I also do on my skin and the zero in. I am happy.



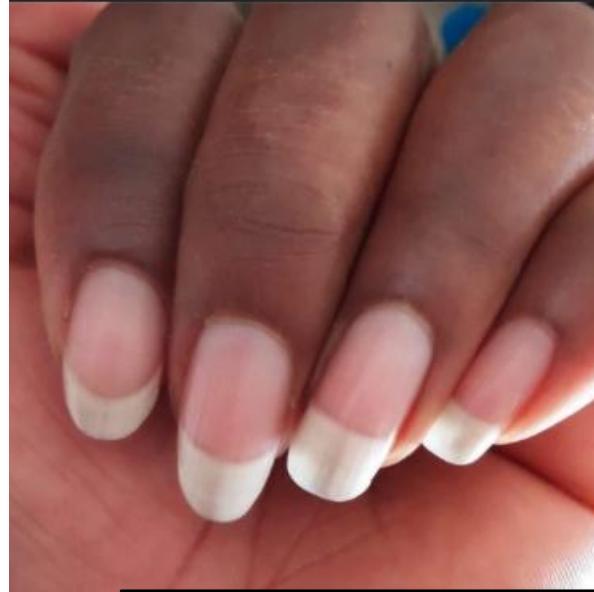
14 · 82 · 135 others · 82 Comments

EXPERIENCE: Better skin, less migraines,
Better sleep...



Lydia Halid
October 15 at 11:53 AM · 82

See what Clean slate Can do also, it's take care of your self inside and outside. It's working go for it and get your self Rooted.



The Root Brand
Healthy long nails are a sign of a healthy amazing system inside. Love the silica!!!

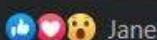
Like · Reply · 1w

1

14 · 56

13 Comments

EXPERIENCE: Strong, healthier nails



Janez Krašna, Rebeka Ukmar and 130 others

44 Comments

EXPERIENCE: Dementia



Joy Hayward
July 4 ·

...

This is my 79 year old husband, David Hayward, he started on Clean Slate late March ,at that time he walked with a shuffle, as he had no confidence in his balance. Today, July 3rd, this is him on our deck He had given up playing the trumpet and he only felt comfortable speaking with close friends as he could no longer finding words and it was difficult to understand him. His speech is still slow but he improves and he is back practicing the trumpet, painting and doing his Astrology research.

Please do not forget the older generation I cannot express my joy in watching my husband regain his ability to enjoy life. He was well aware of his limitations and knew he had been diagnosed with mild dementia over 10 years ago. He had come to accept his deteriorating brain power. Clean Slate and Zero In has given him hope. Thank Clayton Thomas and The Root Brand



Rafael Gutierrez
July 21 · 😊

Hello, my name is Rafael Gutierrez, I am originally from Mexico and I live in the United States. It's been a while since I started having health problems due to various situations. I had spent a long time with problems in my stomach, not being able to lead a normal life or eat things that anyone can eat. I had had very strong pain problems in my stomach and continued diarrhea even with bleeding. I went to different places to give a solution to my problem and in a way I managed to get a solution but without being able to live a life in which I could eat or take my health to a level that anyone has. A friend shared some Zero In capsules with me and then Clean Slate. I took the product very carefully due to my stomach problems, but I saw that all the good things they told me about the product I could experience it in my body. I feel like new, I can now use the bathroom regularly without diarrhea and stomach pain. Now I am not only painless, but I can do things like cycling that has been one of my passions in life. Now I share with you how I was able to ride a few miles today on my bike feeling great. Thank you very much to my friend and to the products that have helped me ... I hope I can help more people know that they can improve their life and health by sharing my experience!



EXPERIENCE: Stomach pain

EXPERIENCE: Difficulties with getting pregnant for 11 years, Autism, Trying to solve problems with dermatitis for 25 years

When a person who has been trying to get pregnant for 11 years calls you and tells you that her body has regenerated to the point that she got pregnant... when she asks you for contact and she cries to your phone and thank you, because we offered her Root products... when you find out she's currently in the toilet and she took a pregnancy test a few seconds ago and she's positive... and when you even realize you're the first person she shared with this information that even her pets don't even know it?!? 🙄😊 When your parents call you... whose diagnosis is autism and ADHD... and they tell you with great pleasure that their child is after 3 years Laughing again... that the second child sleeps all night 😊 When a person writes to you that after 25 years of looking for a solution for their dermatitis, which was present all over the body... she finally got rid of it...

This is all Root...

I would like to thank Root myself for being a part of this story and that Root made my life make sense 🙏

All good from me... stay healthy and love each other ❤️

12 Comments 7 Shares

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Birgit Boesche

July 19 · 😊

...

I would like to give my personal testimonial. About 3 weeks ago I started on Clean Slate and must say I was very impressed how effective it was within just a few days. I slept better, my skin has improved so much and of course felt all the signs of detox. 6 days ago I started with ZERO-IN and I have never been so focused. My problem was always to concentrate and I would start different things in between my work, now I stay focused the whole time. Amazing products. Thank you Root



40

EXPERIENCE: Better sleep, skin, focus...



Joy Hayward

Hi Birgit Zero In is amazing for getting work done! 👍 Energy yes but the ability to focus and the calm feeling of well being is what I experience now on a daily basis. I have been on it since early April and it works each and every time. I think as I am on Clean Slate longer the focus actually improves! 👍😊

Like · Reply · 14w



Birgit Boesche

I totally agree with you Joy. The focus is what really impresses me. I wake up and my mind is already so sharp. Just imagine how many people can benefit from it, there is such a huge market.

Like · Reply · 14w



Žiga Keber

October 15 at 6:30 PM ·

...

It is time to share also my personal testimony about ROOT products. First of all it is really important to say that me and my family are already living really healthy lifestyle and we try to avoid bad stuff as much as possible.

