

Chronic Illness Development

And the vicious loops that sustain it

Who is this talk for?

- Definitely for anyone with chronic illness and chronic fatigue
 - CIRS/Mold Illness, Long-COVID, Lyme and other infections
 - Person who has tried many things - and either not better at all - or relapses easily - or not the 100% they think they should be.
- For anyone with chronic symptoms that are not explained elsewhere - that reflect ongoing immune issues, inflammation, etc...
 - Recurrent infections
 - Pain - joint, muscle, etc...
 - GI Issues
 - And more
- Prevention - chronic disease, dementia, cancer, etc...

Why am I so excited about this?

- Fills in a lot of gaps that were missing for me in people not responding to treating just the mold, infections, nutrient issues, toxins
 - Blood glucose issues
 - Energy
 - Gut issues
 - Nutrient deficiencies
 - Lack of cell resiliency
 - Needing to be perfect

Process

- Watch the education
 - This intro
 - Protocol Introduction
 - Protocol how to
- Get some testing done
- Your personal test info is put into the protocol to adapt it to you
 - See where your bottlenecks and problems are
 - Create a protocol to start unwinding the cycles
- Live meetings to discuss and ask questions

I am in the process of being trained - so as I learn, I will share it

Mechanisms

- Extremely complex and interconnected
- Based on patterns seen and then research supported
- Clinical trials are coming next
- More information: <https://bornfree.life/learn/title/>

New model

Aims to explain how a long term illness could develop when the body slowly loses control over:

- Energy production
- Mineral balance
- Immune signalling
- Stress hormones
- Gut microbes
- Inflammation

Cause and Effect

It does not assume one single cause.....
Many small problems build up over time,
Eventually lock together in a self-reinforcing cycle.

The main idea is that the body may become trapped in a “survival mode” that is useful for short-term danger, but damaging if it continues for months or years.

Healthy body

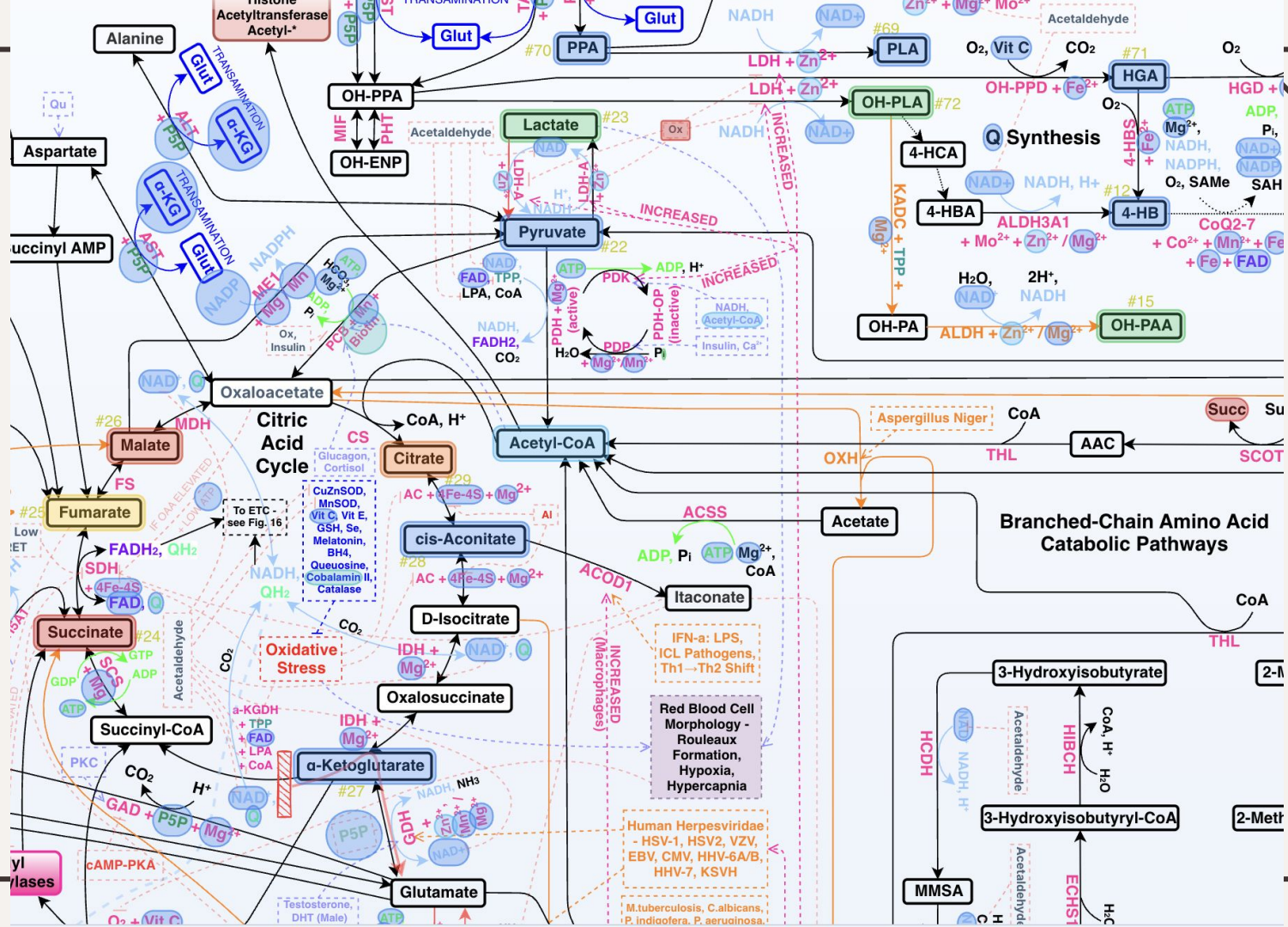
Cells constantly manage several linked systems

