General Mitochondrial and Wellness Protocol

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Based on: https://bornfree.life/understanding-the-model/6/updated-disease-model-wip/45/

This is an experimental protocol which may be helpful for supporting the unique nutritional and wellness / lifestyle requirements of people with:

Myalgic Encephalomyelitis / Chronic Fatigue Syndrome (ME/CFS). Long COVID / Long Haulers. Viral / Post-Viral Chronic Fatigue. Post-Exertional Malaise (PEM). "Floxed". Migraines. Breathlessness. Hypoxia. Acidosis. Alkalosis / pH Dysregulation. Dysregulated Cortisol. Dyslipidemia. Alopecia. Post Finasteride Syndrome (PFS). Post SSRI Sexual Dysfunction (PSSD). Post Accutane Syndrome. Small Fibre Peripheral Neuropathy (SFPN). Mast Cell Activation Syndrome (MCAS). Diamine Oxidase (DAO) Deficiency. Histamine intolerance. Brain Fog. Sleep disorders. Major and other types of Depression. Anxiety. Postural Orthostatic Tachycardia Syndrome (POTS). Autism Spectrum Disorders (ASD). Chronic Inflammatory Response Syndrome (CIRS). Fibromyalgia. Dysautonomia. Frequent Urination. GI Disorders. "Small Intestinal Bowel Overgrowth" (SIBO). Vitamin B6 Toxicity. Vitamin A Toxicity. Candidiasis. Aspergillosis. Ehlers Danlos Syndrome (EDS). Joint Pain. Connective Tissue Disorders. Tinnitus. Polycystic Ovary Syndrome (PCOS). Erectile Dysfunction. Elevated Cholesterols / Fasting Glucose / D-Dimer. Hashimotos.

NB. While all efforts are continuing to be made in eliminating them, some temporary paradoxical effects may be observed during protocol commencement. As certain deficiencies are corrected and neurotransmitter homeostasis is reset, paradoxical effects may include: temporary adrenaline and heart rate increases. Resolving a severe copper deficiency may induce temporary kidney pain and nausea in some cases. *Increasing energy availability will often initially increase immune activity and related symptoms severity, which can be psychologically challenging and create some fear in continuing to move forward with the process.*

Herxheimer effects from microbial die-off can also be experienced. Existing "burning" sensations and headaches may also "flare". Temporary changes to libido / menstruation may be expected. Improvements to adaptive immune function are expected to occur during this protocol, which may result in some short periods of productive, yet otherwise unpleasant tissue inflammation and/or fever, flu-like symptoms, nausea, fatigue, etc. Our Discord hosts a support group.

Monitoring Lactate Dehydrogenase (LDH) - target 100-150 mmol/L (or in-range LD5), D-dimer, B6, cholesterols and fasting glucose via blood tests would be suggested.

Disclaimer: This protocol contains research / educational information ONLY. Always consult with your doctor to make sure this information is appropriate for you, especially if taking medications, eg. SNRI /SSRI, beta blockers, MAO inhibitors, **drugs metabolised by CYP2D6**, etc.

INTRODUCTION

Our ongoing research has identified IFN-α:IFN-γ immune dysregulation and a persistent / cyclic inflammatory cascade that causes a functional insufficiency of at least 9 important minerals that use a common pair of transporters - Divalent Metal Transporter 1 and Ferroportin.

Thanks to microbiome dysbiosis and biofilm formation in any mucosal tissue(s), further deficiencies are observed in this disease model, downstream of silicon excretion / depletion as a (microbial-sourced) Si-acetaldehyde adduct, coupled with any dietary restrictions and further alterations in mineral homeostasis from endotoxins / mycotoxins. Lithium and rubidium insufficiencies can also exacerbate catecholamine metabolism and cause renal dysfunction.

The human body contains a large number of elements. Many of these elements have been well-documented as having important biological activity in humans.

Total Elemental Content of a 70kg Human Being

Element	Mass		Element	Mass		Element	Mass		Element	Mass	
Oxygen	45	kg	Gallium	700	mg	Nickel	15	mg	Lanthanum	800	mcg
Carbon	13	kg	Rubidium	680	mg	Chromium	14	mg	Tellurium	700	mcg
Hydrogen	8	kg	Strontium	320	mg	Manganese	12	mg	Yttrium	600	mcg
Nitrogen	1.8	kg	Bromine	260	mg	Arsenic	7	mg	Bismuth	500	mcg
Calcium	1	kg	Lead	120	mg	Lithium	7	mg	Thallium	500	mcg
Phosphorus	780	g	Copper	72	mg	Mercury	6	mg	Indium	400	mcg
Potassium	140	g	Aluminium	60	mg	Caesium	6	mg	Gold	200	mcg
Sulfur	140	g	Cadmium	50	mg	Molybdenum	5	mg	Scandium	200	mcg
Sodium	100	g	Cerium	40	mg	Germanium	5	mg	Tantalum	200	mcg
Chlorine	95	g	Barium	22	mg	Cobalt	3	mg	Vanadium	110	mcg
Magnesium	19	g	Tin	20	mg	Ruthenium	7	mg	Thorium	100	mcg
Iron	4.2	g	Iodine	20	mg	Antimony	2	mg	Uranium	100	mcg
Fluorine	2.6	g	Titanium	20	mg	Silver	2	mg	Samarium	50	mcg
Zinc	2.3	g	Boron	18	mg	Niobium	1.5	mg	Tungsten	20	mcg
Silicon	1	g	Selenium	15	mg	Zirconium	1	mg	Beryllium	36	mcg

When chronic, a number of the functional mineral insufficiencies from inflammation can turn into systemic deficiencies, which impair immune function / pathways. Inferring intracellular minerals with serum testing during chronic inflammation is problematic due to the alterations in transporter behaviour. Correcting some of these deficiencies via diet and/or supplements is equally challenging due to the cyclic nature of the disease model and impaired absorption.

This metabolic cascade appears in a surprising number of infections and chronic diseases. The model describes severe mitochondrial dysfunction, hypoxia, neurological alterations, collagen synthesis issues and immune deficiency. This is not an exhaustive list. The pattern of elemental deficiencies are also predictive of various disease features, when mapped to impairment of related enzymatic reactions. Ongoing improvements to solving all these problems are reflected in protocol updates.

“THE PROTOCOL”

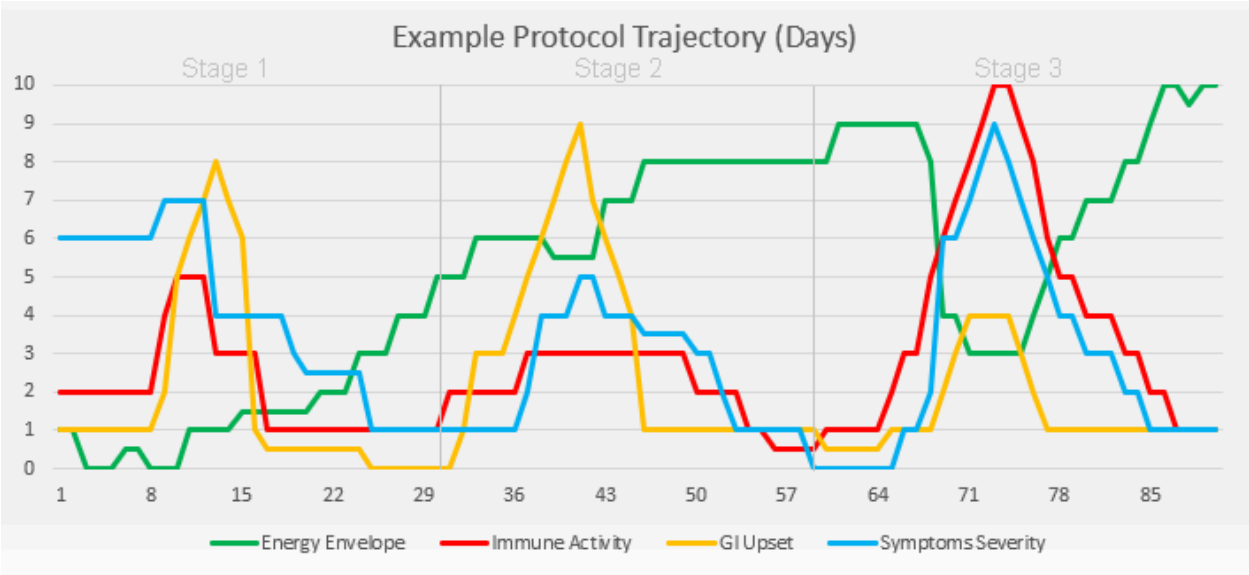
Please read the entire document before attempting anything you read here.

This protocol begins with a data collection process that helps you to identify specific deficiencies relevant to your metabolism (see “COLLECT YOUR DATA”) and select appropriate products (see “CALCULATE SUPPLEMENT DOSES”).

There are multiple tests required to collect this data and the protocol is *unlikely to succeed without them*.

1. It is fully expected that people exploring this protocol are ***highly*** sensitive to supplements. The reasons for this are described in the disease model and accounted for in the protocol.

2. This protocol is intended to stimulate immune activity and should produce a “J-curve” trajectory, making you feel progressively “quite sick” at the beginning of each stage. Increasing energy availability will allow increased immune activity, which diverts energy metabolism towards these goals as a high priority, *temporarily* increasing symptoms. Carefully maintaining electrolytes, copper, zinc, iron, manganese, selenium, glycogen and B vitamin status may help prevent severe symptoms and PEM / crashing.



This is an example, however your trajectory will be influenced by pace of the protocol implementation, pathogens, baseline at beginning and the consistency / accuracy of your participation each day. Avoiding or delaying part of the protocol will hinder progress and potentially create avoidable unpleasantness. Support is available in the Discord server.

3. First assess your lymphatic system as described in the "LYMPHATIC MAINTENANCE" section. *Take note of any tissues which have been or continue to be sore / stiff / inflamed - **these will be expected to flare during immune activity***. These may also be adjacent to other infected tissues.

4. To help REDUCE expected symptoms when correcting deficiencies and herxheimer (fungal die-off) effects, from any improved immune activity, a starting order has been provided.

This die-off effect is responsible for a number of temporary, but highly debilitating symptoms, such as headaches, nausea, additional fatigue, dizziness, swollen glands, bloating / gas, constipation or diarrhoea, joint or muscle pain, tachycardia, chills, cold hands / feet, itchiness, rashes, sweating and/or fever which resembles the "disulfiram effect".

5. A schedule of **SPECIFIC PRODUCTS HAVE BEEN INDICATED, with vendor website links supplied for different regions (see "ORDER YOUR SUPPLEMENTS")**.

These are not "affiliate marketing" links - there are no financial incentives / benefits derived by us by providing them in any way. If there are any supply shortages, please try to find the SAME product at another vendor or ask for help in the community Discord server.

6. Deviations from the **starting order** or **products** may induce **avoidable and unpleasant symptoms**.. *or **simply fail to absorb / work**. You can space out the stages further, as needed*. Despite the large schedule of supplements, other than 1 or 2 items included to make your experience more tolerable, these are all necessary. People trying to do their own "lite" version of this protocol and swap / leave out items has reliably led to failure.

7. Fulvic acid is used in Stage 3 of the protocol. Due to fulvic acid's potent and desired ability to "liberate" and recirculate metals that are being sequestered during chronic inflammation, it is suggested that you test your response to a single drop of the the Good State Fulvic Ionic Man (multi-mineral) in a glass of water in Stage 2 of the protocol and increase doses slowly. If you experience any unpleasant effects, take a few days to titrate up from a smaller dose (eg. place a drop in a bottle of water, mix and then transfer a drop from this first dilution into another glass of water) until you can consume a standard serving without observing these effects.

8. If you have nasal inflammation or notice any nasal airway resistance / restriction when breathing in, performing a MARCoNS test through your health practitioner could be appropriate. Candida, Aspergillus, Streptococcus, Staphylococcus and Klebsiella species are unwanted microorganisms sometimes found in the nasopharynx. These tests may also indicate susceptibility of detected strains to interventions like fluconazole, itraconazole, voriconazole, amoxicillin, etc.

9. Relating to aldehyde metabolism insufficiency, if your magnesium, zinc, molybdenum, selenium, iron, iodine, or calcium levels are low, you may experience additional symptoms which would be enhanced by consuming excess **alcohol, histamine, PEG, Vitamin A or B6**.

Neurotransmitter metabolism,histamine and gut issues are common / expected.

10. **While getting started, you may help avoid unwanted symptoms by consuming the suggested food items, taurine, acetyl L-carnitine and electrolytes to reach the suggested total daily intakes.** *Liberally applying the magnesium gel 2+ times / day, after showering, can be highly effective.*

11. Correcting severe electrolyte deficiencies can create temporary paradoxical effects and increased rates of metabolism, heart rate, etc. NB. Consuming certain minerals (copper, zinc, etc) on an empty stomach will easily induce nausea.

12. If taurine or magnesium affect sleep or cause palpitations, tremors or you "feel worse" when starting them, this may indicate a calcium deficiency. Adding 1-2g of calcium per day may correct this, however be aware that correcting a calcium deficiency can start the process of dumping oxalates, which is necessary but likely to cause muscle pain, etc. Low calcium may coincide with strontium and phosphorus deficiency. The tests included in this protocol will help indicate these. Low strontium in hair testing may provide a proxy indication for calcium deficiency.

13. Correcting an iodine deficiency is likely to temporarily increase anti-TPO and Thyroid Stimulating Hormone (TSH), increasing Na^+/I^- symporter (NIS), while improving T3/T4.

14. There is an annoyingly long list of individual supplements required for this protocol, which creates a new problem to solve. We're working with some compounding pharmacies to simplify it all - transforming most of Stage 1 into two sublingual lozenges (troches) and a tub or bag of premixed powder. A DIY powder recipe is also included. Items are highlighted in orange. [NB. I obtain no financial benefit from these products.]

The lozenges are available now (and premixed powder is a work in progress.)
https://bornfree.life/download/troche_order_form.xlsx

In "STAGE 1" and "ORDER YOUR SUPPLEMENTS" any items replaceable by 2 compounded troches are highlighted in yellow. They have a slightly different dosing schedule, both taken after breakfast and dinner, but 15-30 mins apart.

15. Consuming mixed inositols will signal for your cells to increase glucose uptake and glycogen synthesis, promoting glycolysis over other energy pathways. Inositol inhibits catalase, which may decrease capacity for oxidative stress during immune activity, requiring more antioxidant support. If your liver and muscle glycogen stores are low (expected), you will initially feel "really hungry" or have hypoglycaemic symptoms - dizzy, depressed, extreme fatigue. Consuming up to 500g of additional "net" carbohydrates and water, spread over 2-3 days to replenish glycogen stores should allow you to feel a LOT better. Glycogen binds with water at 1:3, so your total mass should increase by 2kg. Inositol can be problematic if eating a ketogenic diet. **NB. (Myo:)D-chiro inositol should be optimised around eg. (100mg:)2.5mg dosing.**

STAGE 1 - Remineralisation, increasing collagen synthesis rates and performing a controlled initial "die-off". (Typically at least 2 weeks. Proceed slowly.)

This stage can be initially unpleasant due to the microbial 'die-off' effect - even though it is being minimised. Slow things down, as needed / use reduced doses and build up. 100mg/day aspirin can be helpful at this stage to help inflammation / hypoxia. However, items are also complementary and moving too slowly during Stage 1 implementation may lead to an unsupported / unsustainable increase of immune activity, reducing energy availability and leading to lower glycogen and oxidative stress induced damage.

Start adding items in the order listed. Pre/post meals = 30 minutes away from the meal.
[#*] = start **SLOWLY** - may cause temporary unpleasant symptoms. **[#V]** = use vaginal douche.
[#S] = sublingual dosing normally required. **[#T]** = topical / transdermal / mucosal.
[#R] = rectal / retention enema for 3 weeks only. eg. **[#*STR]** = all. Items with weekly DIY powder amounts noted can be premixed and taken 3x/day before meals for convenience. Highlighted items available in a custom troche.

Item	Wake Up	AM Pre	AM Meal	AM Post	Lunch Pre	Lunch Meal	Lunch Post	PM Pre	PM Meal	PM Post	Pre Bed	Weekly (DIY Powder)
O. formigenes**[#R]** 20 doses (2 strips) only.		Y										
Foods [see "DIET"]			Y			Y			Y			
Lecithin**[#]** 1 tablespoon			Y									77g
Electrolytes [see "Electrolytes"] >1.5g Ca, >0.5g Mg, >2.5g Na, >4.5g K,>1g P (DAILY TOTALS, elemental amounts)			Y			Y			Y			(Approx 150g)
Dead Sea mud**[#T*]** [See "Remineralisation"]	Y											
Taurine**[#]** 3g		Y			Y			Y			Y	84g
Acetyl L-Carnitine**[#]** 1-2g		Y						Y				28g
Trimethylglycine 500mg only if indicated [see "MOSAIC DX ORGANIC ACIDS TEST (OAT)"]		Y										(3.5g)
L-Lysine**[#]** 1g		Y						Y				14g
L-Proline**[#*]** 0.5 - 1g		Y						Y				14g
L-Glycine**[#]** 2.5g+		Y						Y				35g
L-Serine**[#]** 1g		Y						Y				14g
Creatine**[#]** 2.5g		Y						Y				35g
L-Glutamine**[#*]** 2.5g		Y						Y				35g
Any/all other indicated minerals, apart from iron **[#ST*, where possible]**			[Y]				[Y]			Y		
Silica**[#*]** 1 capsule / ⅛ tsp				Y			Y			Y		14g
Copper**[#*]** 5mg or above							Y					
Zinc**[#*]** 50mg or above				Y						Y		

Item	Wake Up	AM Pre	AM Meal	AM Post	Lunch Pre	Lunch Meal	Lunch Post	PM Pre	PM Meal	PM Post	Pre Bed	Weekly (DIY Powder)
EGCG 100-200mg				Y						Y		7-14 caps
B1 500mg / TTFD 50mg**[#*]**		Y										
B2 FMN**[#S]** 25mg		Y			Y			Y				
B3 NMN**[#S]** 125-250mg		Y						Y			[Y]	
B5 100mg+, only if indicated [see "MOSAIC DX ORGANIC ACIDS TEST (OAT)"]		Y						Y				1.4g+
B6 (P5P), ½ serving / 10mg, only if indicated [see "MOSAIC DX ORGANIC ACIDS TEST (OAT)"]		Y										
B8 M/D Inositol **[#*]** 100mg/2.5mg		Y						Y				1.4-14g
B9 Folinic Acid 0.8mg		Y										
B12**[#S]** ¼ serving		Y										
Dihydromyricetin (DHM) 0.5g		Y			Y			Y				10.5g
Lymphatic Massage [see "LYMPHATIC MAINTENANCE"]				Y			Y			Y		
Candex**[#*]** 1 capsule				Y			Y			Y		21 caps
PQQ 20mg, CoQ10 200mg		Y			[Y]			[Y]				7-21 caps
Vitamin C 500mg or higher			Y						Y			
Citric acid**[#*]** 0.25-5g	Y							Y				
Vitamin D3 5000-8000 IU				Y								
DHA 300-500 mg				Y								
R-ALA 100 mg			Y						Y			14 caps
NAC**[#*]** 500 - 1000 mg		Y										3.5-7g
Apigenin**[#*]** 50-400mg		Y										7-56 caps
*Mucosal antiseptic**[#*T]*** ***[See "DIY Antiseptic Recipe"]***				Y								
Spirulina 500mg**[#*]**		Y										
Psyllium Husk "shake" - teaspoon / glass **[#*]**		Y										35g
Curcumin**[#*]** ½ capsule							Y			Y		
Youtheory Spore**[#*]** 2 caps		Y										
L. reuteri Probiotic**[#*]**		Y										
LGG + Bifido**[#*TR]**		Y										
Lactulose **[#*]** 1-6mL		Y										
L. sakei**[#*TR]**		Y										
Ora Lady Bugs**[#V]** 1 cap		Y										
B. breve M16-V**[#*] 3B CFU**		Y										

STAGE 2 - Increased GI / Mucosal Interventions. (Typically 2+ weeks.)