But ROOT products simply shock me. Already my first night I slept like never before in my life and since then it is like this. I noticed I have a lot more energy and focus, I am more calm and a lot more productive. But there is something I am really amazed...For over 5 years I had some kind of dermatitis on my head scalp (never asked doctor for official diagnosis). I have tried almost everything...from natural shampoos, creams, oils, etc...But nothing has helped. It was itchy and my head was full of small white "dust". It was really awful and sometimes also painful.

BUT after little less than 1 month I noticed that this problem ran away and since then never came back at all! 🌟🌟🌟🌟

I love to see how my body is eliminating heavy metals and toxins and can't wait to see what next weeks and months will bring to my and my family's health!

Thanks to ROOT products! 🌟🌟🌟



62

24 Comments

EXPERIENCE : Dermatitis, better sleep, more calm, more productive, Energy, Feeling, Calmness,

EXPERIENCE: Fungal infection, eczema...



Diana van Bakel

October 23 at 4:53 PM ·

...

After 3,5 months of using the Cleanslate and Zero, I still see improvements. See picture below before and after of my fungal infection but I also had eczema on my toes. I don't use ointment or anything like that at all this is only by doing something about it from the inside. So by cleaning my body from the inside out. So don't expect a miracle within a month, your body needs time to get rid of heavy metals and toxins.



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Katalin Sebestyén

October 25 at 8:34 PM ·

...

Hello! It's been 2 months since I used the 2 products. I feel much better, and of course the pictures say it all. Don't hesitate to order because by removing these heavy metals you will be reborn, the figure will be just the bonus of this detox hardening nails, always on the move ... the bloating pain is just a thing of the past. I feel younger and much more energetic! .. but to see the pictures .. (another 2 kg lost next to the 7 from the first month!)



45

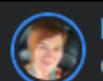
11 Comments

EXPERIENCE : Nails, bloating pain gone, energy, feel younger, loose weight...





**EXPERIENCE: Better sleep, blood sugar,
no more eating sweets...**



Maria Farkas

October 13 at 1:28 AM ·

...

Testimony of [Tiglar Cristina](#) from Romania

❤️Photos Tell EVERYTHING !!! 🍀 3 weeks since I take the drops and pills and I already feel their effect! I feel like "I'm deflating", I sleep more and better, my blood sugar levels don't increase so much anymore, I don't feel like to eat sweet as before ... I RECOMMEND these miracles that cleanse our body of everyone !! I will definitely continue! Thanks to my friend [Katalin Sebestyén](#) for thinking of me too ❤️

EXPERIENCE: Eczema, better skin, loose weight, more energy, feeling better.

This is my testimony from today 10.8. 🌸😊🌸

I am back like I promised 😊

Like I said I started to use Clean Slate clean my body from nicotine, chemicals using cleaning products on daily basis more like 10 years what I believe working perfectly but what I didn't expect and recognize till yesterday is eczema on my right leg. Probably years ago I saw that I have 2 small marks on my leg and so much itching and sometimes real pain. In London where I live is extremely bad water and my skin was always very dry. Also, I had a very bad experience with this strong water. A few years ago I have to call an emergency because 3 days I was in big pain and I thought I have an appendix. More like 6 doctors in the hospital can't find out what is a problem if even morphine didn't stop this horrible pain. It was nearly midnight when finding out that it's probably infection from water that I get using the bath. They didn't recommend me anymore drink water only filtered.

Yesterday after the shower I find out that my eczema disappeared 😊
😊😊

Also, I lost again more weight what I really don't need because I have all my life 48-52kg but before I start using Clean slate I had 58,5kg and now I have 54kg. I can say also that my pneumatic around my belly how I call it 😊 disappeared 😊. My skin is so soft. I'm 62 but I can say that I have less wrinkles like I had when I was younger and I am sure that I can thanks also for Clean slate because as Clayton said in one of his videos if we do detox more Water stay in our body. We know that reason why we have more wrinkles when we getting be old is that our bodies losing water.

So lady's isn't enough just spend so much money for expensive products get less wrinkles but drink a lot of "clean water" and use Clean slate for detox 😊



Aisha Shahzad

August 10 · 😊

...

This is my testimony from 26.6. 🌸😊🌸

When I started using Clean slate drops for the first two days I had a headache, stomach, and nausea. Then he passed. I didn't notice any change, but after 4 days, my urine smelled very strong and I went to urinate more times than before. The second week I took the drops and noticed that I had lost 2-3kg and coughed less. The reason for the cough is that I am a strong smoker and I have been working with very strong cleaning products daily for 10 years and also with dust and mold. I use the product to cleanse my lungs of nicotine, dust, mold, which has accumulated over the years and causes a dry cough. It's true that I've only been using Root Clean slate drops for 2 weeks, but I feel like I have more energy, I can handle hard work better and breathe easier. When I pick up the first bottle I will buy again and share my experiences in the group. 😊

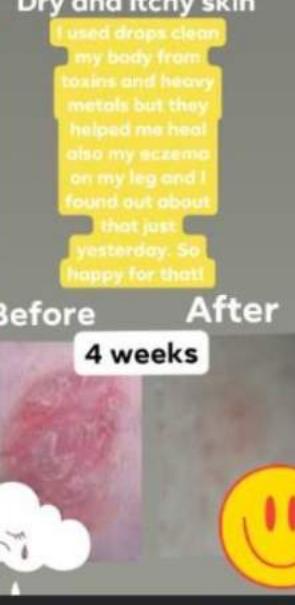


Dry and itchy skin

I used drops clean my body from toxins and heavy metals but they helped me heal also my eczema on my leg and I found out about that just yesterday. So happy for that!