- They make energy from food
- Store glucose as glycogen
- Recycle antioxidants
- Move minerals to the right places
- Remove toxic metals and chemical waste
- Calm inflammation after the danger has passed
- Switch between stress mode and recovery mode

Chronic disease can appear when these systems stop coordinating properly



Figure 3 Pathway Diagram: The role of mitochondrial dysfunction in chronic disease and aging
 ME/CFS: Correcting Chronic Mitochondrial Dysfunction
 Adapted from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4000000/>





The body is beautifully made....

- The body is made to survive.
- When one cycle is not functioning correctly - another will compensate to cover what is needed.
 - However, this comes at a cost.
 - This is fine short-term - but not long term.
- Soon, this cycle will burn out and a new one will take over - possibly with even more cost/byproducts.
- These are often less efficient - so it costs more energy as well.

Example

Loss of sleep for 1 night

- Increased cortisol, increased glycogen breakdown
- We have a homeostasis of sorts for the day

However, if this continues to happen this is not beneficial.

Homeostasis

At the cell level - when these compensations occur - it is not as obvious (like the sleep example).

So - when not corrected (because it is not obvious) - it will continue.

This causes multiple chain reactions to continue to compensate

- All with a cost
- All with by-products
- All with more energy expense

Eventually - the cells can't function and shut down

Primed

- So a baby can be affected in the womb - and already having some compensatory cycles when born.
- Then they have illnesses, toxin exposure, vaccines and more
 - This causes more compensation
- Then they are a teen - with lack of sleep, stress, poor eating habits, illnesses
- Adult - with all the stressors of being an adult, a build up of toxins, etc...
- Blood sugar regulation issues → metabolic disease, and SI disease.
- Trauma adds to this significantly at any level

Spectrum

Infancy/childhood:

- Appearing normal → Slow development → Seemingly low energy → Failure to thrive → Autism spectrum

Teens:

- Appearing normal (but may cycle with how they feel) → Fatigues easily, chooses sedentary activities → Starts to pull inward → ADD/ADHD, brain fog, school issues → Depression and mood issues → Recurrent illnesses → Chronic fatigue

Adults:

- Often can look back and see early signs. But somewhere along the way - the cells fatigued out (“The cliff”)

When did this start?

For many - this likely started before birth.

A baby may inherit some risk from the mom's biology during pregnancy:

- Metal exposure
- Mineral status
- Immune activation
- Inflammation
- Stress hormones or altered glucose handling
- And more

Example - gestational diabetes

- GD is not just too much sugar
- It may reflect a problem with how glucose is stored and processed,
- If the body does not have enough Mg, Ph, Zn, Se, Choline and other helper nutrients, it may struggle to turn glucose into glycogen, antioxidants and repair materials.