*Continue items in all previous weeks and **ADD**;*

Item	Wake Up	AM Pre	AM Meal	AM Post	Lunch Pre	Lunch Meal	Lunch Post	PM Pre	PM Meal	PM Post	Pre Bed	Weekly (DIY Powder)
A-GPC Choline >250 mg **(If muscle stiffness or headache occurs, pause.)**			Y						Y			(3.5g)
Chlorella**[#*]** 500mg - 15000mg **EVERY 3 DAYS**											E3D	
Schisandra		Y						Y				14 caps
Undecylenic acid**[#*]** 250mg+				Y			[Y]			[Y]		
Biotin 1000 mcg**[#S]** **(Pause if fungal bloom observed for more than 1 week)** [see "MOSAIC DX ORGANIC ACIDS TEST (OAT)"]		Y										
Biofilm Phase-2 Advanced**[#*]** 2(-4) caps **(4 days / on, 3 days off)**	Y											
IgG2000**[#*] 4g**	Y											
Elderberry 500mg		Y										3.5g
Floraphage		Y										7 caps
"Heme" Iron 1-3 caps (up to 9, total if indicated by blood test.) [see "BLOOD TESTS"]		Y			[Y]			[Y]				7-21 caps

Then slowly **START / INCREASE;**

Spirulina**[#*]** 0.5 -> 5g		Y										35g
Ionic Man**[#*]** 1 drop->1 serving over 2 weeks				Y								

Stage 2 is expected to trigger additional gastrointestinal immune activity, which is likely to be observed as diarrhoea lasting a few days and sometimes nausea. Extra water and diosmectite / Diarelieve may be a useful binder during this time. https://en.m.wikipedia.org/wiki/Diosmectite

If your doctor has prescribed any antifungals and/or antibiotics, Stage 2 is the most appropriate place to introduce them.
[Methylene blue - https://bornfree.life/download/methylene_blue_protocol.xlsx, Pau d'arco, cinnamon, oregano oil capsules and wormwood are being tested as Stage 2 interventions.]

However, these may have an impact on your existing efforts to restore microbiome diversity - some additional probiotics may be required. Ideally, any antibiotic use should be followed by Biomesight and/or other microbiome reports.

STAGE 3 - Stimulate and support strong immune response. (Typically 4+ weeks.)

[NB. Confirm successful remineralisation of copper, zinc, selenium and manganese via Oligoscan and iron status via blood before proceeding to this stage.]

If your cortisol / heart rate becomes elevated for long periods (eg. >6 hours), or immune-related tissue pain/inflammation extends beyond 3 days per localised tissue, take a few days off the mushrooms, double the Vitamin C and simultaneously decrease spirulina to 500mg during this "recovery break".

Expect temporary die-off symptoms, heavy immune response, pain / inflammation, POTS, fatigue, nausea, diarrhoea, headache, etc.

You will likely feel TEMPORARILY WORSE than your pre-protocol baseline, as the intensity of the innate immune response induces most of the ME/CFS symptoms.

NB. This may add some additional psychological challenges to this stage.

Continue items in all previous weeks APART FROM minerals now measuring as "Normal+" on the Oligoscan report and then

ADD;

Item	Wake Up	AM Pre	AM Meal	AM Post	Lunch Pre	Lunch Meal	Lunch Post	PM Pre	PM Meal	PM Post	Pre Bed	Weekly (DIY Powder)
NAC**[#*]** 1000 mg x3 for **3 weeks only**, then reduce to 500 - 1000 mg x1		Y			[Y]			[Y]				21g
ACV**[#*]** 2-3 capsules		Y			Y			Y				27 caps
Life Extension Reishi Complex**[#*]** 1 Capsule **EVERY 3 DAYS**		E3D						E3D				
Beta-glucans**[#*]** 250mg		Y										1.75g

Increase;

Ionic Man 2 servings				Y						Y		

OPTIONAL FOLLOW UP

When the elements reported by your Oligoscan are optimal, a 3+ day “water fast” may provide additional benefits. This is NOT advisable with severe mineral deficiencies.

If this is your first water fast, it is generally advisable to have someone monitoring you during this time. Avoid driving vehicles, stress and excessive exertion.

Fasting protocol requirements (per day):
No food or other supplements.
3L water.
5g (teaspoon) of sodium chloride (table salt = 2.5g sodium elemental)
3g NAC (mucolytic, oxidative stress)
1000mg Magnesium oxide (will induce diarrhoea)

(Optional add-ons)
500mg EGCG x 3[1]
Resveratrol 120mg x 3
Hesperidin 500mg x 2
“Salt/iodine Overgrowth Flush recipe” in *Gastrointestinal Biofilms, Pathogens and Remediation,* the night before starting day 1 only.

([1]**NB. Important safety consideration**: To break a water fast “early”, use 2 or more Apple Cider Vinegar doses - without capsules - as a succinate source.

This is only a requirement if EGCG has been dosed in the previous 6 hours.

Failure to observe this safety consideration may result in rapid cyclical blackouts and convulsions until the EGCG is fully metabolised or until someone else administers Apple Cider Vinegar.
This could easily be fatal if eg. operating a motor vehicle. YOU HAVE BEEN WARNED.)

TRANSITIONING TO “PREVENTATIVE MAINTENANCE”

After successfully remineralising and remediating dysbiosis sufficiently enough to enjoy a normal quality of life, you may be inclined to adopt lifestyle changes and dietary strategies to prevent sliding back down the slippery slope to poor health.

1. **Eat a balanced, nutritious diet.**

   Real food, lots of coloured vegetables and diversity. Eat the right ballpark targets for carbohydrates, fats and proteins. You can use https://cronometer.com to help structure your diet and learn what micro and macronutrients are in each food until it becomes second nature.

   Now that your dietary absorption is working, your micronutrients should be coming from food, rather than supplements. The protocol’s diet is still a good foundation, however you won’t need to be mindful of avoiding excessive oxalates, vitamin B6, histamine or vitamin A

   Vitamin D3 is a good supplement to maintain.

2. **Exercise.**

   Your hormone synthesis, methylation and immune activity are promoted by physical exertion. This benefits your energy metabolism, sleep, neurotransmitters and helps prevent disease.

3. **Biofilm maintenance**. Eating foods which degrade biofilms, such as;

   Herbs and spices like turmeric and black cumin (which contain tannins, phenolics, flavonoids, aromatics, etc.)
   Sugar replacements such as xylitol and stevia.
   Mushrooms, especially reishi.

   You can perform a periodic biofilm disruption / challenge interval - eg. a large oral dose of sodium EDTA once every 2-4 weeks and a similar interval for nasal / sinus and other microbiomes, using a relevant tool where necessary. Ocean swimming can be helpful. Yearly water fasting intervals would be advantageous.

4. **Testing / checkups.**

   Checking your mineral status every 3 - 6 months is a good way to see how your diet is performing and make corrections. It can also be used to infer your levels of inflammation and potentially dysbiosis, which could justify further testing, eg. OAT / microbiome.

RATIONALE FOR PROTOCOL INCLUSIONS AND GENERAL NOTES

Amino Acids -
(You can pre-mix aminos for easy dosing. Best away from food, due to transporter limitations.)

Taurine	GLUT2, glycogen synthesis, promotes ALDH for aldehyde degradation, adrenaline inhibition. TUDCA synthesis.*Can feed Bilophila wadsworthia, etc
Acetyl L-Carnitine	Fatty acid transport, dopamine synthesis promoter.
L-Lysine	Collagen synthesis, antiviral functions.
L-Proline	Collagen synthesis.
L-Glycine	Collagen synthesis. Glutathione metabolism.
L-Serine	Neuropathy, neurotransmission.
Creatine	GLUT4, ATP, SAMe metabolism efficiency.
L-Glutamine	Collagen synthesis rate. Promotes IFN-gamma. Promotes renal acid excretion.

B Vitamins -

B1 - Thiamine or TTFD	TPP / energy metabolism, affected by acetaldehyde. Increase from 1/10th dose.
B2 FMN (Sublingual)	Absorbable FMN and FAD support. Has antimicrobial functions.
B3 - NMN (Sublingual)	NAD+ biosynthesis, immunity.
B5 - Pantothenic acid	Required for coenzyme A (CoA) and helps regulate lipolysis at VNN1.
B6 - P5P	Problematic when ALDH deficiency exists, but a critical coenzyme for metabolism..
B7 - Biotin (Sublingual)	Only take if indicated by OAT results Required for normal energy metabolism, however will feed fungal infections and promote fungal bloom, if infections are not sufficiently inhibited / managed. Oral dosing fails in alcoholism.
B8 - M/D Inositol	Myo-inositol + D-chiro inositol. Glucose uptake and glycogen synthesis.
B9 - Folinic Acid	Methylation cycle, BH4.
B12 - Vimergy (Sublingual)	Methylation. Antioxidant. Catabolic pathways -> TCA cycle.

Enzymes -

Candex	**Start slowly.** Digests carbohydrates, cell walls, biofilms. You can consume up to 6 of these per day - 1 capsule, 15 minutes after food to help digest carbohydrates x 3. 1 capsule x 3, away from meals, to digest microbial cell walls.

Other -

PQQ, CoQ10	DBH promoter, Electron Transport Chain support. CoQ10 promotes fungal growth.
Vitamin C	Antioxidant. HIF-1a, DBH, collagen synthesis. **NB Use away from copper dosing.**
Citric Acid	**Start VERY SLOWLY**. Prevents oxalate crystal formation. Breaks biofilms. Chelates aluminium. However, it also liberates histamine.
Vitamin D3	PNMT modulation, immunity, GLUT2, hepcidin/mineral homeostasis.
DHA	Lipid membrane maintenance, phosphatidylcholine. Required for ketogenesis.
R-ALA	AMPK promoter - insulin sensitivity. Biofilm breaker. Toxic metal chelator.
Apigenin	ALDH, p38 MAPK inhibitor, TGF-b1 modulator and NADase inhibitor. Start at ¼ dose and increase. Upper threshold for effective dose may be 400mg/day.
EGCG	Reduces nitrogen metabolism, inhibits 11HSDβ1, *increases zinc absorption.* 5-ARi sensitive people may prefer 100mg doses.
A-GPC Choline	For GI motility and muscle contraction. If muscle stiffness or headache occurs, **PAUSE**. Acetylcholinesterase is inhibited by Aspergillus mycotoxins - Aflatoxin B1 and Teritrem B.
Lecithin	Phosphatidylcholine 2.3g - phospholipid membrane and methylation support, Phosphatidylethanolamine 2g, Phosphatidylinositol 1.4g
Trimethylglycine / betaine	Methylation support, glutathione support, energy metabolism.
Dihydromyricetin (DHM)[3]	Promotes ALDH activity. GI health, neurotransmission, mast cell stabilisation.

Probiotics -

Youtheory Spore[2]	Microbiome, GI tract repair, endotoxemia. Oral doses can colonise.
L. reuteri[2]	Helps inhibit unwanted species. Non-spore-forming. Can survive stomach acid.
LGG + Bifido[2]	Microbiome, GI tract repair, endotoxemia. Non-spore-forming.
L. sakei	Apply to any mucosal tissues. Non-spore-forming.
O. formigenes[2]	Promotes oxalate excretion via GI tract. Non-spore-forming.
Ora Lady Bugs	Probiotics required for maintaining a healthy vaginal microbiome. Apply via douche or suppository.
B. breve M16-V[2]	**Start slowly.** Promotes colonisation of bifidobacterium. Epithelial health.
Lactulose	**Start slowly.** Prebiotic with high specificity for lactobacillus and bifidobacterium.

[2]If considering the “Salt/Iodine GI Overgrowth Flush” in the beginning of the protocol, these colonising probiotics would be wasted and would be better included after any GI flush phase.

Immune, biofilm and microbiome related -

Psyllium Husk “shake”	A teaspoon of powder in a glass of water. Will assist toxin removal, gut microbiome / GI motility.
Spirulina[3]	**Start slowly.** Will inhibit microorganisms and promote mitochondrial Complex I.
Curcumin[3]	**Start slowly.** Will inhibit microorganisms and promote MC1. Inhibits 11HSDβ1. Expect herx. Lower doses can promote NRF2 / decrease inflammation. Higher doses can **increase** IFN-gamma / symptoms by decreasing cortisol release.
Chlorella	**Start slowly.** Will increase sIgA. Pause / reduce as needed. Expect die-off / herxheimer symptoms - headache, rash, sore joints, etc.
Schisandra[4]	NADPH oxidase inhibitor. Inhibits yeast glycolysis. Immunomodulator.
Undecylenic acid	Fungistatic. May add to the aldehyde burden.
Biofilm Phase-2 Advanced	**Start slowly at ¼ capsule.** 4 days/week ON, 3 days OFF. This product can cause intense die-off. Please read product instructions. See also: https://ndnr.com/gastrointestinal/biofilms-what-have-we-learned-from-the-research/
N-Acetylcysteine (NAC)	Thrombolytic, mucolytic, biofilm breaker and metal chelator - weeks 5,6,7 at 1000 mg x 3, then reduce to < 500 mg x 1. Will cause die-off.
Apple Cider Vinegar (ACV)	**Start slowly.** May cause temporary GI upset, histamine increase. Provides acetyl groups for cellular energy. Supports gut and microbiome via butyrate and SCFA production. Helps break biofilms via butyrate.
Life Extension Reishi Complex	Energy promoter. Immunomodulator. Targets various pathogens. A 1-3 day initial headache is possible when starting reishi. Do not substitute. A USP study found approximately 75% of reishi products are fake.
Beta-glucans	(+Ergothioneine) Increases NK cells. May increase histamine / insomnia, low dose.
Ionic Man - Fulvic acid + minerals	Breaks biofilms. Transports minerals / toxins during an inflammatory state. Start testing / increasing your tolerance to the fulvic acid in the Good State Ionic Man by starting at 1 drop in a glass of water per day and slowly increasing up to 1 serving / day over 2 weeks. Otherwise, this has been described as “rapidly removing a band-aid from every cell at the same time”.
IgG2000	Similar to IVIg, for mucosal tissue - exogenous adaptive immune response.
Elderberry	Potent source of anthocyanin - antimicrobial, UTIs, etc
Floraphage	Bacteriophage “second-generation” targeted antibiotic solution.

[3] *NB. Drugs metabolised by CYP2D6 may have altered pharmacokinetics - making them more or less potent. Your doctor can best advise on how to manage any tapering or other dose adjustments.*

[4] Increases NOX inhibition and inhibits pathogens, histamine. *May initially cause nausea, headache, fatigue from fungal die-off symptoms - take this slowly and adjust as tolerable.*

Minerals and sources [see "REMINERALISATION"] -

Silica	Silicon deficiency - HIF-1a. Antiviral. Magnesium uptake. Collagen. Silica will also be heavily used to excrete acetaldehyde and toxic metals.
Dead Sea mud	Apply to face, neck, psoriasis and non-sensitive areas, or use strips / cling wrap. Transdermal source of silica, calcium, magnesium, bromine, etc.
Iodine	Thyroid, riboflavin metabolism. Glucose metabolism. Creatine metabolism.
Calcium	Critical mineral / electrolyte. Oral dosing works but can feed biofilms.
Magnesium	Critical mineral / electrolyte for energy metabolism, etc. Low magnesium can also cause arrhythmia, muscle spasms. Transdermal dosing required.
Phosphorus	Critical mineral / electrolyte for energy metabolism (eg. P5P, glycolysis, etc). Oral dosing is "okay". Low phosphorus may indicate [metabolic / respiratory / renal] acidemia. Bicarb can be temporarily helpful in preventing phosphate excretion.
Sodium	Critical mineral / electrolyte. Oral dosing is okay. Low sodium can cause low blood pressure and low dopamine transport.
Potassium	Critical mineral / electrolyte. Oral dosing is okay. Low potassium can cause high blood pressure, arrhythmia,muscle spasms, low glutamate and dopamine synthesis.
Copper	Dopamine precursors. Dopamine beta hydroxylase. CuZnSOD. Glycolysis [..]
Zinc	Catabolic pathways. Glycolysis. HIF-1a. Methylation. BH4. ALDH. LDH. NOS. RK [..]
Iron	Heme. Haemoglobin. Hydroxylase reactions Iron-sulphur clusters [..]
Manganese	MnSOD. GDH. PCB. ME1. PLD.
Chromium	Required for glucose transport and insulin sensitivity.
Vanadium	Required for glucose transport and insulin sensitivity.
Cobalt	EPO regulation. Iron homeostasis. B12 synthesis (microbial).
Molybdenum	RIboflavin metabolism. B6 degradation. Taurine metabolism. ALDH. XO..
Lithium	Adrenergic metabolism / inhibition. Magnesium reabsorption. Immunity.
Germanium	Antioxidant and other functions.
Selenium	Thyroid and glutathione metabolism.
Sulphur	Iron-sulphur clusters. Transsulfuration pathway.
Rubidium	Copper metabolism / tissue distribution. Catecholamine metabolism.
Strontium	Calcium metabolism. Bone density.
Tamarind / fluorine	Studies show rapid excretion of fluorine in response to tamarind.

COLLECT YOUR DATA

BLOOD TESTS

Testing blood is a helpful way to understand specific aspects of immune activity and metabolism. Minimally, it's useful to have markers for blood group (needed for Oligoscan), RBC + WBC counts, "comprehensive" metabolic panel and lipids, LDH isoenzymes, iron studies (iron, transferrin, transferrin saturation %, ferritin), vitamin B6 and vitamin D (inactive form). Your doctor is usually the best person to assist you with these, however private lab services are also available in many countries, should these be helpful. eg.

Australia:
https://imedical.com.au/order/blood-tests/build-your-own-blood-test
A-B
BioChem (Comprehensive Metabolic Panel)
Blood group + antibodies
E-G
Full Blood Count/DIFF
H-I
Iron studies
J-N
LDH isoenzymes
U-Z
Vitamin B6
Vitamin D3
USA:
Blood group
https://www.walkinlab.com/products/view/abo-group-rho-d-typing-blood-test
CBC + CMP
https://www.walkinlab.com/products/view/complete-blood-count-cbc-comprehensive-metabolic-panel-cmp-14-blood-test-panel
Iron studies
https://www.walkinlab.com/products/view/iron-with-total-iron-binding-capacity-tibc-blood-test
LDH isoenzymes
https://www.walkinlab.com/products/view/lactate-dehydrogenase-ld-isoenzymes-blood-test
Lipids
https://www.walkinlab.com/products/view/lipid-panel-blood-test
Vitamin B6
https://www.walkinlab.com/products/view/vitamin-b6-plasma-test
Vitamin D
https://www.walkinlab.com/products/view/vitamin-d25-hydroxy-blood-test

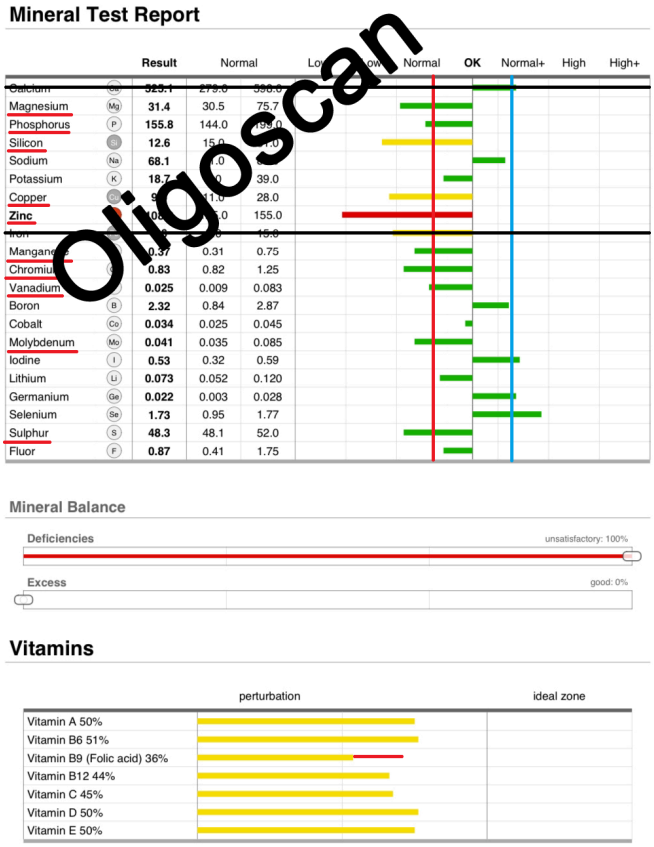
INTRACELLULAR MINERALS (CHOOSE AT LEAST 1)

1) WHITE BLOOD CELLS (WBC)

Cell Science Systems - Cellular Micronutrient Assay (CMA) uses white blood cells from 2 tubes of blood to identify intracellular deficiencies, as a proxy inference for other cell types. The data collected is very different to anything reported in serum or red blood cells, as white blood cells have mitochondria and very different metabolism. **8-12 HOURS FASTING IS REQUIRED.** This comprehensive test is available internationally from a US laboratory, however it also requires rapid return shipping and a local blood draw, which may require a private nurse, adding to costs. It's normally USD$264 + shipping and any phlebotomist costs.

https://www.dhalab.com/shop/cma-cellular-micronutrient-assay/

The data tracks well with the other methodology, Oligoscan - where Oligoscan is interpreted using our upper and lower thresholds. CMA is more accurate and includes additional nutrients. However it also lacks fluorine, toxic metals, and some of the electrolytes - phosphorus, sulphur, sodium and potassium. Low iodine may be used to infer high fluorine. The protocol uses daily targets for electrolytes, however you won't have an understanding of the baselines for these markers.