Before
After

4 weeks

9 Comments

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ANSWER: Breast cancer

Mieke Galiart-kwartan ► ROOT your life
7 Jul · 51

Clayton Diana has a client who wants to use the clean slate but has had hormonal breast cancer

Can this be done without danger

Like Comment

5

Clayton Thomas ✅
The body always wants to be healthy. No cause, no problem
1 w Like Reply

Clayton Thomas ✅
Was it hormonal or possibly toxins screwing up the endocrine system and not allowing tumor suppressor genes and her immune system to work properly that show in testing as a "diagnosis" as hormonal breast cancer.
Remember mercury, cadmium, arsenic and others are hormone mimetic.
1 w Like Reply

ANSWER: Thyroid

Marie Hampel
June 18 · 6

Hey everyone! Has anyone experienced with thyroid problems and clean slate (+zero in)? 😊

Clayton Thomas, Matjaz Augus and 16 others 26 Comments
 Like Comment

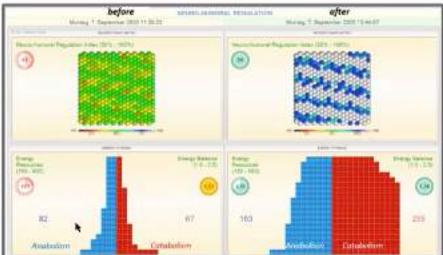
Clayton Thomas ✅
Remove the primary cause of thyroid issues (mercury) and watch the beauty of the body take over. We all function better with a CleanSlate
Like · Reply · 19w

Clayton Thomas ✅
<https://symbiosisonlinepublishing.com/.../thyroid...>

SYMBIOSISONLINEPUBLISHING.COM
Pathophysiological Mechanisms of Mercury's Effect on Thyroid Gland
Like · Reply · 19w

Clayton Thomas ✅
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3637991/>

NCBI.NLM.NIH.GOV
Thyroid Hormones and Methylmercury Toxicity
Like · Reply · 19w

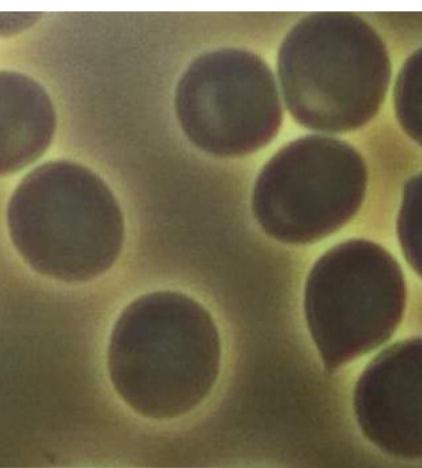
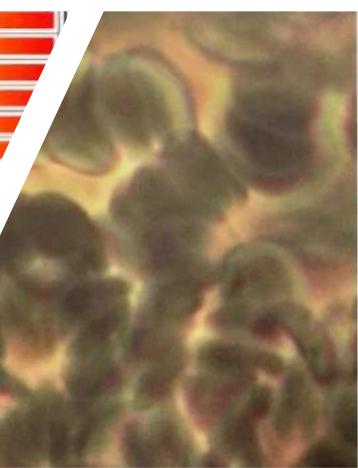
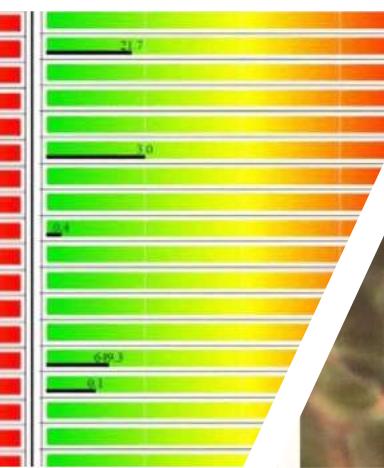
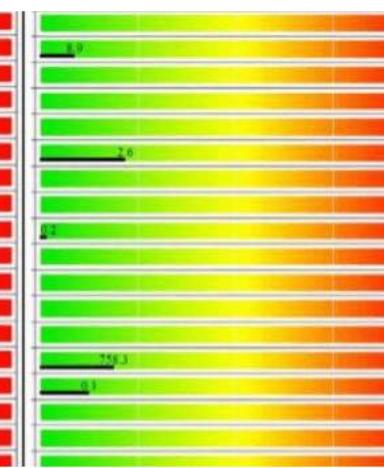


Neuro-Humoral Matrix – Central Regulation
Upper screen reveals correlations to 600 hormones and their regulatory coherence. The Neuro-Humoral Regulation draws conclusions from all organ functions. [They are small spheres and calculated in percent].
In the initial taking the person achieved 44% of Neuro-Humoral Regulation. In the final the Neurodynamic Matrix increased to 99 %.

Energy pyramid – Anabolism/Catabolism



Outcomes Speak for Themselves





ROOTS CLEAN SLATE / ZERO-IN™ and HEART RATE VARIABILITY



Variational Range of a Cardiac Cycle – ECG, Rhythmogram and the physiological systems

In the rhythmogram shown in Figures above, you can see that with a quickening of the heart rate, the curve of the rhythmogram goes down, and with a deceleration of the heart rate it goes up. This is a consequence of the regulatory systems of the body effecting these changes. This way you can see the body responding to the needs of the organs and systems, and trying to meet those needs.