So high blood sugar in pregnancy may be a signal that glucose management system is already under strain.

Other Prenatal Factors

- Genetics
- Stress
- Autoimmune
- Infections
- Toxins
- So much more

Resilience

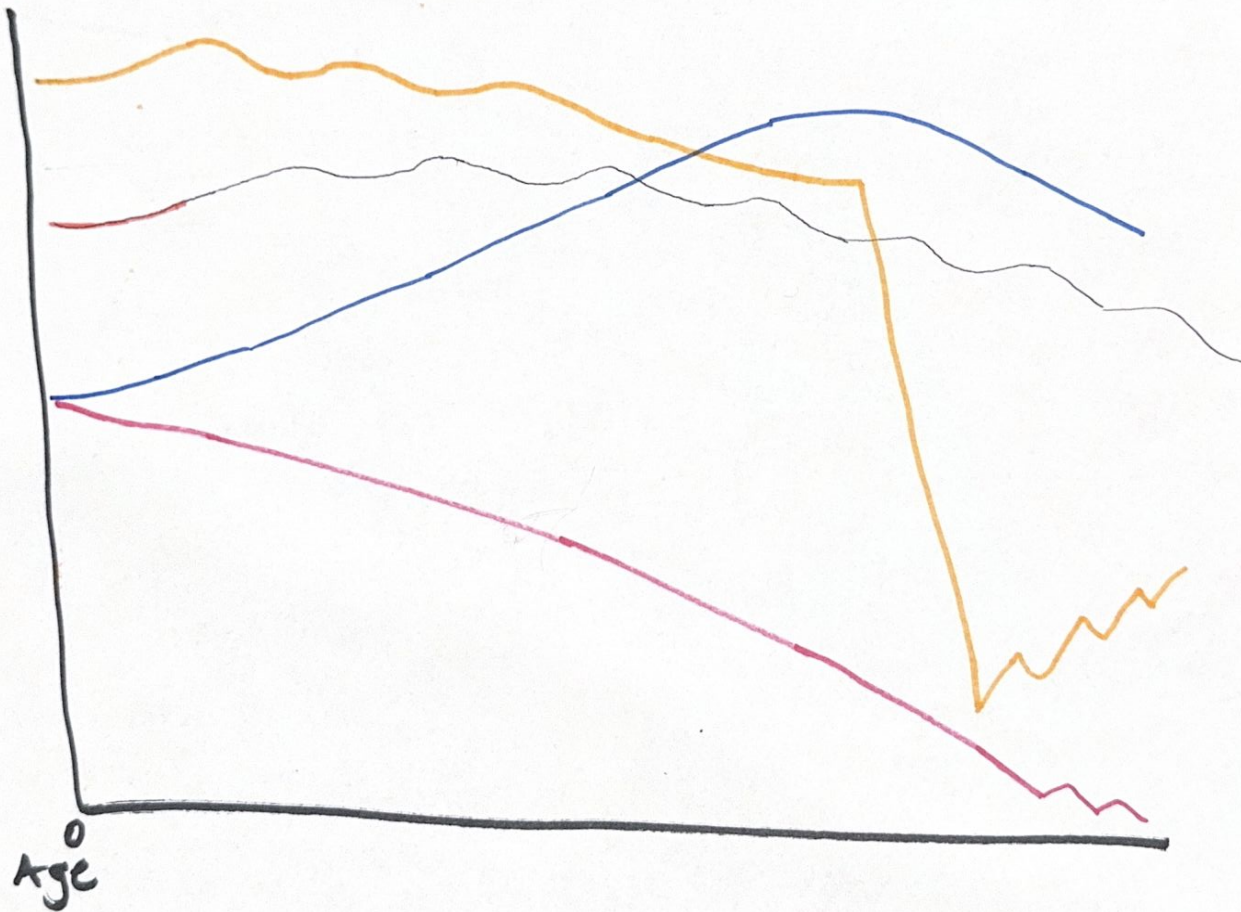




Figure 1 Pathway Map: The role of mitochondrial dysfunction in chronic disease and aging
 MUCFS: Correcting Chronic Mitochondrial Dysfunction
 Author: Johnathan W. Wink, PhD, Director of the Center for Mitochondrial Research and Education (CMRE), University of California, San Diego