2) SKIN

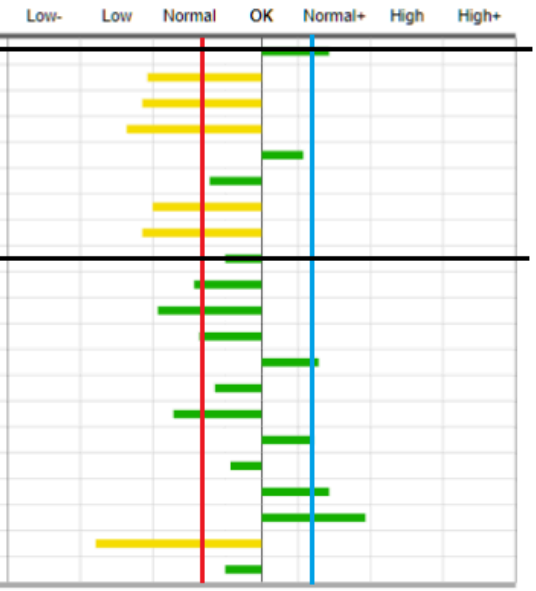
Research suggests that an Oligoscan, So/Check or Zell Check report can provide an approximation of your **ACTUAL** mineral status, using the skin of your hand as a data source. **(“OligoLab” / “OligoHealth” / “Scantest” branded reports are currently not supported.)**

This is an in-clinic test, so a local practitioner will be required. Your **blood type**, **age**, **height** and **weight** affects the sample calibration used to generate this report, so this information will be requested when you visit a clinic. **Any inaccuracies can dramatically alter your results**.

While not happy with the level of published evidence currently supporting this emerging methodology, our testing showed a clear pattern of deficiencies in ME/CFS, Long Covid and C19 vaccine injured people, with minor variability, which was not observed in controls. Follow up Oligoscan reports have also matched eg. supplements taken and previous results.

The array of elemental markers collected is almost the same as the Doctors Data HTMA reports, however it also includes silicon and usually fluorine. Unfortunately, it does NOT show rubidium or strontium markers.

	Result	Normal	
~~Calcium~~	~~534.0~~	~~279.0~~	~~598.0~~
Magnesium	28.2	30.5	75.7
Phosphorus	138.4	144.0	199.0
Silicon	11.9	15.0	31.0
Sodium	66.8	21.0	89.0
Potassium	17.7	9.0	39.0
Copper	11.0	11.0	28.0
Zinc	122.1	125.0	155.0
~~Iron~~	~~0.5~~	~~5.0~~	~~15.0~~
Manganese	0.40	0.31	0.75
Chromium	0.83	0.82	1.25
Vanadium	0.025	0.009	0.083
Boron	2.35	0.84	2.87
Cobalt	0.031	0.025	0.045
Molybdenum	0.040	0.035	0.085
Iodine	0.51	0.32	0.59
Lithium	0.078	0.052	0.120
Germanium	0.023	0.003	0.028
Selenium	1.77	0.95	1.77
Sulphur	46.5	48.1	52.0
Fluor	0.87	0.41	1.75



As >75% of systemic iron is circulated in various blood cells, Oligoscan / skin data for **iron will be an unreliable proxy for systemic levels - blood tests for** serum iron studies (iron, transferrin, tsat% and ferritin) would be needed via your doctor or private lab testing. Low manganese may also provide a hint for low iron, unless IV iron has recently been administered.

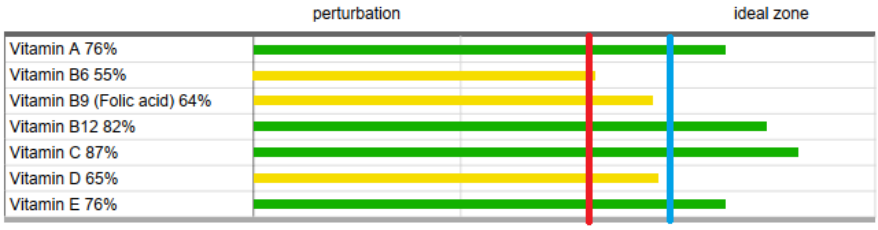
Calcium markers in skin data will be similarly unreliable - 99% of calcium is stored in skeletal tissue. This also makes serum calcium insensitive. As strontium and calcium can potentially substitute for each other in biological processes, using the “strontium” marker from the hair test as a proxy to indicate systemic calcium may be possible, but needs further study.

Tremors and/or heart palpitations, especially in response to taurine or magnesium could indicate low calcium, also. Low phosphorus may indicate low calcium.

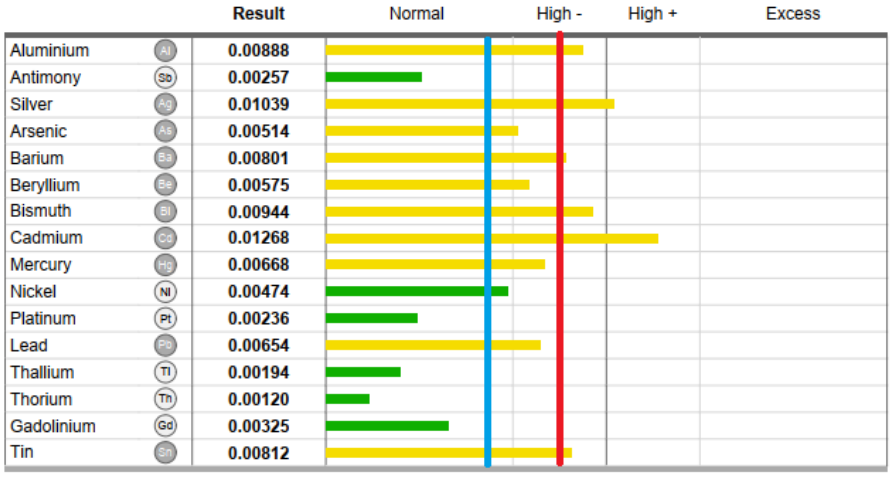
Copper and zinc appear to be over-estimated in some cases. Highly elevated zinc in skin tissue may indicate low protein / histidine intake and mask an actual zinc deficiency.

Oligoscan and CMA results are not known to be directly affected by the inflammatory cascade, meaning that these reports provide an actionable set of objective markers to use when choosing most mineral supplements. The HTMA data **can** be referenced to help supplementation planning for rubidium and strontium (also inferring calcium). For more information about the effects of specific mineral deficiencies, see the "RATIONALE" section.

The Oligoscan and SO/Check reports include a number of vitamin markers, which appear to track relatively well with other data. A good general target for these is to exceed 55%.



Toxic metals are also reported. Any markers in the "High -/+" ranges should be monitored.



Unfortunately, a comprehensive list of providers is not yet available. An outdated list can be found here: https://annuaire.myoligoscan.com/ by searching *<city>, <country>*. If you have a good (or bad) experience with an Oligoscan practitioner, please share details with our community Discord server in the #oligoscan-providers channel. You can also manually enquire about local practitioners here: https://www.theoligoscan.com/nearest-provider

HAIR MINERALS (Deprecated / Limited Use)

Research suggests that a Hair Toxin Mineral Analysis (HTMA) may provide an approximation of your **FUNCTIONAL** mineral status, averaged over the period of follicle growth, sampled adjacent to the transporter alterations from inflammation - where circulating minerals can be sequestered inside various brain, liver and kidney cells and consequently low in other cells.

The results obtained from the HTMA data may be used to infer averaged intracellular mineral availability, downstream of any chronic inflammation, for the period of time in which the hair follicles grew, **in a similar way to read HbA1C for glucose metabolism.** This is largely relevant to the 9 elements transported by DMT-1 and ferroportin.

A list of vendors offering a compatible list of markers and reference ranges is provided here:

Doctors Data and other compatible laboratories:
AU - https://www.toxno.com.au/articles/heavy-metals/hair-tissue-mineral-analysis-hma-or-htma-in-australia/ (can manually add rubidium)
EU / UK - https://regeneruslabs.com/products/hair-toxic-essential-elements-1
EU - https://www.biocoherence.eu/en/shop/htma/ (doesn't include rubidium)
EU - https://www.lifelinediag.eu/en/product/eha-standard-en/#products (doesn't include rubidium)
NZ - https://www.houseofhealth.co.nz/product/hair-toxic-mineral-analysis/
PL - https://analizawlosa.com.pl/produkt/analiza-wlosa/
UK, some EU - https://www.lauristonlabs.co.uk/product/hair-elements-doctors-data/
US - https://www.walkinlab.com/products/view/dd-hair-elements-profile-doctors-data (Not available in NY/ NYC and other areas.)

Hair collection guide:
1. Please ignore any conflicting vendor-specific instructions.
2. The hair needs to be clean, well-rinsed, dry, untreated and uncoloured. Unwashed hair may provide false (elevated) data for sodium and potassium, from dried sweat. Use gloves.
3. Select suitable areas of sideburn, scalp and/or neck hair. If the hair is longer than 2.5cm / 1", first trim the sample area to this maximum length with clean stainless steel scissors. By using shorter hair, the report data relates to a more recent period of time.
4. Cut the (remaining) hair to be sampled as close to the skin as possible. Do not use clippers or an electric razor - metal contamination from tungsten blades, etc may occur. Collect at least 2 heaped tablespoons worth of hair, or approximately 250 mg or the sample may be rejected.
5. Place the hair sample in the sample kit envelope provided, or in a clean, clearly labelled envelope or sachet. Whilst Trace Elements Inc says not to use ziplock bags as apparently hair “sweats” and the sample may be rejected, Doctors Data supplies ziplock bags in their kit.

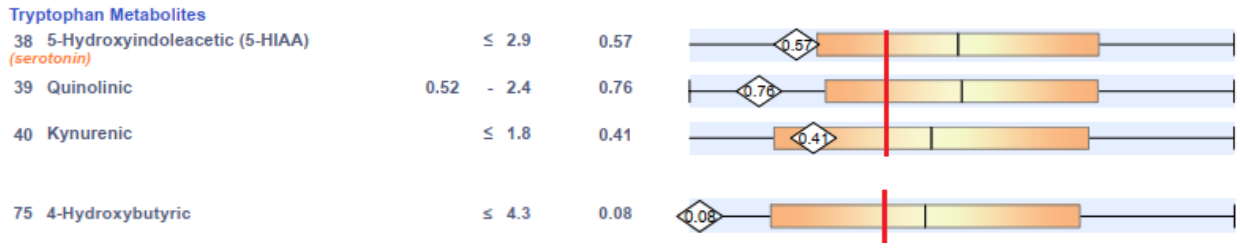
MOSAIC DX ORGANIC ACIDS TEST (OAT)

A Mosaic Diagnostics (formerly Great Plains) Organic Acids Test (OAT) is a comprehensive report on urine metabolites. It is available through local vendors or potentially, this website - https://mosaicdxinternational.com/products/mx-organic-acids-test-oat

In addition to allowing interpretation of metabolic impairment from the patterns observed in these markers, **page 1 of the report shows various markers for microbial interference**. The remaining pages show your metabolic impairments from infection and malnutrition. Elevation of yeast, bacterial and fungal metabolites in OAT results have been seen consistently in our collected data, with matching symptoms. A further MycoTOX test may provide further clarity on species and expected metabolic impairments, if required.

A clinician's guide to interpreting OAT results is being drafted. Example interpretations of these reports can be found on the Discord server. For supplement selection criteria:

"Do I need P5P?"



Tryptophan Metabolites				
38 5-Hydroxyindoleacetic (5-HIAA) *(serotonin)*		≤ 2.9	0.57	
39 Quinolinic	0.52	- 2.4	0.76	
40 Kynurenic		≤ 1.8	0.41	
75 4-Hydroxybutyric		≤ 4.3	0.08	

38, 39, 40, 75 - where no SSRI, melatonin or 5-HTP supplement is being used, if these markers are ALL in the lower range, this can infer low P5P levels, via (38) aromatic L-amino decarboxylase (AADC) [+ P5P] -> monoamine oxidase (MAO) [+ riboflavin as FAD], via (39) kynureninase (KYNU) [+ P5P, less oxidative stress] and via (40) kynurenine aminotransferase (KAT) [+ P5P / zinc / magnesium], via (75) as 4-aminobutyrate transaminase (4ABT) [+ P5P] -> SSAL [+ NADPH] -> GHB}. Part of this pattern assumes dietary tryptophan is sufficient.

Vitamin B6				
51 Pyridoxic (B6)		≤ 34	1.6	

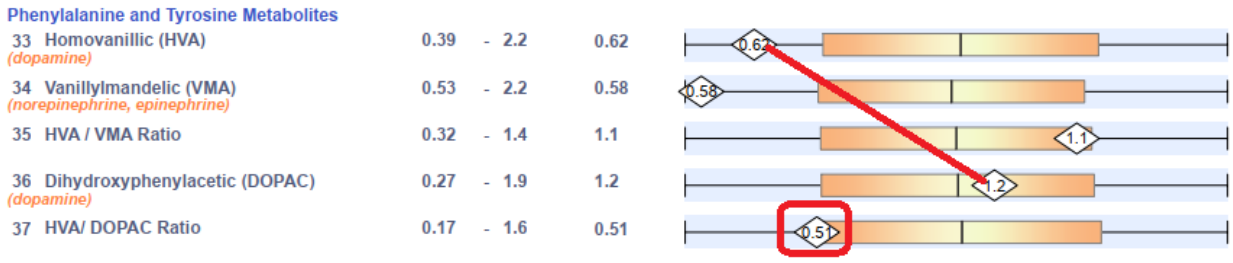
51 - Pyridoxic acid / pyridoxate is a degradation metabolite of B6 / pyridoxal, which can be used to infer pyridoxal LESS any **aldehyde dehydrogenase (ALDH)** activity [NAD+ / magnesium / zinc deficiency, acetaldehyde], **pyridoxine 5'-phosphate oxidase (PNPO)** activity [riboflavin as FMN, tissue damage / TGF-b1 inhibition, hypoxia] and **aldehyde oxidase (AO)** activity [riboflavin as FAD, molybdenum, heme, iron+sulphur, hypoxia].

"Do I need biotin?"

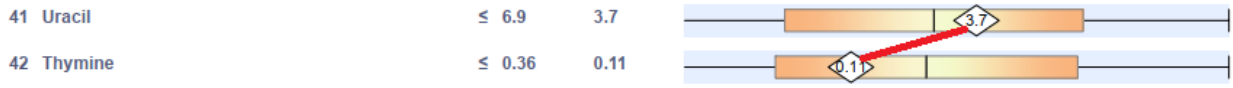
Biotin (Vitamin H)				
57 Methylcitric ✱	0.19	- 2.7	0.70	

57 - Methylcitric is used to indicate biotin availability. If this marker is out-of-range in either direction, sublingual biotin will need to be carefully used in Stage 2.

“Do I need trimethylglycine (TMG) / betaine?”



37 (36:33) - The lower the integer in 37, the more likely you are to benefit from some methylation support. 3,4-dihydroxyphenylacetic acid (DOPAC) -> homovanillic acid (HVA) involves 1 enzymatic reaction - catechol O-methyltransferase (COMT), which requires S-adenosylmethionine (SAMe) as a cofactor. SAMe is produced by the methylation cycle. These markers can be confounded by overgrowth of certain bacteria and by renal synthesis of dopamine.

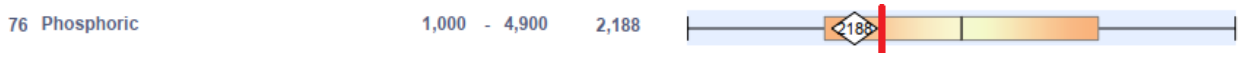


41:42 - This ratio can also help interpret methylation status. An unbalanced ratio of uracil : thymine can indicate low activity at thymidylate synthase. If uracil is also low, this could further indicate dietary protein insufficiency.

“Do I need Vitamin B5”

52 - This marker can help indicate a vitamin B5 deficiency, which will affect lipolysis and pathways reliant on coenzyme-A (many). Elevated 16 / HPHPA may also benefit from more B5 to produce CoA. If in doubt, include B5.

“Does my OAT and Oligoscan data correlate?”



76 - Phosphoric acid should correlate well with the Oligoscan phosphorus marker. If they do not, please share your data and report this in our Discord server for further analysis.

NB. If there is a pattern of “left shift” or “suspiciously low” microbial markers on Page 1 of the OAT, it’s possible the sample has thawed in transit and the integrity compromised. You may need to repeat the test. For best results, a very short shipping time is needed.

CRONOMETER

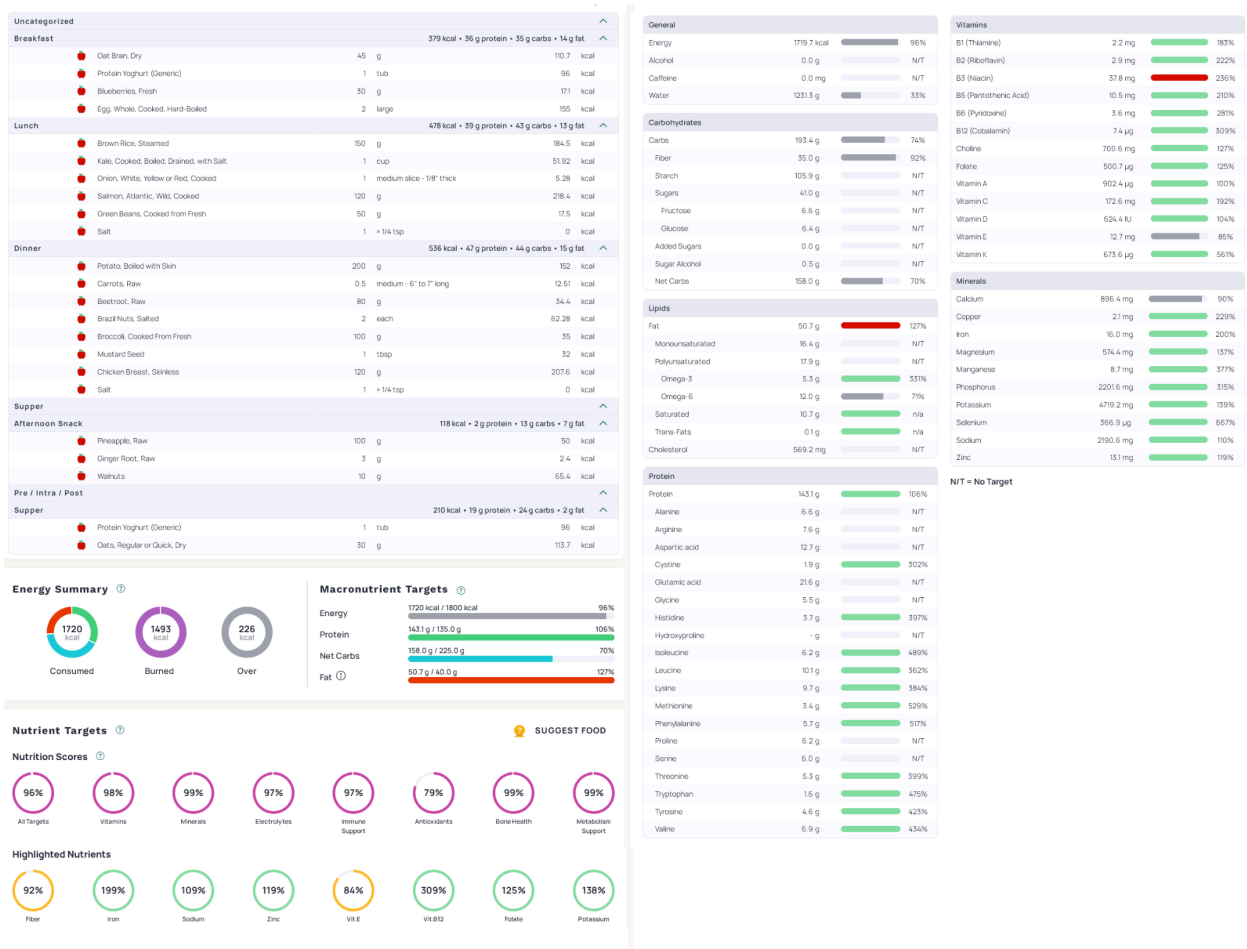
https://cronometer.com is a (freemium) tool which can visualise the performance of your current eating strategy / habits / restrictions and allow you to make positive changes.

It has a mobile app for data collection and basic reporting. Using a desktop / laptop allows access to richer reporting options and diary view.

Logging at least 2 days of eating in Cronometer would be very helpful for identifying problems and also help you rebuild / restore your relationship with food, especially as any sensitivities are reduced / resolved over the duration of the protocol. (see **"Diet"**)

People usually find this process eye-opening.

When selecting food items to enter into the virtual diary, choosing NCCDB or USDA listed food items will provide more micronutrient data. CRDB (user-entered, moderated entries) only contain information displayed on the product labels rather than laboratory identified data.