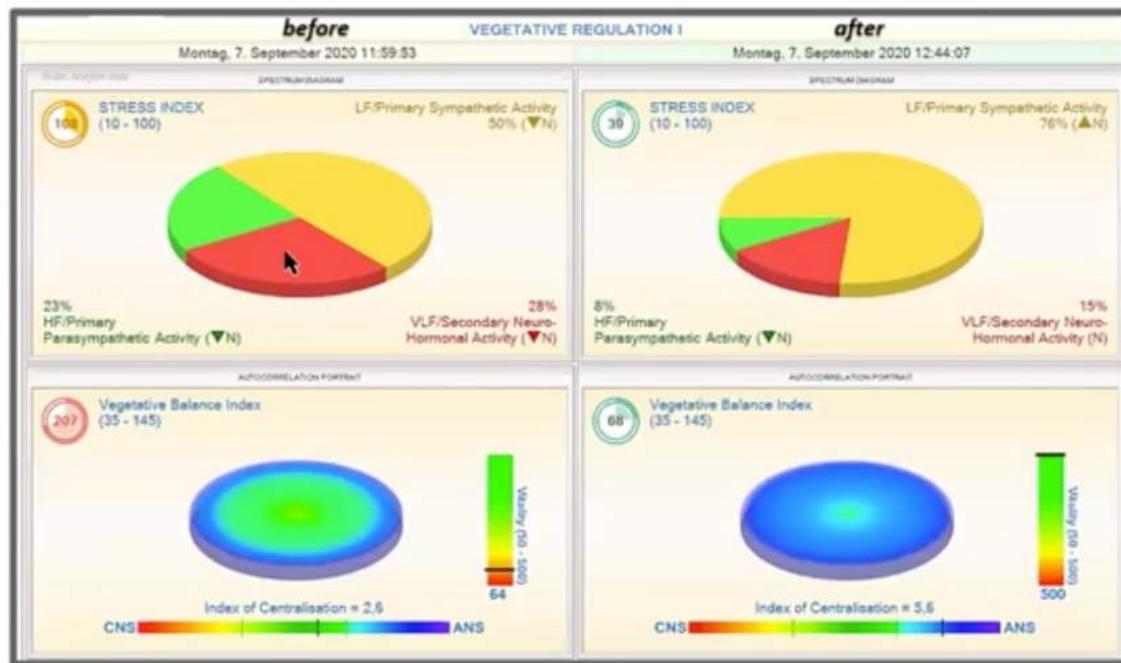
The diagram on the left shows a normal (low) HRV, whereas the diagram on the right – 45 min after fixing the ROOTS CLEAN SLATE/ZERO-IN — illustrates healthy HRV. Above you can see five overview indices of the functional state of various physiological systems:

- Cardiovascular Adaptation	49 % increased
- Vegetative Regulation	43 % increased
- Neurohormonal Regulation	55 % increased
- Psychoemotional State	54 % increased
- Health Index	50 % increased

After taking ROOTS CLEAN SLATE/ZERO-IN ALL physiological systems increase to more than 50% after 45 min.



ROOTS CLEAN SLATE / ZERO-IN™ and Vegetative Regulation III: Stressindex



Stressindex (SI)

The stressindex tells us how hard the Autonomic Nervous System has to work to maintain balance. If it is above the normal range, it is like driving a car with a faulty thermostat; eventually the engine is going to heat up and seize.

ROOTS CLEAN SLATE/ZERO-IN reduces stressindex

Vitality (Vital Force):

The index Vital Force tells us how much "fuel" the patient has in his/her body. If it is low, the use of gentle therapies or detoxification is indicated. If it is high, the person is not pushed beyond his or her capacity to tolerate the treatment.

ROOTS CLEAN SLATE/ZERO-IN increases Vitality!!!

Autonomic nervous system and stressindex

The pie chart presents the Vegetative Nervous System with its constituents Parasympathetic (green) and Sympathetic (yellow) activation as well as the level of Neurohormonal Activation (red) which ranges from the pituitary gland to the sexual organs and represents the Hypothalamus-Pituitary-Adrenal-Axis (HPA axis).

It is obviously to recognize that the assessment of the stress level in the initial test was taken with an index of 108 which is better orientation is given in yellow. This result of 108 is not bad since the index may range from 10 to 3.500 at its maximum. Yet the final test demonstrates that the **ROOTS CLEAN SLATE/ZERO-IN** had its influence on the stress signals. The stress index changed once in a positive direction and is assigned by a green index of 39 after 45 min of taking.

Vital Force and Autocorrelation

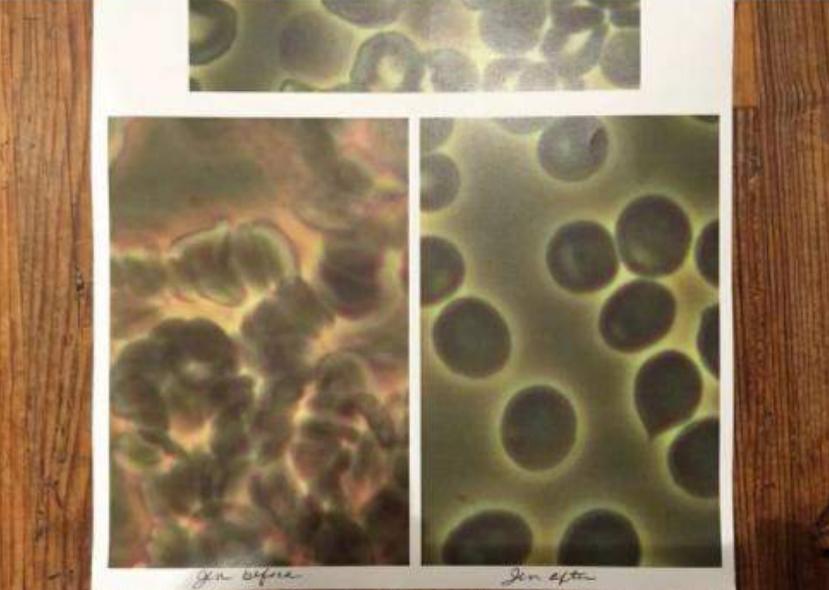
If we analyze Vitality, it will measure high when a person's metabolic state is able to switch easily and frequently between anabolic and catabolic, based on the body's needs. To measure this, we use a calculation called **Autocorrelation**. As you can see in the picture below the Autocorrelation depicts the balance between CNS (Central Nervous System) and VNS (Vegetative Nervous System). From these data the Vitality (i.e. Autocorrelation) is calculated. The first taking shows an increased value of the Index of Vegetative Balance of 207. The index should range from 35 to 145, as one can see in the picture. After taking **ROOTS CLEAN SLATE/ZERO-IN** the Index has declined to 68, which is a positive change to the person.