Energy

- We need energy to live
- Certain amount of energy is required for our basic metabolism and body functions
- Energy comes from chemical reactions in the body - in the mitochondria - which makes ATP (energy currency)
- Various cycles to produce energy
 - Citric acid/Kreb's cycle - 38 ATP per glucose (30-32 more realistic) - with O₂
 - Anaerobic respiration - pyruvate → lactic acid - yields 2 ATP
 - Fat oxidation - feeds the Kreb's cycle - can yield up to 100/fatty acid molecule

Energy Needed for:

- BMR - all the things in our body that occur daily (60-70%)
 - Organ function - all but breathing and heart as well
 - Detoxing, temperature regulation
 - Repair of cells/DNA
 - Immune system
 - Brain use/function, nerve transmission (20% for basics)
 - Used to gate at the nervous system level
 - Gate sensory, light, noise and pain (takes energy to suppress)
- Muscle use/activity and movement (10-30%)
 - More muscle = more mitochondria = more ability to create ATP
- Digestion (10-20%)

Energy

- If the body is in sympathetic overdrive (F/F) - the energy needs of the BMR increase significantly.
 - It will take away from certain functions to conserve energy
- If the body has less muscle → less mitochondria - we generate less ATP
- If we have blocks in the system in critical pathways - we generate less ATP and at a higher cost.
- If we are fighting constant infections, toxins - we spend more internal energy (When you are sick - you are tired).
- Soon digestion is not a priority, as well as anything else not a basic body function to survive.

Energy production

200 g of gas in the 200g tank - can do life.

Body functions like it should

They can work, do social things, sleep well and recover.

100g of gas in the 200 g tank - can kind of do life

Body functions overall - but they have various concerns -

showing signs of aging, some brain fog at the end of the day.

They can work - and do some social things - but not all.

They have to watch how the “spend” their energy in the extra.

20g of gas in the 200g tank - not doing life

Getting out of bed and basic functions take all the gas....which makes the body compensate....which takes more energy.....

Energy Systems

So profoundly affect us in so many ways

Not measured in general labs

Body compensates so well until it doesn't

But there are a few tests we can do to fill in enough blanks to figure out the puzzle.

Getting back to the model

Central Part to this Model - Redox Balance

- Redox - cell's system for moving electrons during energy production and antioxidant defense.
 - **NAD***NADH and NADP*/**NADPH**
- Rechargeable chemical carriers.
- NAD* helps cells process fuel and keep mitochondria working
- NADPH helps recycle antioxidants such as glutathione
 - Glutathione is one of the body's main systems for controlling oxidative stress and handling toxic metals.

Redox

- If NAD^{*}, NADPH and glutathione become weak, several things can happen at once.
 - Energy production is less stable
 - The body becomes worse at clearing chemical waste
 - Toxic metals may be harder to remove
 - Essential minerals may be lost or moved into the wrong places
 - Inflammation becomes harder to switch off
 - Cells may begin to act as if they are under constant threat

The push off the cliff

- If the system is already stressed and redox is affected - a major immune event may push the system past a threshold.
 - Infection
 - Immune flare
 - Surgery
 - Pregnancy
 - Overexertion
 - Heat stress
 - Toxin exposure
 - Severe sleep loss
 - Emotional trauma
 - Or another strong biological stressor

Immune system response

- The immune system may then release inflammatory signals such as:
 - TNF- α
 - IL-1 β
 - IL-6
 - IL-10
 - IL-22
- These signals increase hepcidin, a hormone that controls iron movement.

Hepcidin

Important because hepcidin changes how the body moves metals.

- Reduce iron export from the cells
- Alter mineral transport through systems such as ferroprotein, DMT1

This means: Inflammation can cause metals and minerals to be moved out of the blood and into organs such as the liver, spleen, kidneys, immune cells and possibly the brain.

Blood tests may show low minerals - while tissues may still be overloaded or misallocated.

Not just a deficiency or toxicity - it is poor distribution.

Redistribution

Once this redistribution happens, the body may struggle with basic energy chemistry.