Uncategorized				
Breakfast				379 kcal • 36 g protein • 35 g carbs • 14 g fat
Oat Bran, Dry	45	g	110.7	kcal
Protein Yoghurt (Generic)	1	tub	96	kcal
Blueberries, Fresh	30	g	17.1	kcal
Egg, Whole, Cooked, Hard-Boiled	2	large	155	kcal
Lunch				478 kcal • 39 g protein • 43 g carbs • 13 g fat
Brown Rice, Steamed	150	g	184.5	kcal
Kale, Cooked, Boiled, Drained, with Salt	1	cup	51.92	kcal
Onion, White, Yellow or Red, Cooked	1	medium slice - 1/8" thick	5.28	kcal
Salmon, Atlantic, Wild, Cooked	120	g	218.4	kcal
Green Beans, Cooked from Fresh	50	g	17.5	kcal
Salt	1	× 1/4 tsp	0	kcal
Dinner				536 kcal • 47 g protein • 44 g carbs • 15 g fat
Potato, Boiled with Skin	200	g	152	kcal
Carrots, Raw	0.5	medium - 6" to 7" long	12.51	kcal
Beetroot, Raw	80	g	34.4	kcal
Brazil Nuts, Salted	2	each	62.28	kcal
Broccoli, Cooked From Fresh	100	g	35	kcal
Mustard Seed	1	tbsp	32	kcal
Chicken Breast, Skinless	120	g	207.6	kcal
Salt	1	× 1/4 tsp	0	kcal
Supper				
Afternoon Snack				118 kcal • 2 g protein • 13 g carbs • 7 g fat
Pineapple, Raw	100	g	50	kcal
Ginger Root, Raw	3	g	2.4	kcal
Walnuts	10	g	65.4	kcal
Pre / Intra / Post				
Supper				210 kcal • 19 g protein • 24 g carbs • 2 g fat
Protein Yoghurt (Generic)	1	tub	96	kcal
Oats, Regular or Quick, Dry	30	g	113.7	kcal

Energy Summary: 1720 kcal Consumed; 1493 kcal Burned; 226 kcal Over

Macronutrient Targets		
Energy	1720 kcal / 1800 kcal	96%
Protein	143.1 g / 135.0 g	106%
Net Carbs	158.0 g / 225.0 g	70%
Fat	50.7 g / 40.0 g	127%

Nutrient Targets — SUGGEST FOOD

Nutrition Scores: 96% All Targets; 98% Vitamins; 99% Minerals; 97% Electrolytes; 97% Immune Support; 79% Antioxidants; 99% Bone Health; 99% Metabolism Support

Highlighted Nutrients: 92% Fiber; 199% Iron; 109% Sodium; 119% Zinc; 84% Vit.E; 309% Vit.B12; 125% Folate; 138% Potassium

General		
Energy	1719.7 kcal	96%
Alcohol	0.0 g	N/T
Caffeine	0.0 mg	N/T
Water	1251.3 g	33%

Carbohydrates		
Carbs	193.4 g	74%
Fiber	35.0 g	92%
Starch	105.9 g	N/T
Sugars	41.0 g	N/T
Fructose	6.6 g	N/T
Glucose	6.4 g	N/T
Added Sugars	0.0 g	N/T
Sugar Alcohol	0.5 g	N/T
Net Carbs	158.0 g	70%

Lipids		
Fat	50.7 g	127%
Monounsaturated	16.4 g	N/T
Polyunsaturated	17.9 g	N/T
Omega-3	5.3 g	331%
Omega-6	12.0 g	71%
Saturated	10.7 g	n/a
Trans-Fats	0.1 g	n/a
Cholesterol	569.2 mg	N/T

Protein		
Protein	143.1 g	106%
Alanine	6.6 g	N/T
Arginine	7.6 g	N/T
Aspartic acid	12.7 g	N/T
Cystine	1.9 g	302%
Glutamic acid	21.6 g	N/T
Glycine	5.5 g	N/T
Histidine	3.7 g	397%
Hydroxyproline	- g	N/T
Isoleucine	6.2 g	489%
Leucine	10.1 g	362%
Lysine	9.7 g	384%
Methionine	3.4 g	529%
Phenylalanine	5.7 g	517%
Proline	6.2 g	N/T
Serine	6.0 g	N/T
Threonine	5.3 g	399%
Tryptophan	1.6 g	475%
Tyrosine	4.6 g	423%
Valine	6.9 g	434%

Vitamins		
B1 (Thiamine)	2.2 mg	183%
B2 (Riboflavin)	2.9 mg	222%
B3 (Niacin)	37.8 mg	236%
B5 (Pantothenic Acid)	10.5 mg	210%
B6 (Pyridoxine)	3.6 mg	281%
B12 (Cobalamin)	7.4 µg	309%
Choline	700.6 mg	127%
Folate	500.7 µg	125%
Vitamin A	902.4 µg	100%
Vitamin C	172.6 mg	192%
Vitamin D	624.4 IU	104%
Vitamin E	12.7 mg	85%
Vitamin K	673.6 µg	561%

Minerals		
Calcium	896.4 mg	90%
Copper	2.1 mg	229%
Iron	16.0 mg	200%
Magnesium	574.4 mg	137%
Manganese	8.7 mg	377%
Phosphorus	2201.6 mg	315%
Potassium	4719.2 mg	139%
Selenium	366.9 µg	667%
Sodium	2190.6 mg	110%
Zinc	13.1 mg	119%

N/T = No Target

MICROBIOME TESTING

(This area will be expanding / improving.)

GUT MICROBIOME

Certain gut microbiome tests are useful in getting a rough understanding of the species present in your GI tract, the metabolites they consume and produce and if any of these are toxic / relevant to your metabolic alterations.

As the stool samples are not homogenised, **very different counts of species can be obtained from different parts of the same sample**. False negatives are common. This can create confusion for anyone who is used to interpreting various reports at face value.

However, the “overall trends” of species diversity and overgrowth can be useful in making decisions around changes to eating habits, supplements and other interventions. eg. Consuming codonopsis / Dang Shen tea for inhibiting sulphur reducing bacteria and promoting bifidobacteria, or Akkermansia probiotics, if low or missing, along with a supportive diet.

Biomesight provide some useful reports and allow data export to CSV for further analysis. They are offering a discounted test for people with long covid:
https://shop.biomesight.com/products/long-covid19-study-gut-microbiome-test

OTHER - SINUSES, ORAL, LUNG, URINARY TRACT AND SEX ORGAN MICROBIOME

If you have a known or suspected infection in any mucosal tissue, Next Generation Sequencing (NGS) can help identify the species present and help with decision-making processes around remediation.

MicrogenDX offer a range of different testing and reports, for different tissues. These are available to US and international customers.
https://microgendx.com/patients/microgendx-patient-test-service-dm-intl/

It’s expected that for “PSSD” symptoms that a UTI or sex organ infection may be present. With good data and a discussion with your doctor, specific antibiotics may be appropriate to treat an indicated infection, as these tissues are difficult targets, especially in males.

CALCULATE SUPPLEMENT DOSES

It is generally expected that ACTUAL deficiencies for silicon, magnesium, iodine, selenium, molybdenum and others may show in your Oligoscan data and that FUNCTIONAL deficiencies for iron, manganese, copper and six others may exist in the HTMA, indicating inflammation severity over time. These may take some months to restore.

Recheck your Oligoscan for progress on remineralisation monthly / regularly (and HTMA, as desired, for progress on inflammation, strontium and rubidium.) Adjust supplements as needed. Absorbing a reasonable amount of excess minerals is not normally problematic unless you have eg. Wilson's disease. Where an element is indicated non-optimal, you can use these suggested (elemental) minimum daily doses below, relative to the interpreted lower threshold.

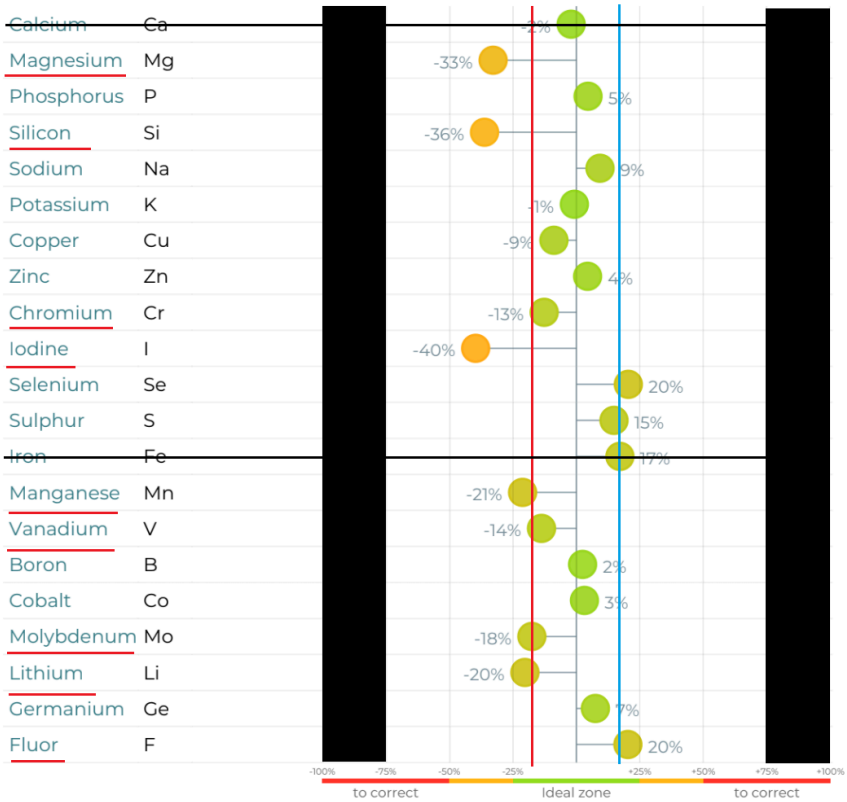
Based on our collected data, we interpret Oligoscan / SO/Check reports using different upper and lower thresholds than the provider's report layout indicates.

For "Oligoscan" reports, the minimum / lower threshold is the "a" in "Normal" (to the left of OK) and the ideal target for all markers *except fluorine* is the "o" "Normal+" (right of OK).

		Result	Normal		Low-	Low	Normal	OK	Normal+	High	High+
~~Calcium~~	~~Ca~~	~~325.1~~	~~273.0~~	~~398.0~~				1.5g			
Magnesium	Mg	31.4	30.5	75.7				750mg			
Phosphorus	P	155.8	144.0	199.0				1.5g			
Silicon	Si	12.6	15.0	31.0				3/4 tsp			
Sodium	Na	68.1	21.0	89.0				>2.5g			
Potassium	K	18.7	9.0	39.0				>5g			
Copper	Cu	9.5	11.0	28.0	>7.5mg			5mg			
Zinc	Zn	108.2	125.0	155.0	>100mg			50mg			
~~Iron~~	~~Fe~~	~~4.8~~	~~5.8~~	~~15.8~~	>30mg, per blood data						
Manganese	Mn	0.37	0.31	0.75	1mg						
Chromium	Cr	0.83	0.82	1.25	1.5mg						
Vanadium	V	0.025	0.009	0.083	0.5mg						
Boron	B	2.32	0.84	2.87	6mg						
Cobalt	Co	0.034	0.025	0.045				Use B12			
Molybdenum	Mo	0.041	0.035	0.085	0.5mg						
Iodine	I	0.53	0.32	0.59	>2mg			0.5mg			
Lithium	Li	0.073	0.052	0.120	5mg						
Germanium	Ge	0.022	0.003	0.028				Use food			
Selenium	Se	1.73	0.95	1.77	0.5mg						
Sulphur	S	48.3	48.1	52.0	2g*						
Fluor	F	0.87	0.41	1.75				Use 10g tamarind for excess			

If your Oligoscan report also shows **extremely** elevated levels of heavy metals (eg. lead, mercury or uranium), taking a final binder (eg. 5g of activated charcoal, micronized zeolite or bentonite clay) could be appropriate before bed and far away from meals. *The included citric acid, silica, spirulina, NAC, R-ALA and psyllium husk already have functions for this.*

For “So-Check” branded reports, these have a different format / layout and show a “percentage deviation” from “normal”. You can ignore this report’s two outer columns to use the dosing guide image above.)



Elevations of electrolyte excretion in HAIR tests can indicate LOW cellular uptake. Where a HAIR mineral profile shows low potassium and similarly low rubidium, the rubidium deficiency will need correcting or else potassium levels may be difficult to restore. Similarly calcium with strontium and magnesium with lithium. High zinc can indicate low histidine / insufficient protein.

Low phosphorus in Oligoscan or OAT data can indicate parathyroid issues, acetaldehyde and/or (metabolic|respiratory|renal) acidemia. ¼ teaspoon of sodium bicarb in water AWAY from meals 1-3x / day can be helpful in “patching” downstream issues of acidemia, until resolved.

Low sulphur in Oligoscan data can indicate elevated transsulfuration, sulphur metabolising microorganisms or microbial oxalate issues.

Low iodine is often observed with fluorine excess. Fluorine is found in medicines, toothpaste and town water. Consuming 10g tamarind / day can dramatically increase excretion of fluorine.

If you have taken a blood test for [iron, transferrin, transferrin saturation% and ferritin] and the transferrin saturation% is below 18%, you have a critical need for iron supplementation before Stage 3, however **MOST** oral supplements will not absorb and can feed pathogens.

ORDER YOUR SUPPLEMENTS

While the Oligoscan provides instant data, it will typically take 2-3 weeks to get your HTMA and OAT results and a potentially similar timeframe to order / receive supplements from vendors. Now would be an opportune time to order any/all supplements which do not require personalisation (everything apart from biotin, P5P, silicon, magnesium, iodine).

Some products are not available domestically in all regions and will need to be imported from the US. As such, the "master list" is based around US suppliers. However, a list of local vendors / supplements for regions has been provided for some products. **Quantities are indicated for a 3 month supply.** *(PRODUCTS RECENTLY UPDATED are marked in GREEN)*

	[USA / Master List 1/2 - most products ship internationally] ***Standard supplements, regardless of mineral results:***
0.1	**B2 / FMN (Riboflavin)[5] 57g -** https://pforlife.com/riboflavin-5-phosphate-riboflavin-5-phosphate-sodium-powder.html ([5] This is a special sublingual coenzyme form which bypasses common absorption and thyroid issues.)
4.5	**Antifungal Enzymes 1 (Candex) -** https://www.allstarhealth.com/f/pure_essence_labs-candex.htm
2	**Biofilm Breaker (BP2A) -** https://femologist.com/products/biofilm-phase-2 (now ships to AU)
2	**IgG2000 -** https://femologist.com/collections/gut-health/products/mega-igg2000-immune-detoxification-support-120-capsules
2	**Schisandra -** https://iherb.com/pr/solaray-schizandra-580-mg-100-vegcaps/99980
2	**Undecylenic Acid -** https://iherb.com/pr/thorne-undecylenic-acid-250-gelcaps/18560
1	**Citric Acid -** https://iherb.com/pr/frontier-co-op-citric-acid-16-oz-453-g/30733
2.5	**Lecithin -** https://iherb.com/pr/now-foods-sunflower-lecithin-pure-powder-1-lb-454-g/59514
1	**B3 Nicotinamide Mononucleotide (NMN) -** https://renuebyscience.com/product/pure-powder-100-grams/
1	**Spirulina (Powder) -** https://iherb.com/pr/kos-organic-spirulina-powder-13-5-oz-381-5-g/104647
1	**Psyllium Husk (or powder) -** https://iherb.com/pr/frontier-co-op-organic-psyllium-husk-powder-16-oz-453-g/31080
1	**NAC** - https://iherb.com/pr/now-foods-nac-pure-powder-4-oz-113-g/114824
3-9	**PQQ + CoQ10** - https://iherb.com/pr/lake-avenue-nutrition-coq10-with-pqq-100-mg-60-veggie-capsules/97389
1	**Sublingual B12 -** https://vimergy.com/products/organic-b12
3	**B8 M/D Inositol -** https://iherb.com/pr/wholesome-story-myo-d-chiro-inositol-120-vegetarian-capsules/114887
1.5	**DHM** - https://www.amazon.com/Purisure-Dihydromyricetin-Prevention-Intoxication-Restoration/dp/B07RCVVX4R
1	**B1 -** https://iherb.com/pr/source-naturals-high-potency-b-1-500-mg-100-tablets/980 (TTFD / Allithiamine also good)
1	**Folinic Acid** (not folic acid) - https://iherb.com/pr/source-naturals-megafolinic-800-mcg-120-tablets/7735
1	**Vitamin D3 + K2** - https://iherb.com/pr/futurebiotics-vitamin-k2-d3-with-vitamin-k2-as-mk-7-120-capsules/99900
1.5	**DHA** - https://iherb.com/pr/deva-vegan-omega-3-dha-epa-500-mg-60-vegan-softgels/107941
1	**EGCG** - https://iherb.com/pr/now-foods-egcg-green-tea-extract-400-mg-180-veg-capsules/11598
2	**A-GPC Choline** - https://iherb.com/pr/now-foods-alpha-gpc-300-mg-60-veg-capsules/12803
1	**Vitamin C -** https://iherb.com/pr/california-gold-nutrition-gold-c-usp-grade-vitamin-c-1-000-mg-240-veggie-capsules/61865
2	**R-ALA** - https://iherb.com/pr/allmax-r-ala-60-capsules/67927
1	**ACV** - https://iherb.com/pr/swanson-apple-cider-vinegar-625-mg-180-capsules/109045
2	**Chlorella -** https://iherb.com/pr/now-foods-certified-organic-chlorella-pure-powder-1-lb-454-g/514
1-8	**Apigenin** - https://iherb.com/pr/codeage-liposomal-apigenin-non-gmo-vegan-90-capsules/114120
1	**Xylitol -** https://iherb.com/pr/xlear-xylosweet-natural-xylitol-sweetener-1-lb-454-g/5307
1.5	**Curcumin -** https://iherb.com/pr/solaray-turmeric-300-mg-60-vegcaps/70047
1	**L-Glutamine 500g+ -** https://www.bulksupplements.com/products/l-glutamine
1	**L-Proline 250g+-** https://www.bulksupplements.com/products/l-proline
1	**L-Glycine 500g+ -** https://www.bulksupplements.com/products/glycine-pure-powder
1	**Taurine 1kg+ -** https://www.bulksupplements.com/products/taurine
1	**L-Serine 250g+ -** https://www.bulksupplements.com/products/l-serine
1	**Creatine 500g+ -** https://www.bulksupplements.com/products/creatine-monohydrate
1	**ALCAR 250g+ -** https://www.bulksupplements.com/products/acetyl-l-carnitine-alcar
1	**L-Lysine 250g+ -** https://www.bulksupplements.com/products/l-lysine-hcl
1	**Beta-Glucans 100g+ -** https://www.bulksupplements.com/products/beta-glucan-1-3-1-6-powder *)*
2	**Reishi[7] -** https://iherb.com/pr/life-extension-reishi-extract-mushroom-complex-60-vegetarian-capsules/46279 ([7]PRODUCT DOES NOT SHIP TO EU - use EU source. Do not substitute.)
1	**Elderberry -** https://iherb.com/pr/now-foods-elderberry-500-mg-120-veg-capsules/99028
1	**Floraphage -** https://iherb.com/pr/arthur-andrew-medical-floraphage-probiotic-multiplier-90-capsules/62323
1	**Lactulose (AU source)** - https://www.naturalchemist.com.au/dulose-lactulose-oral-liquid-500ml/

[USA / Master List 2/2 - most products ship internationally]

3 **Spore Probiotic -** https://iherb.com/pr/youtheory-spore-probiotic-6-billion-cfu-60-vegetarian-capsules/78522
1.5 **LGG + Bifido -** https://www.amazon.com/Probiotic-Psychobiotic-Depression-Histamine-Free-Featuring/dp/B07L8MMCZV
3 **L. reuteri -** https://iherb.com/pr/biogaia-gastrus-for-optimal-gut-health-mandarin-30-tablets/80974
1 **L. sakei -** (use local sources) https://www.amazon.com/Lactobacillus-Probiotic-Billion-Sinusitis-Potency/dp/B09KZL6FJC
1 **O. formigenes -** https://www.ebay.com/itm/375003720123 (may have issues importing to NZ)
1.5 **Ora Lady Bugs -** https://iherb.com/pr/ora-lady-bugs-women-s-probiotic-prebiotic-supplement-60-capsules/105993
1 **B. breve M16-V -** https://www.amazon.com/Optibac-Probiotics-Health-Immune-Support/dp/B086GZTYVT/ (or use EU)

"Standard" Elemental Supplements:

1-2 **Fulvic Acid "complexed" Ionic Multi-Mineral (Boron, Chromium, Iodine, Lithium, Magnesium, Manganese, Molybdenum, Potassium, Rubidium, Selenium, Strontium, Zinc, others - only at "maintenance dose")** - https://www.amazon.com/Good-State-Supplement-Different-Minerals/dp/B0BJ85QN78
9 **Silica -** https://iherb.com/pr/solaray-bamboo-vital-extract-600-mg-60-vegcaps/24423 (updated)
0.2 **OR 1kg powder** https://www.bulksupplements.com/products/bamboo-extract-powder (use ⅔ tsp / day)
4 **Magnesium (Transdermal[4]) -** https://iherb.com/pr/life-flo-magnesium-oil-sport-spray-8-fl-oz-237-ml/49247
([4]Transdermal absorption route appears to be **required**. This magnesium product helps prevent stimulating topical fungal biofilm growth. *If this is not well-tolerated - eg. itchy rash, you can use this transdermal magnesium "oil" instead -* https://goodstate.com/collections/ionic-magnesium/products/good-state-ionic-magnesium-oil-professional-grade-8-oz)
1 **Iodine -** https://www.amazon.com/Carlyle-Lugols-Iodine-Solution-Twin/dp/B07CGVQ5WJ/
1 **Bromine + Silica, etc (Transdermal) -** https://www.amazon.com/Dead-Sea-Mud-Bag-Israel/dp/B003UPIUJK
3 **Calcium Phosphate (Marine) -** https://iherb.com/pr/veglife-red-marine-calcium-90-tablets/70153

Additional supplements, where indicated:

1 **"Heme" Iron -** https://proferrin.com/product/proferrin-clear-90ct/
0.5 **Vanadium -** https://iherb.com/pr/country-life-vanadyl-sulfate-180-vegan-capsules/1754
1 **Lithium -** https://iherb.com/pr/kal-lithium-orotate-5-mg-120-vegcaps/85528
1 **Molybdenum -** https://iherb.com/pr/source-naturals-reduced-glutathione-complex-orange-50-mg-100-lozenges/1407
1 **Selenium -** https://iherb.com/pr/california-gold-nutrition-selenium-yeast-free-200-mcg-180-veggie-capsules/90416
1.5 **Chromium -** https://iherb.com/pr/solaray-chromium-picolinate-natural-lemon-raspberry-1-000-mcg-100-lozenges/124399
2.5 **Sulphur -** https://iherb.com/pr/doctor-s-best-msm-with-optimsm-1-500-mg-120-tablets/3 (34% sulphur)
3 **Zinc -** https://iherb.com/pr/source-naturals-wellness-zinc-lozenges-peach-raspberry-23-mg-120-lozenges/1476
2 **Copper -** https://iherb.com/pr/solaray-copper-2-mg-100-vegcaps/70102
1 **Cobalt -** https://www.naturitas.com/#/dffullscreen/query=ifigen%20cobalt
2 **Germanium GE-132** - https://www.nutricology.com/organo-germanium-50-vegetarian-capsules
1 **Disodium Phosphate -** https://www.amazon.com/Disodium-Phosphate-Na2HPO4-Grade-Powder/dp/B083H3DCG1
1 **Biotin (ONLY if indicated) -** https://iherb.com/pr/nature-s-way-biotin-cherry-1-000-mcg-100-vegan-lozenges/1892
1 **B6 (P5P) (ONLY if indicated) -** https://iherb.com/pr/swanson-p-5-p-pyridoxal-5-phosphate-20-mg-60-capsules/117697
2 **Tamarind (for fluorine excess) -** https://www.amazon.com/Rani-Organic-Tamarind-Indian-Certified/dp/B09CPQ5JQT
1 **TMG (ONLY if indicated) -** https://iherb.com/pr/nutricost-betaine-anhydrous-unflavored-17-6-oz-500-g/129092
1 **B5 (ONLY if indicated) -** https://iherb.com/pr/source-naturals-pantothenic-acid-100-mg-250-tablets/1357

Foods, salts (use local sources):

1 **450g Sodium Chloride -** https://www.amazon.com/Amazon-Brand-Happy-Ground-Ounces/dp/B07QW1G8MW/
1 **600g Potassium Chloride** - https://www.amazon.com/No-Salt-Substitute-11/dp/B00KPX1YPM/
1 **Ginger** (ground) - https://www.amazon.com/Organic-Ground-Anthonys-Gluten-Free-Non-GMO/dp/B019ZW9XBA/
9 **Oat Bran** - https://www.amazon.com/Bundle-Two-16oz-Packages-BELLATAVO-Certified/dp/B09MCPY86H

DIY Antiseptic Recipe Product Links:

1 **Tea Tree Oil -** https://iherb.com/pr/now-foods-organic-essential-oils-tea-tree-1-fl-oz-30-ml/956
0.5 **Clove Oil -** https://iherb.com/pr/now-foods-essential-oils-clove-2-fl-oz-59-ml/21119
1 **Black Seed Oil -** https://www.amazon.com/HBNO-Organic-Black-Liquid-120ml/dp/B0B3MDJ9QB
0.5 **Oregano Oil -** https://www.amazon.com/Oregano-Oil-Essential-Respiratory-Therapeutic/dp/B08JVMK9VD
- **NAC Powder - (**NAC located above)
1 **Boric Acid -** https://www.amazon.com/dp/B072MJ2GLN
1 **Empty Bottles -** https://www.amazon.com/PrettyCare-Measured-Pipettes-Tincture-Essential/dp/B07RK5SFYH/
1 **Sinus Rinse -** https://www.amazon.com/NeilMed-Sinus-Rinse-Xylitol-Count/dp/B08FPK73R7
- **BP2A - (**BP2A located above)
1 **Baby Shampoo -** https://www.amazon.com/Johnsons-Baby-Shampoo-Ounce-200ml/dp/B07K7XKHLS/

Tools:

1 **Milligram Scales -** https://www.amazon.com/Fuzion-Milligram-Portable-Reloading-Batteries/dp/B07TBJBFRK/
1 **Small Measuring Spoons -** https://www.ebay.com/itm/363766617232
1 **50mL Syringe -** https://www.amazon.com/Catheter-Syringe-Cover-Pieces-Brandzig/dp/B07NF6ZGMX/

[EU & UK - alternate / domestic sources for *SOME* products]

Standard supplements, regardless of mineral data:

2	**IgG2000 -** https://www.spectrumsupplements.eu/supplement/mega-igg2000-120-capsules/
3	**L. reuteri -** https://www.24evexia.com/BIOGAIA-PROTECTIS-FOR-GUT-COMFORT-30-CHEWABLE-TABLETS
3	**NAC -** https://www.amazon.de/N-Acetyl-L-Cysteine-Powder-Sulphur-Containing-Fermentation-Additives/dp/B07D3722WS
2	**Reishi -** https://www.lifeextensioneurope.de/reishi-extract-mushroom-complex
2	**Lions Mane** (Equivalent to Beta-Glucans + Ergothioneine on USA list) **-** https://www.amazon.de/dp/B07W668CZF
3	**PQQ + CoQ10 -** https://www.sunday.de/en/polyphenol-21-komplex.html
1	**Xylitol -** https://www.amazon.de/dp/B01FDHRONA
2	**Biofilm Breaker (BP2A) -** https://naturesfix.co.uk/product/biofilm-phase-2-advanced-60-vegcaps-priority-one-vitamins/
3	**L. sakei (UK, EU) -** https://kimchipower.co.uk/
3	**Mixed Inositol -** https://timehealth.co.uk/product/myo-d-chiro-inositol (UK, link to EU on page)
1	**B2 (FMN) -** https://www.natuerlichlangleben.de/Riboflavin-5-phosphat-Vitamin-B2-Pulver-30-g
2	**B. breve M16-V -** https://www.optibacprobiotics.com/uk/product/for-your-baby-30-servings
1	**Lactulose -** https://www.arzneiprivat.de/product/lactulose-al-sirup.319583.html

Additional elements, as needed:

3	**Calcium + Phosphorus -** https://www.sunday.de/en/natural-calcium-400mg-high-dose-capsules-set.html
1	**Iodine -** https://www.amazon.de/-/en/Lugolsche-Solution-Pharmaceutically-according-Developed/dp/B07L87KPTB/
2	**Potassium -** https://www.amazon.de/-/en/Potassium-Tablets-Vegan-Additives-Dosage/dp/B08VRPR39L/
1	**1kg Monosodium Phosphate -** https://atomscientific.com/product/mono-sodium-phosphate-anhydrous-food-grade **OR**
4	**250g Dipotassium Phosphate (DPP) -** https://www.dolphinfitness.co.uk/en/crystal-di-potassium-phosphate-250g/181465
1.5	**Chromium -** https://www.dolphinfitness.co.uk/en/solaray-chromium-picolinate-100-lozenges/41784
1	**1kg MSM -** https://www.amazon.de/-/en/Meavita-Powder-99-9-1000g-Methylsulfonylmethane/dp/B07FXMVVJX
2	**Dead Sea Mud (Bromine + Silica, etc., Transdermal) -** https://www.amazon.de/-/en/Dead-Sea-Mineral-Mud-Pure/dp/B09TRRJLC6
2	**Tamarind (fluorine excess) -** https://www.amazon.de/-/en/dp/B07PQZGL5K/

Foods, salts:

1	**Sodium Chloride -** https://www.amazon.de/-/en/dp/B07PBJG722
4	**Potassium Chloride (or use DPP above) -** https://www.amazon.de/-/en/VITAFLOR-Bouillet-Salt-Diet-Nutrition/dp/B003ROCBMG
7.5	**Oat Bran -** https://www.amazon.de/-/en/764087/dp/B06WVLBX5P
4	**Ginger -** https://www.amazon.de/Ginger-Powder-120-Additives-Laboratory/dp/B09B2GRNG7

DIY Antiseptic Recipe Product Links:

1	**Tea Tree Oil -** https://www.amazon.de/Pure-Organic-Tea-Tree-50ml/dp/B072LZFK3Y
1	**Clove Oil -** https://www.amazon.de/Cosmetics-Organic-Carnation-Essential-Oil/dp/B0153Q871E
2	**Black Seed Oil -** https://www.amazon.de/-/en/Naissance-Black-Seed-250-100/dp/B0711N25NS
1	**Oregano Oil -** https://www.amazon.de/-/en/Undiluted-Oregano-Essential-Carvacrol-Probably/dp/B07F1VT6V2
-	**NAC Powder** - (NAC located above)
1	**Boric Acid -** https://farmacianovadamaia.pt/en/disinfectants-and-antiseptics/12990-alvita-boric-acid-powder-30g.html
1	**Empty Bottles -** https://www.amazon.de/HandsUnity-Pipette-Bottle-Small-Glass/dp/B094DFK7F5/
1	**Sinus Rinse -** https://www.amazon.de/-/en/Neilmed-Original-Sinus-Flush-60-Pre/dp/B000RDZFZ0
-	**BP2A -** (BP2A located above)
1	**Baby Shampoo -** https://www.amazon.de/35701-Johnsons-Shampoo-500/dp/B07YCF21Y2

Tools:

1	**50ml Syringe -** https://www.amazon.de/Syringes-Reusable-Individually-Packaging-Laboratory/dp/B0B9GWSBF9

[AU / Oceana - alternate / domestic sources for *SOME* products]

Standard supplements, regardless of mineral data:

0.25	**B2 / FMN (Riboflavin) -** https://www.ebay.com.au/itm/185438817270
2	**IgG2000 -** https://www.holisticlifestyler.com/new-products/microbiome-labs-mega-igg-2000
1	**300g NAC -** https://www.ebay.com.au/itm/204114762944
3-9	**PQQ + CoQ10** - https://return2health.com.au/jarrow-formulas-qh-absorb-pqq
4	**250g Taurine -** https://www.bulknutrients.com.au/products/taurine
1	**250g Acetyl L-Carnitine -** https://www.bulknutrients.com.au/products/acetyl-l-carnitine-alcar
0.5	**1kg Creatine -** https://www.bulknutrients.com.au/products/creatine-monohydrate
1	**250g Lysine -** https://www.bulknutrients.com.au/products/l-lysine
2	**250g Glycine -** https://www.bulknutrients.com.au/products/glycine
1	**1kg Glutamine -** https://www.bulknutrients.com.au/products/l-glutamine
1	**Citric acid -** https://shop.thesourcebulkfoods.com.au/product/citric-acid/
1	**Vimergy B12 -** https://floweroflife.com.au/shop/vimergy-b12/
1	**1kg Chlorella -** https://www.australherbs.com.au/shop/item/chlorella-powder-organic
2	**B8 Mixed Inositol -** https://www.sportyshealth.com.au/Switch-Inositol-Powder.html
2	**Psyllium Husk -** https://www.woolworths.com.au/shop/productdetails/479953/macro-organic-psyllium-husk
3	**Youtheory Spore -** https://vitamingrocer.com.au/products/youtheory-spore-probiotic-171108
1	**LGG Probiotic -** https://www.chemistwarehouse.com.au/buy/123507/natures-way-restore-probiotic-30-billion-90-capsule
1	**L. reuteri -** https://blackshawspharmacy.com.au/products/bio-practica-biogaia-protectis-100-chewable-tablets
1	**Xylitol -** https://www.nutgrocer.com.au/xylitol-sweetener/
1	**L. sakei (only available as a CHR-Hansen food-grade product via industry sources)**
	(AU) - https://www.mblsa.com.au/327850/MEAT-CULTURE-SAFE-PRO-B_dash_2-%28100gm_or_200kg%29/pd.php
	(NZ) - https://netropolitan.co.nz/shop/bactoferm-meat-starter-cultures/ (select B2)
1	**B. breve M16-V -** https://michaelschemist.com.au/products/bioceut-babybiotic-02byrs-100g
1	**Lactulose -** https://www.naturalchemist.com.au/dulose-lactulose-oral-liquid-500ml/
1	**DHM -** https://www.ebay.com.au/itm/185984102064

Additional elements, as needed:

4	**Magnesium -** https://www.mrvitamins.com.au/products/nts-magsorb-mg-oil
2	**Calcium -** https://www.amazon.com.au/NOW-Foods-Mineral-Vegetarian-Capsules/dp/B005P0JBLO
18	**Silica -** https://www.swansonaustralia.com/solaray-bamboo-stem-extract-300-mg-60-vegcaps
1	**OR** https://www.amazon.com.au/BulkSupplements-Bamboo-Extract-Powder-Grams/dp/B01LVZW6Z7
1	**Iodine -** https://www.ariyahealth.com.au/product/28698-ariya-purity-lugol-iodine-25ml
2.5	**Disodium Phosphate -** https://www.ebay.com.au/itm/152197693111
1	**Bromine + Silica, etc (Transdermal) -** https://www.blants.com.au/product-category/dead-sea-mud-powder/
4	**Tamarind (for fluorine excess) -** https://ocfinefoods.com/products/maharajahs-choice-tamarind-block-with-seeds
3	**Zinc -** https://au.therastore.co/buy-supplement/source-naturals/wellness-zinc-lozenges/

Foods, salts:

1-2	**400g Sodium Chloride -** https://www.woolworths.com.au/shop/productdetails/320992/mckenzie-s-natural-salt-sea
0.5	**1kg Potassium Chloride -** https://ozdingo.com.au/products/pure-potassium-chloride-powder
7.5	**Oat Bran -** https://www.woolworths.com.au/shop/productdetails/203867/woolworths-oat-bran
2	**Ginger -** https://www.woolworths.com.au/shop/productdetails/680510/woolworths-crushed-ginger

DIY Antiseptic Recipe Product Links:

1	**Tea Tree Oil -** https://www.chemistwarehouse.com.au/buy/86222/thursday-plantation-tea-tree-oil-100ml
1	**Clove Oil -** https://www.chemistwarehouse.com.au/buy/85247/thursday-plantation-clove-oil-13ml
2	**Black Seed Oil -** https://www.amazon.com.au/Pressed-Nigella-Heart-Healthy-Support-Healthy/dp/B00FYGT66E
1	**Oregano Oil -** https://www.amazon.com.au/Gya-Labs-Oregano-Essential-10ml/dp/B07SGRBF3H
-	**NAC Powder** - (NAC located above)
1	**Boric Acid -** https://www.ebay.com.au/itm/334031115910
1	**Empty Bottles -** https://www.amazon.com.au/Magic-Season-Boston-Bottles-Dropper/dp/B09919MRFD/
1	**Sinus Rinse -** https://www.chemistwarehouse.com.au/buy/118364/neilmed-sinus-rinse-kit-60-sachets-online-only
-	**BP2A -** (BP2A located above)
1	**Baby Shampoo -** https://www.amazon.com.au/JOHNSONS-Baby-19008464-Johnsons-Shampoo/dp/B00E86ST28

Tools:

1	**50ml Syringe -** https://www.amazon.com.au/50ml-syringe-catheter-plastic-extension/dp/B0BB6GFX7W/

DIET

Foods to generally consume as part of this protocol (as tolerance allows / increases):

Oat bran 40 g+ /day (*silicon @ 143 mg/100g,* beta glucans - increases sIgA, NK cells, inhibits glyoxylate shunt / isocitrate lyase)
Black pepper (500mg = 35mg beta-caryophyllene. Nice with salt and lime as dipping sauce)
Codonopsis tea [#*] 5-10g/day (promotes bifidobacteria, inhibits sulphur reducing bacteria)
Brazil and other nuts (silica, rubidium, strontium, cobalt, warning - high selenium)
Liver, organ meats (very nutrient dense, not every day)
Broccoli + radish / mustard seed (additional sulforaphane / NRF2, trace elements)
Seaweed / kelp / wakame (bromine, trace elements, minerals, cortisol metabolism)
Cabbage (zirconium, rubidium)
Green beans (silica)
"Purple foods" [#*] (anthocyanins) - purple berries, purple sweet potato, etc
Eggs (Iron, iodine, choline, lecithin, biotin, etc)
Pumpkin seeds/oil (phosphorus, omega fatty acids)
Beetroot (nitrates for blood volume, nitric oxide and dopamine synthesis)
Ginger 2.5-5g/day (gut microbiome dysbiosis and itaconate / isocitrate lyase inhibition)
Pineapple (100-200 g for silicon, bromelain - fibrin-, warning: IFN-γ+)
High protein diet (essential amino acids, often good phosphorus sources) >1.5g/kg/day
Low-GI carbs >1.5-2g/kg/day spread across multiple 20-50g net carb meals, just like in diabetes, unless employing a ketogenic diet (glycogen storage is also impaired when cortisol is elevated. Shakiness, tinnitus, nausea, drowsiness, elevated cortisol / anxiety can be triggered by insufficient glycogen / carbohydrate intake. See "PEM Prevention and Recovery")
Water 2.5-3L of water / day (detoxification, helps prevent red blood cell "rouleaux" formation.)

Foods to generally avoid as part of this protocol:

Alcohol is metabolised to acetaldehyde which will exacerbate all histamine, etc symptoms.
Gluten may be poorly tolerated at this stage, inhibits glucose uptake and damages celia, increasing severity of symptoms. This can be found in many processed foods, soy sauce, wheat products. Oats are often processed on the same machinery as wheat and can have traces of gluten. https://celiac.org/gluten-free-living/what-is-gluten/sources-of-gluten/
High Vitamin B6 foods - (you need **some** B6, however will have issues degrading excess, at first.) https://ods.od.nih.gov/factsheets/VitaminB6-HealthProfessional/
High Vitamin A foods - (you need **some** vitamin A, however will also have issues degrading excess, at first.) https://www.healthline.com/nutrition/foods-high-in-vitamin-a
High histamine foods - https://www.histamineintolerance.org.uk/about/the-food-diary/the-food-list/
High oxalate foods - https://www.stjoes.ca/patients-visitors/patient-education/patient-education-k-o/pd-9447-oxalate-in-food.pdf
Simple sugars and fructose - these do provide a substrate for maintaining glycogen, however the simple forms may also promote microbial growth. Fructose may inhibit copper homeostasis to some extent, also.

HERXHEIMER / DIE-OFF / ACETALDEHYDE SUPPORT

Acetaldehyde is one of the primary toxins released during microbial die-off events and also in smaller amounts, multiple times per day, in response to normal dietary intake of nutrients. Our food intake also feeds our resident microorganisms - including the pathogenic species - which allows them to produce (toxic) metabolites and poison us downstream of each meal.

Acetaldehyde potentially places a difficult burden on our metabolism in key places - histamine degradation, neurotransmitter degradation, collagen synthesis, carnitine synthesis (needed to transport longer chain fatty acids), fatty acid degradation, glucose transport and glycolysis, GABA metabolism, choline metabolism, methylation, Vitamin B6 degradation, Vitamin A degradation, lysine degradation, pyruvate metabolism and other pathways. Aldehyde dehydrogenase enzymes (ALDH2, 1A1, 1A2, etc) detoxify acetaldehyde into acetate as a priority over their normal substrates. Having low NAD+ as a result of chronic IFN-gamma activity exacerbates this problem significantly, as ALDH normally requires NAD+, magnesium and zinc.