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 Clayton Thomas
 Moderator · March 13 · 🌎

How does CleanSlate affect your body? How quickly does it start working?

CleanSlate starts working immediately. Here is live blood analysis of a 38 year old smoker pre and 10 minutes later after 10 drops.



125

84 Comments

WORKING IMMEDIATELY – cells after 10 minutes

 Clayton Thomas
 Moderator · March 11 · 🌎

Want to see what CleanSlate does?

430% increase in mercury excretion in 7 days. 10 drops twice daily. No negative side affects.



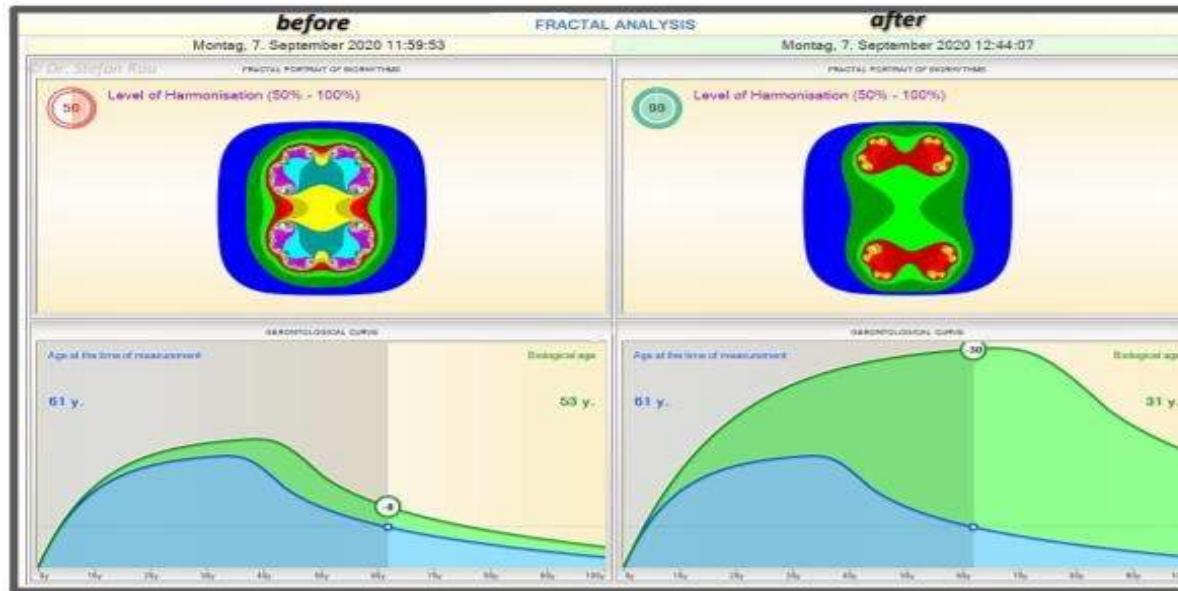
50 Comments

URINE TEST – 430% increase in mercury excretion after 7 days of use.

LABORATORY ANALYSIS



ROOT CLEAN SLATE / ZERO-IN™ and Biological Age



Fractal Portrait of the Biorhythms:

The Fractal Portrait shows "biorhythm coherence" as it correlates to downstream hormones, such as cortisol and melatonin, that influence circadian rhythms and other biorhythms.

ROOT CLEAN SLATE/ZERO-IN harmonizes the biorhthym !!!

Biological Age:

This screen shows the client's actual age and his or her "Biological" Age. When in robust health, a client's biological age should be at or lower than his or her chronological age.

ROOT CLEAN SLATE/ZERO-IN improves Biological Age !!!

Fractal Portrait of the biorhythms

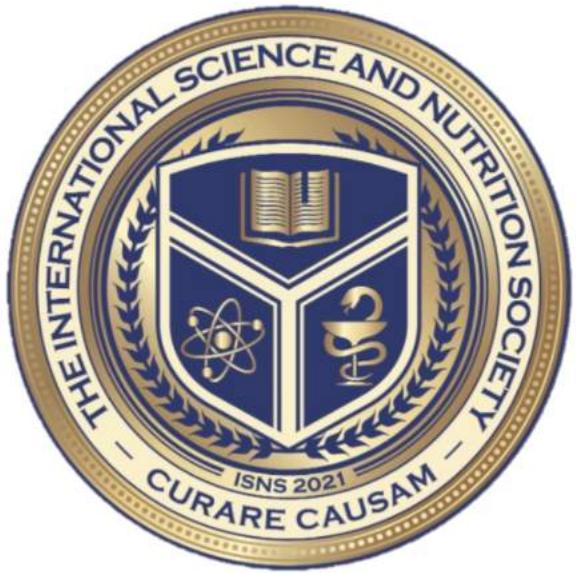
The Fractal Analysis features the degree of harmony of biological rhythms. The results are given in per cent. (Fractals by themselves demonstrate the systematic order of the disorder in the body). Disruptions in adaptability and rhythmicity can be seen or caused by both emotional and social imbalances.

In the initial measurement the test person's Harmonisation Status reached to 50%. The final taking showed positive changes. The level of harmonisation of the biological rhythms increased to 99% by taking the **ROOTS CLEAN SLATE/ZERO-IN**.