Enzyme	1.1.3.17	1.1.3.23	1.2.1.3	1.2.1.4
	1.2.1.5	1.2.1.8	1.2.1.15	1.2.1.16
	1.2.1.19	1.2.1.20	1.2.1.21	1.2.1.24
	1.2.1.26	1.2.1.29	1.2.1.31	1.2.1.39
	1.2.1.47	1.2.1.48	1.2.1.53	1.2.1.54
	1.2.1.63	1.2.1.69	1.2.1.71	1.2.1.73
	1.2.1.77	1.2.1.79	1.2.1.83	1.2.1.88
	1.2.1.91	1.2.1.95	1.2.1.99	1.2.1.-
	1.2.3.1	1.2.3.7	1.2.-.-	1.14.14.3
	1.14.14.49			
Pathway	rn00040	Pentose and glucuronate interconversions		
	rn00053	Ascorbate and aldarate metabolism		
	rn00071	Fatty acid degradation		
	rn00073	Cutin, suberine and wax biosynthesis		
	rn00250	Alanine, aspartate and glutamate metabolism		
	rn00260	Glycine, serine and threonine metabolism		
	rn00310	Lysine degradation		
	rn00330	Arginine and proline metabolism		
	rn00340	Histidine metabolism		
	rn00350	Tyrosine metabolism		
	rn00360	Phenylalanine metabolism		
	rn00362	Benzoate degradation		
	rn00380	Tryptophan metabolism		
	rn00410	beta-Alanine metabolism		
	rn00430	Taurine and hypotaurine metabolism		
	rn00440	Phosphonate and phosphinate metabolism		
	rn00470	D-Amino acid metabolism		
	rn00625	Chloroalkane and chloroalkene degradation		
	rn00630	Glyoxylate and dicarboxylate metabolism		
	rn00640	Propanoate metabolism		
	rn00643	Styrene degradation		
	rn00650	Butanoate metabolism		
	rn00730	Thiamine metabolism		
	rn00760	Nicotinate and nicotinamide metabolism		
	rn00770	Pantothenate and CoA biosynthesis		
	rn00930	Caprolactam degradation		
	rn00980	Metabolism of xenobiotics by cytochrome P450		
	rn00982	Drug metabolism - cytochrome P450		
	rn01100	Metabolic pathways		
	rn01110	Biosynthesis of secondary metabolites		
	rn01120	Microbial metabolism in diverse environments		
	rn01220	Degradation of aromatic compounds		
	rn01230	Biosynthesis of amino acids		
	rn01240	Biosynthesis of cofactors		

Name	aldehyde dehydrogenase (NAD+) [EC:1.2.1.3]
Pathway	map00010 Glycolysis / Gluconeogenesis
	map00053 Ascorbate and aldarate metabolism
	map00071 Fatty acid degradation
	map00280 Valine, leucine and isoleucine degradation
	map00310 Lysine degradation
	map00330 Arginine and proline metabolism
	map00340 Histidine metabolism
	map00380 Tryptophan metabolism
	map00410 beta-Alanine metabolism
	map00561 Glycerolipid metabolism
	map00620 Pyruvate metabolism
	map00625 Chloroalkane and chloroalkene degradation
	map00770 Pantothenate and CoA biosynthesis
	map00903 Limonene degradation
	map00981 Insect hormone biosynthesis
	map01100 Metabolic pathways
	map01110 Biosynthesis of secondary metabolites
	map01120 Microbial metabolism in diverse environments
	map01240 Biosynthesis of cofactors
	map04936 Alcoholic liver disease
Module	M00135 GABA biosynthesis, eukaryotes, putrescine => GABA
	M00913 Pantothenate biosynthesis, 2-oxoisovalerate/spermine => pantothenate
Disease	H00162 Sjogren-Larsson syndrome
	H01071 Acute alcohol sensitivity
	H01611 Alcohol dependence
Brite	KEGG Orthology (KO) [BR:ko00001]
	09100 Metabolism
	09101 Carbohydrate metabolism
	00010 Glycolysis / Gluconeogenesis
	K00128 ALDH; aldehyde dehydrogenase (NAD+)
	00053 Ascorbate and aldarate metabolism
	K00128 ALDH; aldehyde dehydrogenase (NAD+)
	00620 Pyruvate metabolism
	K00128 ALDH; aldehyde dehydrogenase (NAD+)
	09103 Lipid metabolism
	00071 Fatty acid degradation
	K00128 ALDH; aldehyde dehydrogenase (NAD+)
	00561 Glycerolipid metabolism
	K00128 ALDH; aldehyde dehydrogenase (NAD+)
	09105 Amino acid metabolism
	00280 Valine, leucine and isoleucine degradation
	K00128 ALDH; aldehyde dehydrogenase (NAD+)

Taurine, NAD+, magnesium, zinc and molybdenum help promote ALDH activity and restore normal metabolism. Cultivating acetaldehyde metabolising probiotic species like bifidobacterium and reducing acetaldehyde producing species is the long-term goal, however using one of these short-term interventions can be very helpful pre-meal and during die-off:

Kislip - https://ase-onlinestore.com/products-list/asetablet-1box/ (Japan, worldwide shipping)
Acetium - https://www.biohitshop.com/product/3/acetium-capsules-3-x-60-pcs (EU only)
ZBiotics - https://zbiotics.com/products/zbiotics (Too expensive for daily use)
NAC - eg. 250mg, 30 mins after meals (Can potentially create more die-off by opening biofilm.)
DHM - (Now included in Stage 1. Additional amounts can be taken.)

ELECTROLYTES

(Potassium, sodium, calcium, magnesium, phosphorus, bicarbonate)

Maintaining electrolytes can be challenging, due to expected renal dysfunction in this disease model.

Electrolytes are required for ion channels / transporters and signalling pathways. Where deficient, neurological symptoms, muscle spasms and pain/inflammation may occur. Nutrient absorption may be impaired.

Most electrolytes should be consumed slowly over the day and typically with carbohydrates / food.

Electrolytes can “exchange” at the cellular membrane as pairs, eg. sodium:potassium and calcium:magnesium. For this reason, a deficiency of one electrolyte in the pair can create issues with the other.

Transdermal administration has been demonstrated as a superior route for magnesium absorption and for many of the minerals which are transported by DMT-1 and ferroportin, which are inhibited by chronic inflammation.

Consult your doctor if suffering from any pre-existing kidney disease.

Total daily (elemental) targets from all food / supplement sources -
Sodium (Na): >2.5 g, eg. 5 g (teaspoon) of table salt.
Potassium (K): >5 g, eg. 900g / 3 large potatoes, or eg.10g of potassium chloride (Nu-Salt).
Magnesium (Mg): >500 mg transdermally, where deficient.
Calcium (Ca): >750 mg. 1.5-2 g, where deficient. Cronometer can help visualise your calcium intake. Low phosphorus and also low strontium in hair testing may also infer calcium status. If unknown, start with 1g/day. Oxalate dumping can be expected initially.
Phosphorus (P): 1 g for maintenance, higher where deficient. eg. Meat, dairy, pumpkin seeds / *pumpkin seed oil*, red lentils, sunflower seeds, potatoes. Supplements which combine phosphorus with various electrolytes, eg. calcium phosphate may be available in some regions.

Elemental weights, by compound, for calculating servings of various electrolytes:
Sodium Chloride (Cl): 39% Na, 61 % Cl | eg. 6.4 g = 2.5 g sodium, 3.9 g chloride
Potassium Chloride: 52% K, 48% Cl | eg. 9.6 g = 5 g potassium, 4.6 g chloride
Calcium Phosphate: 39% Ca, 20% P | eg. 3.8 g = 1500 mg calcium, 770 mg phosphorus
Disodium Phosphate: 32% Na, 22% P | eg. 7.73 g = 2.5 g sodium, 1.7 g phosphorus
Monosodium Phosphate: 19% Na, 26% P | eg. 6.6 g = 1.25 g sodium, 1.7 g phosphorus
Dipotassium Phosphate: 45% K, 18% P | eg. 10g = 4.5g potassium, 1.8g phosphorus

REMINERALISATION

One of the biggest challenges for remineralisation with chronic inflammation is absorption, the disease model shows this is mostly related to inflammation, by promoting hepcidin and inhibiting DMT-1 & ferroportin. This inhibits uptake and/or export of at least 9 minerals in some cell types.

ORAL absorption of certain minerals will be inhibited throughout the day, relative to the inflammatory state. This makes absorption from food and regular supplements unreliable.

IV, sublingual and transdermal routes bypass this transporter blockade. Magnesium spray is one example of a transdermal supplement. Dead Sea mud is another very rich transdermal source for a number of minerals, however it's normally a little cumbersome and inefficient to use. It's "messy" and dries out quickly, causing skin irritation, but doesn't have to be.

Here are two ways to prevent Dead Sea mud drying out, to make it more cost effective and user-friendly. These can be placed on your skin for many hours, improving absorption.

Waterproof Dead Sea mud "strips" - simply apply the Dead Sea mud on your skin and cover with post-surgical tape: https://www.amazon.com/Transparent-Stretch-Adhesive-Bandage-10-94/dp/B0B5R9NZ5F

Make sure the tape edges are clean.

Cling wrap - you can smear the Dead Sea mud on your arm, then wrap it with cling wrap to keep it moist and your clothes / bedding clean: https://www.amazon.com.au/Glad-Green-Bio-Based-Cling-Metres/dp/B08HDT4MYD/

This method allows larger coverage areas.

Compounded sublingual vitamins and minerals are now available internationally from an Australian pharmacy. Please see note 14 in "THE PROTOCOL".

Depending on the skin microbiome, a rash or biofilm may develop. This can be prevented by pre-rinsing with a NAC-based solution (eg. 5g NAC in 250mL of water) when showering and then washing the area with a cloth. Be sure to thoroughly clean and dry your skin, especially the areas where transdermal supplements are being used.

WEEKLY “DIY POWDER” PREP

For convenience, weekly batches of powder can now be prepared ahead of time to simplify dosing and improve time management. You can still adjust / modify your weekly batches around any individual dosing requirements.

The tables in the various protocol stages now include a column indicating the amount of powder to be added (or capsules to be opened) and thoroughly mixed together in a suitable kitchen mixer / grinder. Ideally this device should support dry materials and have at least 1.5L capacity.

eg. Philips HL7759/00, Thermomix, etc
https://www.ebay.com.au/itm/204475603917

Empty tubs / buckets are needed to store the finished DIY powder. In the absence of a suitable mixer, the destination tub itself can be filled and shaken vigorously / used as a manual dry mixer.. if your energy envelope allows or someone can assist.
eg. https://www.ebay.com.au/itm/334715304879

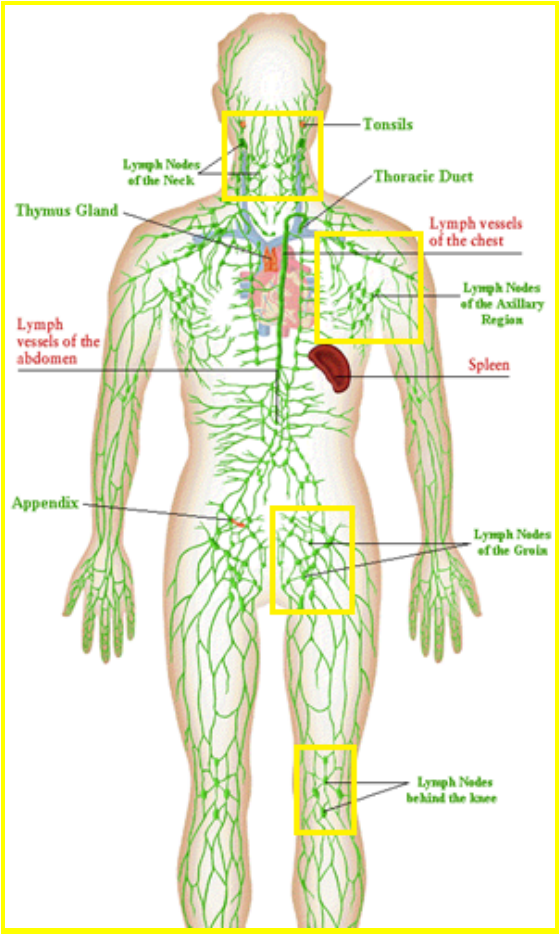
To calculate your serving size, divide the total net weight of your finished DIY powder by 21 to reach a single serving. Eg. 615g net / 21 servings = 29.3g per serving. Large kitchen scales will be required. eg. https://www.ebay.com.au/itm/126108837735

The DIY powder is taken 3 times per day, 15 - 30 minutes before meals, replacing the existing schedule for those supplements, which may have been previous dosed eg. once per day.

In Stage 2 and 3, there are items such as NAC, ALA and spirulina which are present in Stage 1, yet have increased doses. The amounts listed in the weekly column replace the earlier amounts during that later Stage, where indicated.

If you are just starting out, you can still prepare a full week of powder, start with smaller servings, eg. ¼ the normal dose and increase the serving size over time to reach a full dose.

LYMPHATIC MAINTENANCE



The lymphatic system is a network which spans the majority of the human body. Until quite recently, it was not known that this also included the brain - https://www.nih.gov/news-events/nih-research-matters/lymphatic-vessels-discovered-central-nervous-system

The lymphatic system has a number of important roles in immunity and circulation.

Lymphoid organs are the source of B and T lymphocytes. **The system transports dietary fats and collects extracellular fluid and metabolites from tissues, returning them via lymphatic vessels to the bloodstream, preventing lymphoedema or catastrophic fluid buildup, pressure / pain and metabolic backlog.**

A friendly primer on the lymphatic system can be found here - https://www.britannica.com/science/lymphatic-system.

The lymphatic system relies on breathing and muscle contractions to maintain healthy circulation and waste excretion. Calendula creams can also help move lymph.

In any disease where movement is being restricted, this creates additional difficulties for maintaining immune function, fat transport and metabolite circulation. Head pressure and edema is expected. https://www.youtube.com/watch?v=dDrJajg2ZII

A session with a massage therapist who specialises in lymphatic drainage may help you assess and remediate any recurring lymphatic blockages. These may also be observed as being stiff, sore swollen tissues that can feature enlarged lymph nodes, such as in the **neck, groin and/or armpits**. *A strong paradoxical effect may be felt the first time a blockage is cleared.* https://bornfree.life/images/neck-lymphatic.mov

A daily regimen to maintain any problematic areas by hand or vibrating massage gun (used on a glancing angle), may also assist unlocking functional gains and preventing pain in chronic illnesses / infections. https://www.youtube.com/watch?v=ccV24hCOe5A

Conversely, not maintaining the lymphatic system may create a serious roadblock to recovery. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5954877/

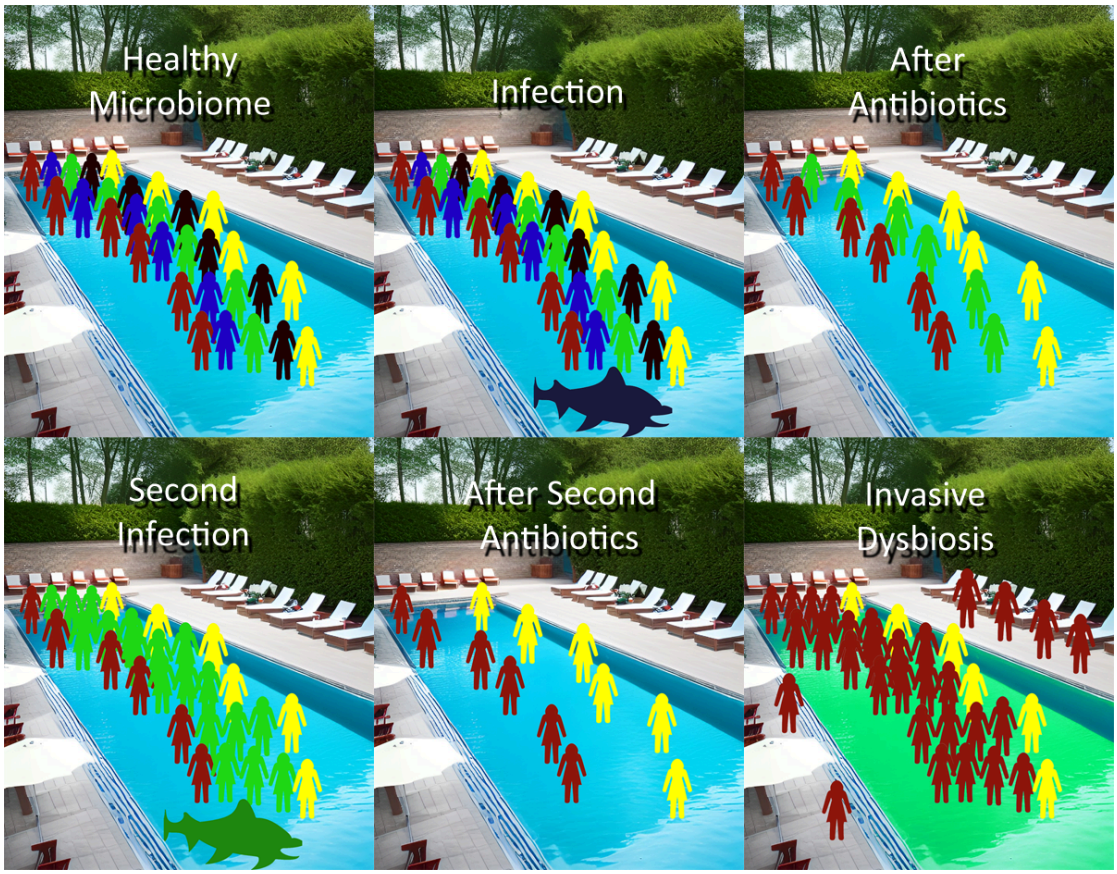
LIVING WITHOUT CHRONIC DYSBIOSIS

Yeasts, moulds and fungi are found everywhere in nature and have an important role. They decompose animals, plants and other organisms, recycling their elements and other nutrients, thereby continuing the circle of life.

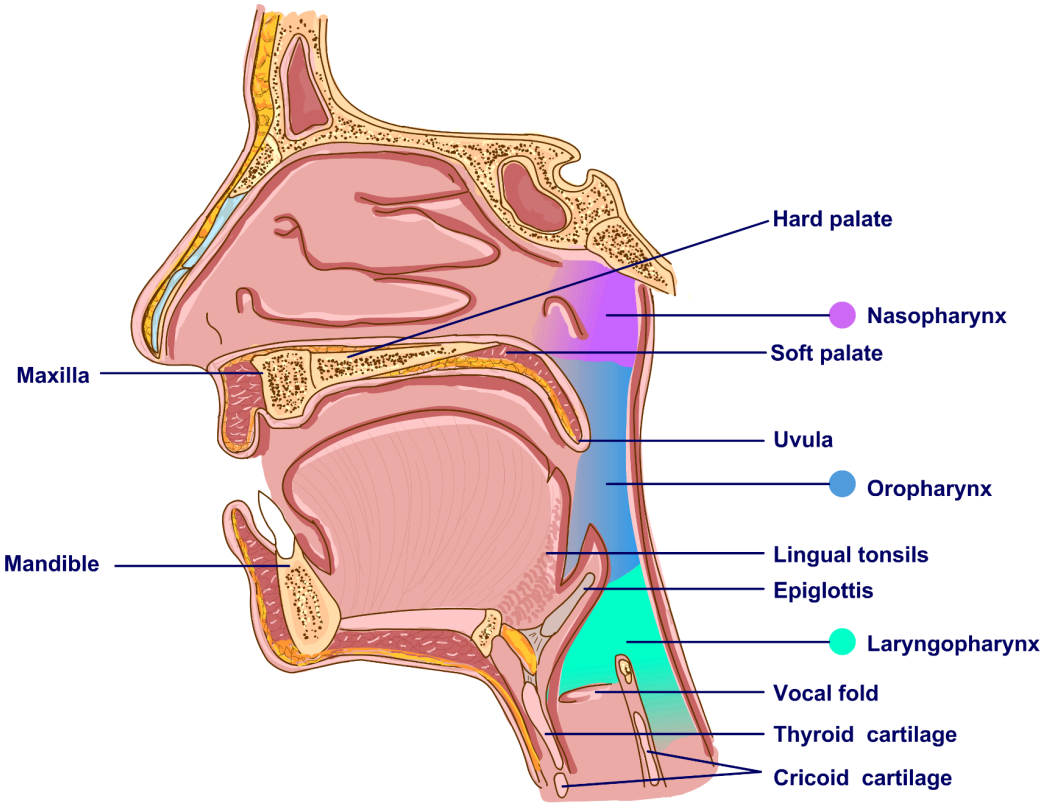
Usually these decomposing animals are not alive, however when an organism's immune response is incapable of maintaining a defence against the normal daily background level of fungal challenge, the living organism will become food for yeast, mould and/or fungi. Various lifestyle influences contribute positively and negatively to maintaining this daily defence.

Lack of exposure to sunlight, lack of sufficient activity to maintain a specific immune function and/or lack of a balanced, protective microbiome can also contribute to an organism being more susceptible to mould. It has been previously said "we don't grow old, we mould!"

Antibiotics are powerful tools in controlling infections and dysbiosis, however they are also broadly indiscriminate in their effects and overused in food production and minor infections - leading to a loss of microbial diversity and the development of drug-resistant strains. Maintaining a protective gut microbiome in modern times has a number of challenges due to the germicidal effects of stomach acid and a disconnection from our natural source of probiotics via our industrialised food chain / use of preservatives and general preference for cooked food.

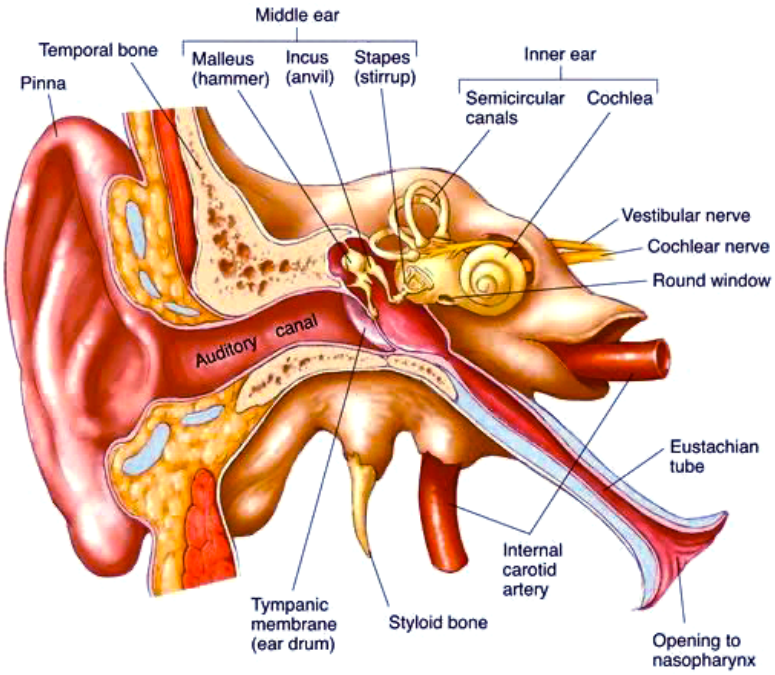


The barrier function of the skin and mucosal layers play an important part in resilience against pathogens. Unfortunately, the human body has a number of tissues that are opportunistic for yeast / mould / fungal infections to thrive with minimal interference from direct immune activity.

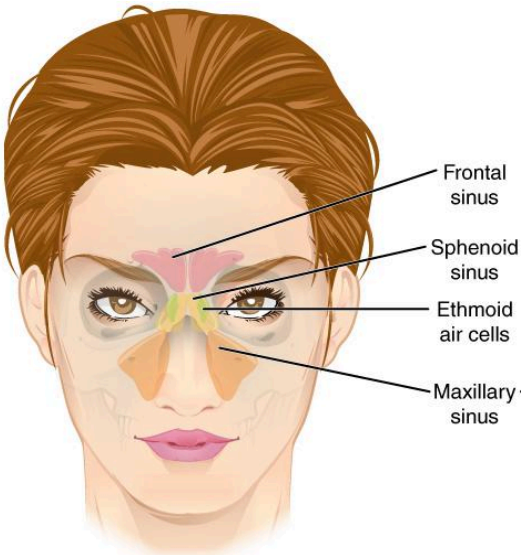


Do you have a history of cracked lips / ears / toes / feet / rectum, flaking skin, dandruff, hair loss, red / inflamed skin patches / rashes, eczema, psoriasis, nasal inflammation, tonsillitis, sleep breathing disorder, gut pain / issues, cystitis, prostatitis, mastitis, epididymitis, white or green/black film on tongue or discharge?

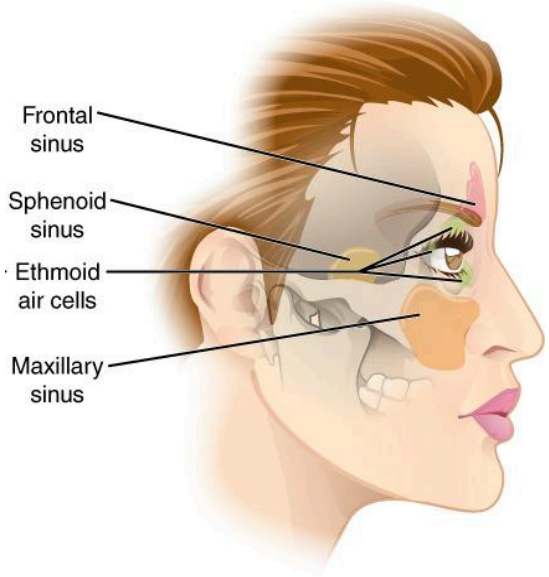
These are strong indicators for potentially invasive microbiome dysbiosis. The extent / severity of the invasiveness of these microbes has a direct correlation with the intensity and duration for activation of chronic innate immune response pathways. These alter energy metabolism towards specific immune functions and generate predictable symptoms, such as neurotransmitter and endocrine dysregulation, POTS, dysautonomia, elevated cholesterols, insomnia, frequent urination, etc., especially where coenzyme or mineral deficiencies are also present.



Orifices and tissues such as the **nasopharynx, sinuses, throat, Eustachian tubes, ears, GI tract, rectum, vagina, feet, toes** are areas which are not regularly exposed to direct sunlight. *This list might well include all tissues, where someone is bed-bound or house-bound.* These tissues provide "safe spaces" for any pathogenic microorganisms to colonise, create biofilms and thrive, without appropriate immune surveillance.



(Image source:*https://commons.wikimedia.org/w/index.php?curid=30850944.*)



Lateral

(Image source:https://commons.wikimedia.org/w/index.php?curid=30850945)

Subgrouping for ME/CFS, PFS, PSSD and other patients may have a relationship with the locations of infected tissues. In the case of a GI tract infection, this may also affect dietary absorption efficiency. The nasopharynx (and surrounding areas) may be very important tissues for chronic innate immune activation. A healthy microbiome appears to play a very important role in providing protection against invasive bacterial, yeast, mould and fungal infections.

Apart from generating gaseous toxins, ethanol and acetaldehyde - depleting silicon and other metals in compensation, many yeasts / mould / fungi and bacteria can cause dramatic metabolic alterations. They have an ability to break through our skin / epithelial tissue / mucosal barrier function from immune-evasive biofilms and cause recurring / chronic immune activation during the invasion. This immune activation inhibits specific mitochondrial metabolism and reconfigures a number of other metabolic pathways toward combating these pathogens. However, while ultimately beneficial, these alterations can be quite debilitating, under certain conditions.

Additionally, whenever our efforts or immune system is successful in killing these microorganisms, their death can cause "dumping" and circulation of these toxins which contribute to a well-known "die-off effect" occurring.

This die-off effect is responsible for a number of highly debilitating symptoms, such as **headaches, nausea, additional fatigue, dizziness, swollen glands, bloating / gas, constipation or diarrhoea, joint or muscle pain, tachycardia, chills, cold hands / feet, itchiness, rashes, sweating and/or fever which resembles the "disulfiram effect".**

(Read more here: https://www.thecandidadiet.com/candida-die-off-symptoms/)

This can cause an ongoing / recurring cycle of extreme unpleasantness, if these infections and their original “safe spaces” (biofilms) are not fully resolved and protective microbiome restored.

We have been actively researching a combination of some existing strategies to help kill these microorganisms and minimise the die-off symptoms. Some additional challenges relate to the lifecycle stages and biofilms being created, which provide further protection against our immune activities.

In addition to the supplement schedule included in this protocol, a more rapid clearance of any (somewhat) accessible microorganisms may be achieved by direct or topical interventions for these infected tissues. Commercial preparations are available with various levels of efficacy.

Popular antifungal soaps, shampoos and creams containing zinc pyrithione can be effective at inhibiting fungal overgrowth. However, these products are now banned in Europe due to concerns around causing DNA damage.

However, a successful intervention for these tissues may include first administering a solution to break up any protective biofilms, leaving this solution to incubate for 20-30 minutes before (where possible / appropriate) wiping the area clean and then administering a second solution to selectively inhibit these foreign cells. These 2 solutions can also be applied simultaneously. The process may be repeated daily for 1-2 weeks, or as necessary.

Ongoing testing and literature review has suggested that a solution of NAC and salt water alone can reliably break up many biofilms and has other beneficial functions. This exposes microbes to immune surveillance and interventions you may explore.

Further research has also suggested that a solution containing diluted tea tree oil, clove oil and other oils, when applied with or immediately following NAC yields a tolerable, yet significant inhibitory effect on **bacteria, yeasts, moulds and fungi** which may rival or exceed existing pharmacological interventions and is appropriate for a range of applications.

Commercial preparations made from tea tree oil and clove oil, are readily available as shampoos, vaginal douches, topical sprays, mouthwashes, creams and suppositories.
https://iherb.com/pr/tea-tree-therapy-suppositories-with-tea-tree-oil-for-vaginal-hygiene-6-suppositories/14691

Available from your local chemist, Neilmed make sinus washing products - such as **“Sinugator”** and **“Sinus Rinse”**, which can be highly effective at pre-rinsing these difficult-to-reach mucosal tissues, 20 minutes prior to application of any antiseptic products.

1g xylitol, 2g boric acid and 5-10mg of liquid iodine can also be added to the Neilmed solution, for additional potency, however this may not be appropriate for daily use. A temporary smell of iodine and some “burning” / “stinging” would also be expected where infected tissues exist.

DIY Antiseptic Recipe: Nasopharynx Clean and Flush, Dental Rinse, Topical Spray

NB. Due to the die-off effect when killing fungi, using this antiseptic recipe while not using the other supplements from Stage 1 may be unnecessarily unpleasant and exacerbate symptoms.

1) A "potent" essential oil-based recipe:

Part 1:
Mix 500mg of NAC powder (preferably not from a capsule, as these usually have fillers, although these could also be filtered / strained after stirring), 500mg of sodium bicarbonate (baking soda), 1g of xylitol and >5 ml of water.

Part 2:
Separately, mix essential oils - 20 drops of tea tree oil, 80 drops of black seed oil, 6 drops of oregano oil, 6 drops of clove oil, 1 capsule of Biofilm Phase 2 Advanced (BP2A).
(You can add more black seed oil if you find this too strong.)

Mix both parts together to form your final solution - allow a 2 week shelf life. Store in an empty glass bottle with a dropper for convenient dosing. Shake well before use.

To test this as a nasal antiseptic - while laying on your back, with your head tilted back and breathing through your mouth, drip about 6 drops of the solution into each nostril.

Let the solution run into the nasopharynx and incubate for a minute or so, while you "suffer" through some **shockingly unpleasant** "burning" for a few minutes (*the first time)*, assuming you have infected tissue. (See the experiences reported in the Discord server for more information.)

Healthy tissues *won't* be irritated, so if it burns - repeat this process every 1-3 days until clear - it will get progressively much easier. Rotating your head slowly to each side and gently "equalising" (like popping your ears on an aeroplane) with fluid in the nasopharynx may allow the solution access to the Eustachian tubes. Eventually blow / purge your nose, leaving the residue behind. *A followup nasal probiotic may be very helpful.*

To test this as a topical antiseptic - simply clean the area and then spray / apply the solution. A cotton tip could assist application to the ear canal or rectum (don't use this in enemas).

To test this as a dental pre-rinse - apply a few drops to your tongue, teeth and gums, or more to gargle and spit. Wait a few minutes, then brush / floss as usual. *NB. Unpleasant flavour.*

NB. As an antiseptic, small amounts reaching your throat isn't likely to cause toxicity, whereas drinking it intentionally *could be harmful*.

***2) For these and more sensitive infected tissues*, eg. ocular and vaginal infections, a pH balanced "gentle" rinse / douche can also be effective:**

Combine a "squirt" of J&J Baby Shampoo *(NB. exploring organic alternatives)* + 1 Neilmed

hypertonic sodium sachet in 240mL of clean water.This makes a gentle, yet potent biofilm breaking intervention that can be used in a Neilmed Sinugator/Sinus Rinse tool, vaginal douche, Waterpik, etc.

3) Alternatively, you can also make another DIY Rinse Recipe:
Per 500mL of boiled / cooled water -

Mix 5g of sodium bicarbonate (baking soda) with 5g NAC. This allows an acid:base reaction (and gas release) to occur, which helps create a pH balanced solution.
This can then be combined with 1/4 teaspoon of boric acid (making a 1.5-2% solution) and 10 drops of the 5% Lugol's iodine or 25 drops of 2% Lugol's.

Eyebath -
Use eg. 30mL of the solution to bathe each eyeball, also cleaning the eyelids, lashes.

Urethra -
Administer eg. 5-30mL of the solution via a large (needleless) syringe to the opening.

Vagina -
Administer eg. 120mL, using a suitable douche tool and keep hips and legs elevated for 30 mins.
(https://www.amazon.com/Bottle-Postpartum-Perineal-Recovery-Cleansing/dp/B09YNP2N72/)

Lungs -
Administer eg. 5mL via an ultrasonic nebuliser. (https://www.amazon.com.au/dp/B084W812C9)

Sinuses, Eustachian tubes -
This recipe can also be added to the Neilmed Sinugator reservoir.

The Floraphage and IgG2000 products from Stage 2 can also be successfully used in other mucosal tissues to neutralise unwanted species, antigens, etc.

Rotating between the “potent” recipe and the “gentle” recipes for 1-2 days is recommended if intense inflammation for more than 30 minutes is experienced. Continue with the nasal probiotics from the next section once an inflammatory response can’t be provoked by the normal antiseptic recipe.

Regardless of the recipe used, strong die-off effects can be expected the first time and should only be implemented after metabolic and detox support supplements are added in Stage 1 of the protocol.

(Links to ingredients mentioned can be found in the “ORDER YOUR SUPPLEMENTS” section.)

Protective Probiotics

Following on from any efforts in clearing unwanted biofilms and microbial species overgrowth in the eyes, sinuses, nasopharynx, mouth, throat, oesophagus, lungs, GI tract, vagina, urethra and other mucosal tissues, further restorative efforts are usually needed in repopulating these tissues with helpful species to promote and maintain a healthy microbiome. (Links to these products can be found in the "ORDER YOUR SUPPLEMENTS" section.)

These helpful species assist in inhibiting unwanted species and preventing opportunistic growth. They can also provide helpful functions, such as metabolism of oxalates, acetaldehyde, histamine, plus production of short chain fatty acids and other compounds beneficial to humans.

Many of these species were traditionally found in the bacillus, lactobacillus and bifidobacterium genus, although recent taxonomy changes have relabelled / reclassified some of them, providing some minor confusion when researching species. Lactulose is a helpful prebiotic for lactobacillus and bifidobacterium species.

https://en.wikipedia.org/wiki/Bacillus | https://en.wikipedia.org/wiki/Bifidobacterium
https://en.wikipedia.org/wiki/Lactobacillus **|** https://en.wikipedia.org/wiki/Oxalobacter_formigenes

Studies and dosing information for these microorganisms in different mucosal tissues can be found on the BornFree Discord server and/or the literature. This protocol currently includes a number of key probiotics relating to these studies and their described functions / benefits:

Youtheory Spore: B. coagulans, clausi, subtlis. **Biogaia:** L. reuteri. **Various:** B. breve M16-V
Mood Super Strains Probiotic: L. rhamnosus, B. longum, bifidum, lactis, breve, infantis.
Ochek: O. formigenes, L. acidophilus, L. rhamnosus, B. lactis. **Lady Bugs:** Lacto. spp.
(Various sources, Kimchi): L. sakei (also used in food production to prevent spoilage, etc.)

These can be directly administered to mucosal tissues, using appropriate methods - generally mixing a suitable amount of the probiotic (remove capsule where appropriate) with a small amount of clean water and then applying it where needed. eg.
Nostrils - cotton tip / fingertip and apply inside the nostrils.
Eustachian tubes - place drops of liquid into the nose and use the "equalisation" technique.
Mouth / throat / oesophagus / upper GI - gargle and swallow.
Vagina - add to a 5ml vaginal douche + 15 minutes of hips+legs elevation, while laying down, or place moistened, unopened capsule deep into fornix and allow to dissolve.
Lower GI tract - use a probiotic rectal syringe (no tip) w/<50mL of water, then "down dog" yoga pose for 15 mins to bypass stomach acid. Achieves a similar colonisation rate to FMT.
Eyes - place drops of liquid into the corners of the eyes and / or under the eyelids.

Please note these probiotics are based on an observed pattern of diversity loss, are included for specific functions and to generally promote a healthier balance in the microbiome. They are not intended to replace MARCoNS, vaginal swabs, "GI-MAP" or Biomesight gut microbiome tests.

Environmental Toxicity, Transference and Reinfection Cycle

When a person is chronically ill and confined to their bed / house, the transfer of pathogenic microbes from their body to their surroundings becomes a significant concern. Pathogenic microbes can transfer easily from the body to the environment and back again, causing an ongoing challenge to an already compromised immune system.

One of the primary concerns is the transfer of pathogenic microbes to the bed, pillows, sheets, and mattress. These surfaces can harbour pathogens and continue a cycle of infection.

Bed linen - sheets, pillowcases, and blankets, should be changed frequently and washed in hot water, with a hygienic detergent - to kill any pathogens present and arrest the cycle of reinfection.

Mattresses and pillows should also be rotated and disinfected regularly. A waterproof mattress protector can also help prevent the accumulation of moisture and bacteria. These will also need regular cleaning.

Another concern is the transfer of airborne pathogens through air conditioning systems. Air conditioning systems can spread pathogens throughout a room, increasing the risk of infection. It is important to clean / change the air filter frequently, and consider using an air purifier to help remove pathogens from the air.

Carpets, window frames, walls, ceilings, etc should also be inspected and maintained appropriately. Commercial air quality testing and mould remediation services are also available.

If not completely bed-bound and where the room doesn't have plants and/or pets (which can be excluded from the room for an hour), a relatively cheap ozone generator can be used to disinfect entire rooms, very effectively. Sunlight is also helpful in inhibiting certain microorganisms.

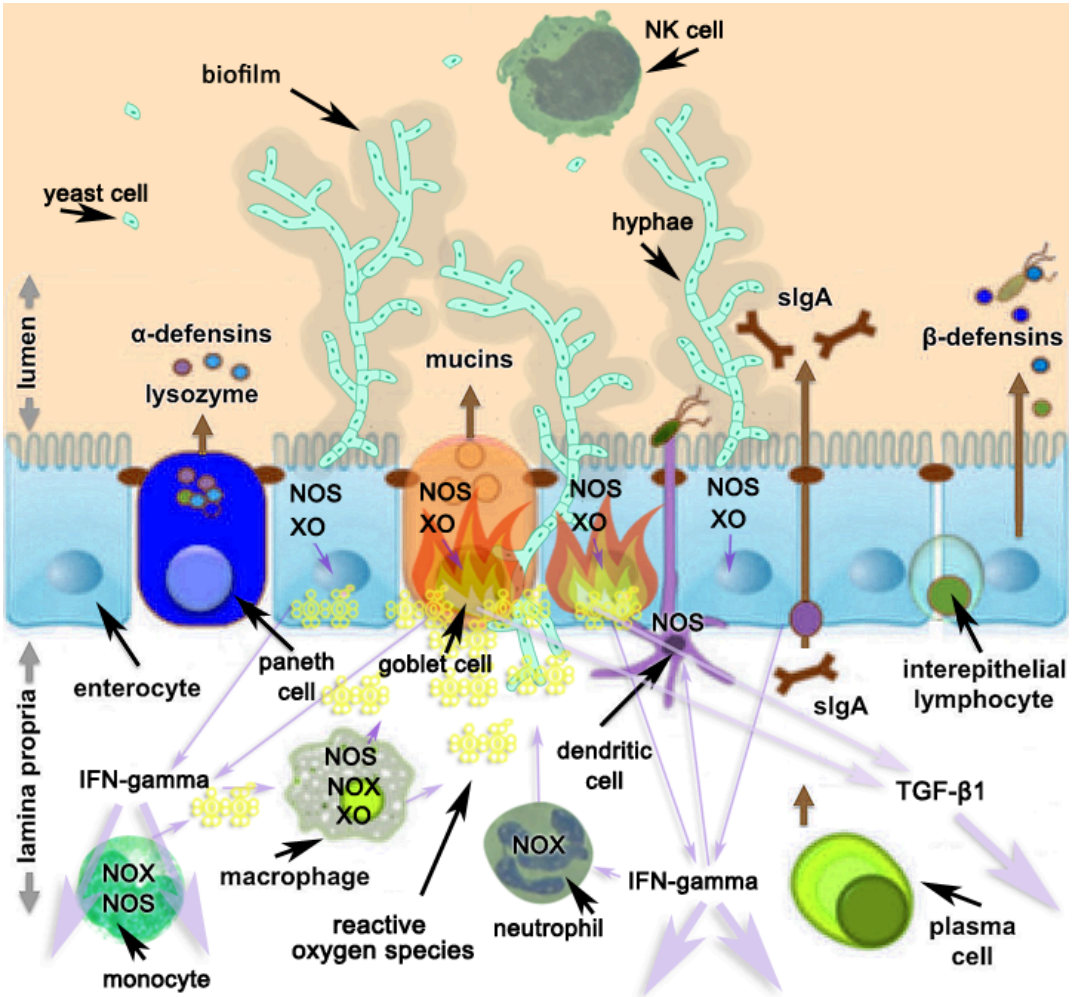
Overall, it is essential to maintain good hygiene practices - regularly disinfecting surfaces and fabrics, to prevent ongoing reinfection and unnecessary delays in progress.