Biological Age

With increasing age, the regulatory capacity of our body diminishes and HRV decreases. At the time of our natural end of life, the HRV has also fallen to a minimum. For this reason, the HRV measurement allows conclusions about the biological age of our body. The 61-year-old test person has a biological age of 53 years in the initial measurement. In the final measurement the biological age was calculated to be 31 years, resulting in a biological rejuvenation of 22 years. This shows a breaking proof on the effects of the **ROOT CLEAN SLATE/ZERO-IN**.

Biological age BEFORE USE: actual age 61 years - biological age 53 years.
Test after 45 minutes: biological age 31 years.
Research findings by dr. Stephan Rau



ISNS Case Studies

Psoriasis (Adult) Case Study

By: Dr. Dori Naerbo, Ph.D.

Patient: Man

Age: 55-year-old

Medications: Methotrexate 15-20mg per week, numerous creams and ointment Rx and OTC.

Proprietary Blend #1: 10 drops diluted in one glass of water BID

Result: After 3 weeks, grey, scaly, inflammation, and blisters disappeared, leaving clear, smooth skin with slight discoloration due to previous damage. His regime now consists of only the Proprietary blend and moisturizer (sometimes inconsistent) and has continued to improve over four months, leading to significantly clearer skin.



LEGEND:

Proprietary blend 1: silica, vitamin c and trace minerals.

Proprietary blend 2: n-acetyl L-tyrosine, anhydrous caffeine, L-theanine, velvet bean seed, pine bark, curcumin, and vitamin d.

Proprietary blend 3: black seed oil, resveratrol, turmeric, raspberry ketone, apple cider vinegar, aloe vera, and d-ribose.

Detoxification & Immune Experience Case Study 1

By: Dr. Norbert Ketskés

Patient: Man

Age: 45-year-old

Medications: ramipril 5 mg, alprazolam 0.5 mg

Proprietary Blend #3: 1 sachet in the morning, 2 sachets a day for 7 days after 1 week, 1 sachet a day in the morning and afternoon, then 1 sachet a day

Result: after 10 days the extreme fatigue decreased, his mood improved, after 1 month the limb pains significantly decreased



LEGEND:

Proprietary blend 1: silica, vitamin c and trace minerals.

Proprietary blend 2: n-acetyl L-tyrosine, anhydrous caffeine, L-theanine, velvet bean seed, pine bark, curcumin, and vitamin d.

Proprietary blend 3: black seed oil, resveratrol, turmeric, raspberry ketone, apple cider vinegar, aloe vera, and d-ribose.

Detoxification & Immune Experience Case Study 2

By: Dr. Norbert Ketskés



Patient: Woman

Age: 35-years-old

History: 5 years autoimmune polyarthritis, wavy, recurrent pain, weakness, and swollen joints

Medications: steroids, biological therapy

Proprietary Blend #1: 2x5 drops, morning and evening, for 3 days, then every 3 days then increased by 1-1 drops every 3 days to 2x10

Proprietary Blend #3: 1 in the morning for 10 days, then 1.5 daily,

Result: after 14 days the pain gradually decreased, the joint swelling decreased, the weakness disappeared, after 1 month the pain decreased by 90% Laboratory: CRP: 45 (mg / L), ASAT- 90 (U / L)

LEGEND:

Proprietary blend 1: silica, vitamin c and trace minerals.

Proprietary blend 2: n-acetyl L-tyrosine, anhydrous caffeine, L-theanine, velvet bean seed, pine bark, curcumin, and vitamin d.

Proprietary blend 3: black seed oil, resveratrol, turmeric, raspberry ketone, apple cider vinegar, aloe vera, and d-ribose.

Post Covid Syndrome (page 1 of 2)

Case Study 1

By: Dr. Norbert Ketskés

Patient: Male

Age: 40-year-old

History: A 40-year-old male suffered from COVID infection in May this year. He is a professional athlete, non-smoker, and not obese. He experienced mild symptoms including fever, mild fatigue, and loss of taste and smell. After 2 weeks, these symptoms disappeared. His medication is Bisoprolol 5mg daily.

First consultation mid-October

- Symptoms: difficulty breathing with mild physical exertion, severe fatigue, dizziness, numbness in limbs, headache, sleep disturbance, "brain-fog", dull, difficult thinking, unable to train.
- Diagnostics (chest x-ray, ECG, cardiac ultrasound, laboratory tests)
- High pro-BNP 360pg/ml (normal up to 125) and higher liver enzyme levels: ASAT-105 (U/L) (range 0-50), ALAT-192, range (0-50)

(Treatment and Results on Next Slide)



LEGEND:

Proprietary blend 1: silica, vitamin c and trace minerals.

Proprietary blend 2: n-acetyl L-tyrosine, anhydrous caffeine, L-theanine, velvet bean seed, pine bark, curcumin, and vitamin d.

Proprietary blend 3: black seed oil, resveratrol, turmeric, raspberry ketone, apple cider vinegar, aloe vera, and d-ribose.

Post Covid Syndrome (page 2 of 2)

Case Study

By: Dr. Norbert Ketskés

Treatment/ Method:

Proprietary blend I : 2x5 drops, morning and evening, for 3 days, then every 3 days then increased by 1-1 drops every 3 days to 2x12

Proprietary blend II : 1 daily for 3 days, in the morning, then 2 daily, morning and afternoon,

Proprietary blend III :1 in the morning for 7 days, then 1.5 daily for 7 days, then 2, 1 in the morning and 1 in the evening

Results:

- After 2 weeks, his fatigue and dyspnea decreased, and headaches stopped. His dizziness and limb numbness greatly reduced, and his thinking became clear.
- After 1 month his shortness of breath and dizziness had disappeared, and his fatigue was minimal. Limb numbness is only felt during heavy physical exertion. Sleep disturbance had also disappeared, and his thinking and concentration has improved.
- Liver enzyme values have normalized: ASAT-52 (U/L) (range 0-50), ALAT-50, range (0-50)
- The specific pro-BNP value has decreased from **360 to 170!**
- He was able to return to regular exercise



LEGEND:

Proprietary blend 1: silica, vitamin c and trace minerals.