Gastrointestinal Biofilms, Pathogens and Remediation

This protocol currently includes a number of staged interventions to address biofilms and pathogens in different locations inside the GI tract, such as Candex, Biofilm Phase 2 Advanced, NAC, spirulina, curcumin, fulvic acid, prebiotics, targeted probiotics and water-fasting, with an aim of not unduly circulating endotoxins / acetaldehyde in the process of eliminating them, if at all possible. These strategies have been testing well and we are always exploring ways to improve on this process (please join the Discord community - https://discord.gg/CAMXV78).

One of the key challenges is that invasive microorganisms which breach the (mucosal) barrier function can trigger an IFN-gamma response, which causes collateral damage and inflammation to infected tissues in the process of oxidising pathogens, using reactive oxygen species.

If the rate of collateral oxidative damage + pathogenic damage exceeds the regenerative capacity of the tissue, this could further compromise the barrier function and dysregulate IFN-gamma activity, leading to a "deadlocked" cycle / state. External indicators for insufficient collagen synthesis rates may include hEDS symptoms, poor skin texture, chronic cranial instability, slipped rib syndrome, thoracic outlet syndrome, etc.



Co-infection of flesh-eating parasites such as worms, flukes, etc., can temporarily induce severe ME/CFS symptoms by directly attacking the epithelial layer and allowing opportunistic invasion by any/all microbial species.

If you suspect you have a parasitic infection, OTC pharmaceutical interventions such as mebendazole, albendazole and pyrantel could be appropriate. These are commonly taken as either a single dose intervention by all inhabitants of a household or multiple times over 2 weeks, per your pharmacist's or doctor's advice.

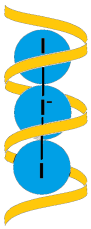
Additionally, various herbal products based on black walnut, cloves and wormwood have also shown as effective. eg. https://www.australianhealthfoods.com/product/ppc-herbs-herbal-tri-plex

There are some additional strategies being tested which may feature in future updates.

Xylitol:
5g of xylitol before meals to prevent acetaldehyde production, created when your food also feeds microorganisms. Can cause initial die-off effects. Can create oxalates.

Silicol Gel, Enterosgel:
Both of these readily-available products are non-absorbing silica-based gels that act as "sponges" for endotoxins / LPS / acetaldehyde and salts of heavy metals, backed by clinical trials. It is not yet known how much of an impact on "normal" mineral status this has.

Salt / Iodine-Starch Complex "Overgrowth Flush / Trojan Horse":
Dissolve ½ teaspoon of quality sea salt into ½ cup of boiling water.
Slowly stir in 6 teaspoons of sifted potato starch, to prevent clumping.
Add ¼ dropper of 5% Lugol's iodine (12.5mg, if using a different liquid iodine source or concentration), while stirring. The solution should change colour to dark blue.
Add cool water until the glass is full.



Iodine binds to the starch and can transit the GI tract. The flush solution would be taken on an empty stomach. Consume 500ml of water, 30 minutes later. Expect unpleasant die-off symptoms / herxheimer-style reactions, diarrhoea, nausea. This flush could be performed for up to a week in the beginning of the protocol or during any water fasting stage, if overgrowth exists. A course of protective probiotics would follow this type of intervention process to prevent regrowth of unhelpful species.

Boric Acid
Despite having an oral toxicity profile that is similar to eg. potassium (LD50>300g) and a No Observable Adverse Effect Level (NOAEL) of 3.3g/day in 70kg humans, no carcinogenicity and no genotoxicity, oral dosing of boric acid in many countries is restricted to 3-6 mg/day. This is quite unfortunate, as it would appear to be a remarkably effective way to avoid damaging flora in the large intestine, while targeting biofilms in the stomach, small intestine, kidneys, bladder and urethra at eg.1.5g of boric acid in water for (max) 1-2 weeks. https://tinyurl.com/borates2023

THE IMPORTANCE OF “PACING” OR “JUST ENOUGH ACTIVITY”

Anyone who has experience with ME/CFS is likely to have gained a significant appreciation for the symptoms associated with “crashing” and Post Exertional Malaise (PEM).

A daily fear that too much activity will “crash” you and leave you with fatigue / malaise, flu-like symptoms and often tinnitus. A further fear that this may persist for days / weeks / months.

A hypothesis surrounding the mechanisms involved in PEM is being described in the upcoming paper, however the WIP diagrams are available on the website and Discord server.

Unfortunately, due to the trauma surrounding PEM, some people choose to severely limit their activity. This unfortunately has an impact on the capabilities of their immune system to deal with chronic infection.

One of the primary tools the innate immune system can use against microbial challenges is creating reactive oxygen species (ROS) to oxidise these pathogens. Interferon-gamma inhibits Complex I, which means that NADH generated by the TCA cycle can be diverted towards elevating NADPH, also powering NADPH oxidase (NOX) and nitric oxide synthase, which then (like xanthine oxidase, which uses NAD+ instead), create reactive oxygen species to oxidise pathogens, damaging your cells in the process. This can also lead to fungal die-off symptoms.

Excess NADPH / low NADP with elevated NADH / low NAD+ can be observed / inferred by elevated cholesterols, impaired glucose metabolism, elevated cortisol / inverted diurnal release profile, low aldosterone, low testosterone, low BH4, impaired methylation and various other compensations.

For optimal immune response and hormones, “pacing” should always be attempted - testing the appropriate upper threshold for activity, each day, unless that threshold has been exceeded already. Over sufficient time, inactivity leads to “rotting”, which is wholly undesirable, as the immune response is expected to be insufficient for maintaining resilience against pathogens.

The combination of supplements here should help improve the exertion threshold and buffer against “crashing”. However, you may have already noticed that fungal “die-off” symptoms share some common features with PEM and crashing, as does any immune activity. This will add some challenges for identifying your upper limits for exertion / glycogen synthesis rate.

NB. The upper limit for exertion will be artificially reduced when interferon-gamma is elevated and Complex I is inhibited, during any intense immune response. Increasing temperature elevates interferon-gamma levels potentially 10x. Spirulina, schisandra and curcumin modify this pathway, favourably, by inhibiting NOX.

Proceed carefully, however the age-old phrase “no pain, no gain” absolutely applies here.

SLIPPED RIB SYNDROME, COSTOCHONDRITIS AND CHEST PAIN

The lower traps and rhomboids are essential muscles responsible for scapular control and stability. Weakness in these muscles can lead to poor scapular control, which can result in chronically pronated shoulders and thoracic outlet syndrome (TOS).

Pronated shoulders occur when the shoulder blades “wing” and rotate forward, leading to a hunched posture. This can occur when the lower traps and rhomboids are weak and unable to maintain proper scapular alignment. The resulting forward shoulder position can cause tension and compression in the neck and shoulder region, leading to TOS.

TOS is a condition where the nerves, ***lymphatic thoracic duct*** and blood vessels that pass through the thoracic outlet become compressed, leading to pain, numbness, and weakness in the arm and hand. Forward head position will further contribute to the progression of this syndrome. This can cause impaired immune response and water retention / lymphoedema.

To prevent TOS and other related conditions, it is essential to maintain proper scapular control and stability. This can be achieved through exercises that strengthen the lower traps and rhomboids, such as scapular retraction and shoulder blade squeezes. Additionally, maintaining good posture and avoiding activities that require prolonged shoulder and arm elevation can help prevent TOS, however when this position occurs during sleep, it can be hard to avoid.

Slipped rib syndrome, costochondritis, and worrying chest pain can all be downstream effects of a poorly seated rib - usually between T6-T8. When a rib is not properly aligned, it can cause thoracic instability, leading to overworked intercostal muscles and inflammation in the surrounding tissues. This is a common issue where hEDS metabolism is present. hEDS metabolism is described in the disease model as a "normal feature" whenever innate immune response pathways are activated and/or specific mineral deficiencies are present.

Slipped rib syndrome occurs when a rib slips out of place and moves too easily, causing pain and discomfort. Costochondritis is inflammation of the cartilage that connects the ribs to the breastbone, which can also cause significant chest pain, which can mimic having a cardiac event.

When a rib is poorly seated, it can create an unstable environment for the intercostal muscles that are responsible for breathing. With mitochondrial dysfunction, these overworked muscles can become fatigued and inflamed, leading to scary chest pain and difficulty breathing.

It is wise to seek medical attention if you experience chest pain, as it can be a symptom of more severe conditions such as a heart attack or pulmonary embolism. However, if you have chronic chest pain that is related to slipped rib syndrome or costochondritis, treatment may include correcting the alignment of the rib and regular physical therapy, once any hEDS metabolism is corrected. Like any other resistance training, this tissue rehabilitation process will normally take weeks or months to complete. *A (free) posture rehabilitation course can be found in the Discord.*

CORTISOL, LIMBIC SYSTEM, GLYCOGEN AND INTERFERON-GAMMA

Cortisol is the “master” negative regulator for IFN-gamma.

What this means is that **any/all** influences which promote cortisol also **decrease** IFN-gamma activity and provide some “relief” for most of the symptoms observed in ME/CFS. This allows periods of increased functionality, while *simultaneously inhibiting the necessary suppression of the pathogens that are triggering the innate immune response pathways*.

In the disease model, we have described how cortisol acts as a “sensor” and signalling relay for insufficiencies of NAD+, P5P and glucose / glycogen, via phosphatidylserine and 11HSDβ1/2 flux. The metabolism for NAD+ and P5P is altered by IFN-gamma and they act as upstream sensors for specific IFN-gamma activities which can upset the metabolism or cause excessive tissue damage via oxidative stress. An inverted diurnal cortisol release pattern is expected.

When any of the sensed metabolites are insufficient, cortisol increases, signalling for an increase of epinephrine and catabolic activity, plus inhibition of IFN-gamma. This allows metabolites to replenish and partially restores normal metabolism.

As the metabolites reach sufficiency, cortisol levels decrease. If any triggers for IFN-gamma are still present, then IFN-gamma activity will resume and the cycle will repeat, as necessary.

Exercise and heat can increase IFN-gamma. Dietary supplements can support IFN-gamma activity. Cortisone medications are potent immunosuppressants and will inhibit IFN-gamma.

Appropriate carbohydrate intake and metabolism supports glycogen. NMN can support NAD+ biosynthesis. Creatine can reduce the “costs” associated with use of this pathway and increase glucose transport. Magnesium and zinc can support B6->P5P metabolism.

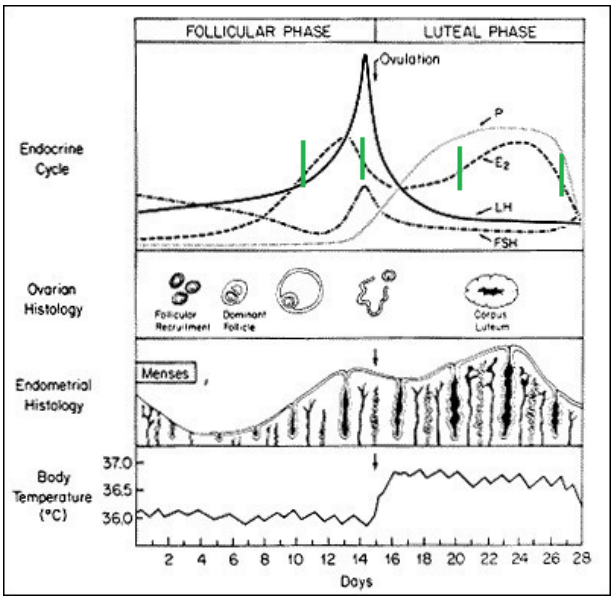
Hypothyroidism affects both glucose metabolism and “B6 toxicity” / P5P insufficiency. The thyroid hormone, T3 (tyrosine, heme iron, iodide, selenium, calcium) is required to maintain FMN levels, needed for P5P recycling and to induce pyruvate flux into the TCA cycle.

The primary sex hormones (testosterone / DHT in males, estradiol in females) sense the elevation of NADPH (created during physical / metabolic activity), with sufficiency of NAD+, magnesium and zinc. These primary sex hormones then promote creatine synthesis and glucose uptake. They inhibit cortisol, promote nitrogen metabolite recycling and glycogen synthesis. This also allows IFN-gamma activity to increase, which is also needed for tissue adaptations to exercise. Non-optimal sex hormones can cause chronic cortisol increase.

Importantly, lifestyle factors and *learned responses to stimulus* - namely stress / fear / anxiety cause the limbic system to promote cortisol levels and inhibit the IFN-gamma pathway / immune response, while decreasing glycogen stores. As this also decreases “ME/CFS” symptoms, a *persistent cycle of fear / anxiety and immune suppression can also be learned / imprinted*.

REPRODUCTIVE HEALTH, MENSTRUAL CYCLES, UTIs AND PSSD

As part of normal female reproductive health, estradiol normally elevates on days 10-12 and 22-26 of the menstrual cycle. This decreases cortisol levels and promotes IFN-gamma activity. Without chronic infection, these alterations would allow for increased energy availability and libido. With chronic infection, these alterations allow for increased immune activity, pain / inflammation, neurological and emotional challenges, etc. Conversely, estradiol is low on days 1-8, allowing cortisol to increase - decreasing immune activity and increasing anxiety.



[Image source: Feingold KR, Anawalt B, Blackman MR, et al., editors. South Dartmouth (MA): MDText.com, Inc.; 2000-.]

Both of these situations are ultimately helpful, longterm. However no one enjoys the symptoms of immune activity.Supplements like DIM, found in broccoli and calcium d-glucarate can help reduce the effect of these hormonal alterations.

Metabolism described in this disease model can significantly influence urinary tract infections by weakening the immune system, promoting bacterial growth in the urinary tract due to elevated glucose levels, renal excretion of oxalates, impaired nerve function and bladder emptying.

Similarly, pathogenic species found in the nasopharynx, oral, gut and other microbiomes may translocate or be transferred to urinary and sexual organs, potentially leading to further sexual dysfunction, pain and inflammation.

This may be more prevalent in eg. PSSD, PCOS, endometriosis, cystitis, prostatitis and epididymitis sufferers, however dysbiosis and biofilm formation in urinary and sexual organs is generally found across the entire scope of chronic diseases.

For renal and urinary tract infections, **methylene blue protocols** and the ‘purple foods’ containing anthocyanins may be particularly relevant. Elderberries and chokeberries appear to be the richest sources of anthocyanins and will provide the same benefits in other tissues.

SLEEP

Sleep is often viewed as a simple daily routine, but it is far more than just rest for the body and mind. It is a complex and essential physiological process that plays a pivotal role in maintaining overall health, particularly when it comes to the brain.

Sleep is a naturally recurring state of altered consciousness and decreased physical activity. It is divided into several stages, including non-rapid eye movement (NREM) and rapid eye movement (REM) sleep, each serving different purposes in the sleep cycle.

Dopamine is a neurotransmitter that plays a vital role in mood regulation, motivation, and reward systems in the brain. However, the metabolism of dopamine produces toxic byproducts. If these metabolites accumulate excessively, they can lead to oxidative stress and damage to brain cells.

The glymphatic system is a relatively recent discovery that has revolutionised our understanding of brain health during sleep. This system acts as the brain's waste clearance system, similar to the lymphatic system in the rest of the body. It operates primarily during sleep and is responsible for removing metabolic waste products from the brain.

Melatonin is a hormone produced by the pineal gland in response to darkness. It plays a crucial role in regulating the sleep-wake cycle. Melatonin levels rise at night, promoting the onset of sleep and maintaining sleep duration. What's fascinating is that melatonin has been shown to enhance the efficiency of the glymphatic system during sleep. It does this by causing a temporary contraction of brain cells, which allows cerebrospinal fluid to flow more freely, aiding in the removal of waste products.

When we don't get enough sleep, the glymphatic system's efficiency is compromised. This can lead to the accumulation of toxic metabolites in the brain. Over time, this buildup can contribute to cognitive decline, increased risk of neurodegenerative diseases like Alzheimer's, Parkinson's and severe mood disturbances.

To benefit from this natural brain-cleansing process, it's essential to establish a healthy sleep routine. Aim for 7-9 hours of quality sleep per night, starting ideally before 10pm. Maintain a consistent sleep schedule, create a comfortable sleep environment, and limit exposure to blue light from screens before bedtime.

The protocol targets issues which cause low serotonin, GABA and high cortisol levels at night, preventing quality sleep. If you fall asleep and wake up quickly with myoclonic jerks, you may have a calcium deficiency and/or airway restrictions. Another influence is low vitamin C - inhibiting dopamine beta hydroxylase, which makes norepinephrine. This is more likely to occur with increased immune activity and/or exertion. Low glycogen can reliably cause cortisol increase and is one of the major influences in post exertional malaise. Following the dietary guidelines, plus correcting chromium, vanadium and other deficiencies will help prevent this.

PEM PREVENTION AND RECOVERY

One of the hallmark symptoms of ME/CFS, Long COVID / Long Haulers and other named syndromes is post-exertional malaise (PEM). Exertion -> IFN-gamma -> Oxidative stress -> inhibited glycolysis, fatty acid oxidation, methylation and other key energy metabolism.

The disease model describes this primarily as glycolysis deficiency, NAD+ and/or FAD deficiency, with multiple influences for each deficiency, many of which relate to specific mineral deficiencies and dysbiosis, leading to chronic innate immune response, oxidative stress and endo/mycotoxin-induced metabolic impairments.

Glycolysis insufficiency is frequently accompanied by tinnitus, vision reduction, dizziness, reduced mobility / muscle activation, tachycardia and nausea.

The protocol addresses these upstream influences and the glucose uptake and glycolysis rate has been shown to improve / revert, however some daily variability around glycogen usage will exist relative to your exertion and immune activity levels.

During increased exertion, immune activity (-> oxidative stress), your carbohydrate intake may need to be increased to match your glycogen expenditure. These would normally be additional low-GI carbohydrates AND a large additional intake of vitamin C and/or other antioxidants.

However, in a crash / PEM, the priority is restoring glycogen (and sodium) levels - spoonfuls of NZ Manuka honey are one of the least risky sources for simple carbohydrates, as it has an antimicrobial profile thought to be related to the methylglyoxal content and various phenols.
https://newzealandhoneyco.com/collections/manuka-honey

You can also target restoration of energy availability and glycogen synthesis via alternative pathways, if they are functioning. These pathways may include (non-exhaustive):

Branched-chain amino acid (BCAA) catabolism - which requires sufficiency of B1 (as thiamine pyrophosphate), P5P, biotin and B12 (as adenosylcobalamin, for 2 of the BCAAs). L-leucine has a different pathway. Assuming you are supporting these cofactors with the protocol, you can simply take 5-10g of BCAAs or L-leucine alone to help recovery and then increase carbohydrates to prevent reoccurrence.
https://www.bulksupplements.com/search?q=bcaa

Ketogenesis - which requires phosphatidylcholine (PC), NAD+ sufficiency and beta-hydroxybutyrate (BHB). Assuming you are supporting phosphatidylcholine and NAD+ biosynthesis and redox with the protocol, you can take 10-20g of a BHB supplement, as needed to help recovery and then increase carbohydrates to prevent reoccurrence.
https://www.bulksupplements.com/search?q=hydroxybutyrate

If you have an asthma inhaler (salbutamol), it can be VERY helpful to increase catabolic activity.

CHANGELOG

[v3.64-v3.65 RC3 changelog]

[Text / description updates] -
RC1
Notes on sulphur, calcium, phosphorus.
Clarified glycogen refill description in Note 15. Added “start slowly” note and weekly dose range updated..
Clarified mineral dosing schedule to allow split dosing after any meal.
RC2
Lactulose added to helpful probiotics, rationale, stage 1, order your supplements
Note added to DHM for CYP2D6 (and CYP3A4)
RC3
Added note about OAT left shift / sample thawing in transit.
Clarified local sources are for SOME products only
Carbs updated in Diet section. Small text updates in PEM / Recovery section.

[Product updates]
RC1
RC2
+Lactulose as prebiotic for lacto/bifido spp.
RC3
AU source for dead sea mud updated
B8 Mixed inositol dose adjusted to 100mg:2.5mg
NMN dosing range updated as 125-250mg, x 2-3
AU source for DHM added
Lecithin amount in weekly DIY recipe updated to 77g.