Proprietary blend 2: n-acetyl L-tyrosine, anhydrous caffeine, L-theanine, velvet bean seed, pine bark, curcumin, and vitamin d.

Proprietary blend 3: black seed oil, resveratrol, turmeric, raspberry ketone, apple cider vinegar, aloe vera, and d-ribose.

Post Covid Syndrome Live Blood Analysis

Case Study 2

By: Dr. Norbert Ketskés

Patient: Female

Age: 36-year-old

History: A 36-year-old female, (she received her second Pfizer vaccination in August) suffered from COVID infection October 2021. She is a professional athlete, non-smoker, and not obese. She experienced severe symptoms including high fever, severe fatigue, severe cough, dyspnoea, and loss of taste and smell. Her medication was Covid protocol in Hungary (Favipiravir, aspirin, Azithromycin, LMWH, Vitamin D3, Vitamin C)

First consultation was 2 weeks after acute infection and after 2 negative PCR test.

- Symptoms: difficulty breathing with severe physical exertion, severe fatigue, dizziness, numbness in limbs, headache, mild cough, difficulty thinking, unable to train.
- Diagnostics (chest x-ray, ECG, cardiac ultrasound, laboratory tests)
- Pulsoxymeter: 89% (normal up to 95%) High pro-BNP 285 pg/ml (normal up to 125) and high inflammatory parameter (CRP: 205 mg/l, normal up to 5,0) and higher liver enzyme levels: ASAT-115 (U/L) (range 0-50), ALAT-182, range (0-50)

(Treatment and Results on Next Slide)



LEGEND:

Proprietary blend 1: silica, vitamin c and trace minerals.

Proprietary blend 2: n-acetyl L-tyrosine, anhydrous caffeine, L-theanine, velvet bean seed, pine bark, curcumin, and vitamin d.

Proprietary blend 3: black seed oil, resveratrol, turmeric, raspberry ketone, apple cider vinegar, aloe vera, and d-ribose.

Post Covid Syndrome Live Blood Analysis

Case Study 2

By: Dr. Norbert Ketskés

Treatment/ Method:

Proprietary blend I : 2x6 drops, morning and evening, for 2 days, then every 2 days then increased by 1-1 drops to 2x10.

Proprietary blend II : 1 daily for 3 days, in the morning, then 2 daily, morning and afternoon for 3 days, then 3 daily, 2 in the morning and 1 afternoon.

Proprietary blend III :1 in the morning for 3 days, then 1.5 daily for 3 days, then 2, 1 in the morning and 1 in the evening.

Results:

- After 2 weeks: her breathing improved, her tiredness and cough decreased, her headache disappeared, and her concentration improved.
- CRP: from 205 to 100mg/l, Pulsox.: from 88 to 94%,
- After 1 month: her breathing returned to normal, her tiredness and cough disappeared, her concentration further improved.
- Liver enzyme values have normalized: ASAT-48 (U/L) (range 0-50), ALAT-53, range (0-50)
- The specific **pro-BNP value has decreased from 285 to 150!**
- CRP: from **100 to 10mg/l**, Pulsox.: from 94-98%,
- She was able to return to regular life



LEGEND:

Proprietary blend 1: silica, vitamin c and trace minerals.

Proprietary blend 2: n-acetyl L-tyrosine, anhydrous caffeine, L-theanine, velvet bean seed, pine bark, curcumin, and vitamin d.

Proprietary blend 3: black seed oil, resveratrol, turmeric, raspberry ketone, apple cider vinegar, aloe vera, and d-ribose.

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CASE STUDY 2:

Post-COVID Syndrome with Live Blood Analysis



Patient: Female

Age: 36-year-old

History: A 36-year-old female, (she received her second Pfizer vaccination in August) suffered from COVID infection October 2021. She is a professional athlete, non-smoker, and not obese. She experienced severe symptoms including high fever, severe fatigue, severe cough, dyspnoea, and loss of taste and smell. Her medication was Covid protocol in Hungary (Favipiravir, aspirin, Azithromycin, LMWH, Vitamin D3, Vitamin C)

First consultation was 2 weeks after acute infection and after 2 negative PCR test.

- Symptoms: difficulty breathing with severe physical exertion, severe fatigue, dizziness, numbness in limbs, headache, mild cough, difficulty thinking, unable to train.
- Diagnostics (chest x-ray, ECG, cardiac ultrasound, laboratory tests)
- Pulsoxymeter: 89% (normal up to 95%) High pro-BNP 285 pg/ml (normal up to 125) and high inflammatory parameter (CRP: 205 mg/l, normal up to 5,0) and higher liver enzyme levels: ASAT-115 (U/L) (range 0-50), ALAT-182, range (0-50)

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CASE STUDY 2:

Post-COVID Syndrome with Live Blood Analysis



Treatment/ Method:

Proprietary blend I : 2x6 drops, morning and evening, for 2 days, then every 2 days then increased by 1-1 drops to 2x10.

Proprietary blend II : 1 daily for 3 days, in the morning, then 2 daily, morning and afternoon for 3 days, then 3 daily, 2 in the morning and 1 afternoon.

Proprietary blend III :1 in the morning for 3 days, then 1.5 daily for 3 days, then 2, 1 in the morning and 1 in the evening.

Results:

- After 2 weeks: her breathing improved, her tiredness and cough decreased, her headache disappeared, and her concentration improved.
- CRP: from 205 to 100mg/l, Pulsox.: from 88 to 94%,
- After 1 month: her breathing returned to normal, her tiredness and cough disappeared, her concentration further improved.
- Liver enzyme values have normalized: ASAT-48 (U/L) (range 0-50), ALAT-53, range (0-50)
- The specific **pro-BNP value has decreased from 285 to 150!**
- CRP: from **100 to 10mg/l**, Pulsox.: from 94-98%,
- She was able to return to regular life

ISNS Paediatric Asthma Case Study

By: Dr. Tina Božičnik

Patient: Female

Age: 7-year-old

History: A 7-year-old female with asthma on regular Ventolin and Flixotide 125 mcg treatment experienced worsening of her condition.

Treatment/ Method: She went through an integrative medicine protocol for gut health which included Silica in Proprietary formula starting 2 drops in the morning and 2 at night. Increasing the dose for 1 drop weekly. After 2 weeks she started having episodes of mucus discharge from her nose during the day and some mucus in her stools, otherwise of normal consistency. After the increase of the dose to 3 drops, twice daily, she started experiencing severe mucus expectoration, especially during the night. Those episodes lasted a week, but during this phase she reported her breathing was easier and she was actually feeling relief after the episodes of cough.

Results: The parents were advised to stay on the dose she was on or lower if the coughs would get worse during the night, because of the importance of a good quality sleep. She remained on 3 drops BID and her stools got normal in the matter of two days. After the stools normalised, the cough episodes during the night stopped completely. She started sleeping better they reported no wheezing., even during the day. In the course of next 2 months, she started sleeping even better, her overall performance increased, she didn't need to use any Ventolin; in addition, her pulmonologist lowered the dose of inhalatory corticosteroids to minimum and in 6-months from the start of the treatment she came off Flixotide completely.



LEGEND:

Proprietary blend 1: silica, vitamin c and trace minerals.

Proprietary blend 2: n-acetyl L-tyrosine, anhydrous caffeine, L-theanine, velvet bean seed, pine bark, curcumin, and vitamin d.

Proprietary blend 3: black seed oil, resveratrol, turmeric, raspberry ketone, apple cider vinegar, aloe vera, and d-ribose.

Depression with Schizoaffective Disorder Case Study

By: Dr. Tina Božičnik

Patient: Female

Age: 68-year-old

History: A 68-year-old female with a history of severe Schizoaffective disorder with severe depression since 1996. Her symptoms included lack of motivation, almost non active during the day, immersed into her own thoughts, and experienced fears. She was on antidepressants and experienced severe extrapyramidal side effects; therefore, she was on Biperiden (Akinetone), Risperidone (Risset) and Paroxetine tablets. She had marked signs of insulin resistance. Her family reported severe problems with the ability to focus, deepening depression up to the point where she stopped eating and needed to be hospitalized for I.V. fluids several times in 2 consecutive years. Her past medical history showed no significant reports.

Treatment/ Method: She began on 10 drops of Proprietary blend 1 and 1 capsule Proprietary blend 2 B.I.D. After seeing some improvements in her symptoms, she then increased to Proprietary blend 2, 2-3 times a day



LEGEND:

Proprietary blend 1: silica, vitamin c and trace minerals.

Proprietary blend 2: n-acetyl L-tyrosine, anhydrous caffeine, L-theanine, velvet bean seed, pine bark, curcumin, and vitamin d.

Proprietary blend 3: black seed oil, resveratrol, turmeric, raspberry ketone, apple cider vinegar, aloe vera, and d-ribose.

ISNS CASE STUDY: Post-COVID Syndrome



Patient: Male

Age: 40-year-old

History: A 40-year-old male suffered from COVID infection in May this year. He is a regular sportsman, non-smoker, and not obese. He experienced mild symptoms including fever, mild fatigue, and loss of taste and smell. After 2 weeks, these symptoms disappeared. His medication is Bisoprolol 5mg daily.

First consultation was middle of October

- Symptoms: difficulty breathing with mild physical exertion, severe fatigue, dizziness, numbness in limbs, headache, sleep disturbance, "brain-fog", dull, difficult thinking, unable to do sports because she could not do sports.
- Diagnostics (chest x-ray, ECG, cardiac ultrasound, laboratory tests)
- High pro-BNP 360pg/ml (normal up to 125) and higher liver enzyme levels: ASAT-105 (U/L) (range 0-50), ALAT-192, range (0-50)

(Treatment and Results on Next Slide)

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CASE STUDY:

Post-COVID Syndrome



Treatment/ Method:

Proprietary blend III :1 in the morning for 7 days, then 1.5 daily for 7 days, then 2, 1 in the morning and 1 in the evening

Proprietary blend II : 1 daily for 3 days, in the morning, then 2 daily, morning and afternoon,

Proprietary blend I : 2x5 drops, morning and evening, for 3 days, then every 3 days then increased by 1-1 drops every 3 days to 2x12

Results:

- After 2 weeks, his fatigue and dyspnea decreased, and his headaches stopped. His dizziness and limb numbness greatly reduced and his thinking became fresher.
- After 1 month his shortness of breath and dizziness had disappeared, and his fatigue was minimal. Limb numbness is only felt during heavy physical exertion. Sleep disturbance had also disappeared, and his thinking and concentration have improved.
- Liver enzyme values have normalized: ASAT-52 (U/L) (range 0-50), ALAT-50, range (0-50)
- The specific pro-BNP value has decreased from 360 to 170!
- He was able to return to regular exercise

More information

This explains all 5 products:

<https://www.youtube.com/watch?v=znKPd-o5iBg>

This explains the quantum aspects:

<https://www.youtube.com/watch?v=cx8lIqXoiXc&t=1677s>

Reverse Biological Age, Trinity Clinical Outcomes Analysis:

<https://www.youtube.com/watch?v=foMydu7wzNE&t=568s>

Referral link:

<https://www.therootbrands.com/cryptocaleb>

Take a look at this to understand the compensation:

<https://vimeo.com/687482027> (Password: SMT2022)

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referral username: cryptocaleb