- Glycogen storage may fall
- Glycolysis, the first stage of glucose breakdown may become unstable (needed for both Krebs's and anaerobic -pyruvate)
- The mitochondria may struggle to process fuel through the TCA cycle and electron transport chain
- NAD* may become harder to regenerate
- NADPH may be less available for antioxidant defense.
- ATP may become harder to use properly.

ATP

At the same time: ATP can become a danger signal outside the cell.

Inside cells - ATP is useful energy

Outside cells - ATP tells the immune system that tissue is stressed or damaged.

- Extracellular ATP signalling

Normally extracellular ATP is quickly broken down into ADP/AMP/adenosine and inosine - which helps to calm inflammation and support recovery.

But in this model - the calming sequence is impaired.

Extracellular ATP

- When ATP moves outside the cell (extracellular space), it transforms from an intracellular energy source into a powerful danger signal and communication molecule
 - **It acts as a "Find Me" signal:** This immediately alerts the immune system
 - **It binds to Purinergic Receptors:** Extracellular ATP locks into these receptors to trigger quick biological responses.
 - **It triggers inflammation and pain:** The binding of ATP to receptors (like P2X7) activates immune pathways, triggering localized **inflammation** to help clear out damaged cells. When sensory neurons detect it, it acts as a neurotransmitter that signals **pain**
 - **It promotes platelet clotting:** In blood vessels, extracellular ATP released from damaged red blood cells or endothelial cells binds to nearby blood platelets. This rapidly **amplifies platelet activation** and aggregation to start a clot and stop bleeding
 - **It gets degraded to turn off the signal:** To prevent over-inflammation, enzymes called **ecto-ATPases** quickly break down the extracellular ATP into ADP, and finally into **adenosine**, which actually helps calm the immune system down. (This step can be impaired!)

The result:

- Cells may have too little usable energy inside
- Too much danger signalling outside

Extracellular ATP

Extracellular ATP can activate receptors on:

- Mast cells
- Immune cells
- Nerves
- Blood vessels
- Gut lining cells
- Skin cells
- Brain support cells

This can increase inflammation, pain signalling, mast-cell activation, oxidative stress, cytokine release and CDR signalling. Instead of resolving the issue - the signal keeps repeating

Gut microbiome

- Gut microbiome then adapts to this stressed environment
 - The body is stuck in sympathetic overdrive
 - Low oxygen in the tissues
 - Poor gut movement
 - Low bile flow
 - Weak immunity
 - Unstable glucose storage

Gut Microbiome

- Some microbes will shift towards fermentation which will increase
 - Ethanol
 - Acetaldehyde
 - D-lactate
 - Hydrogen sulfide
 - Ammonia
 - Other microbial products
- These may be useful short term - but harmful if chronically produced

Acetaldehyde

Very important in this model

- A reactive chemical produced from alcohol metabolism and by some microbes
- Body normally clears it by using aldehyde dehydrogenase enzyme - ALDH
- These enzymes require good NAD^{*} redox
- IF NAD^{*} is low or poorly recycled, it will be too high
- Acetaldehyde then further damages redox balance.
- This creates a loop
 - Poor NAD^{*} makes acetaldehyde harder to clear
 - Acetaldehyde makes NAD^{*} problems worse

Histamine

- Not only allergies - but affects blood vessels, the gut, the brain, immune cells and energy metabolism.
- Histamine rises for 2 reasons in this model:
 - Mast cells release more of it
 - Gut barrier damage, antigen exposure, extracellular ATP, oxidative stress, inflammation
 - The body clears it more poorly
 - Acetaldehyde, low zinc, and impaired ALDH or DAO reduce histamine breakdown

Histamine

High histamine can worsen the energy problem

- In liver - histamine promotes glycogen breakdown, reducing stored glucose
 - Leads to blood sugar instability
 - Adrenaline surges
 - POTS-like symptoms
 - Post-exertional malaise
- Also increases sensitivity to beta-adrenergic signalling
 - Body reacts more strongly to stress hormones such as adrenaline.
- Exercise which normally helps adaptation - may then trigger an exaggerated histamine and inflammatory response.

Mast cell release/histamine

- Histamine supports the cortisol release and glucose release.
- The body is releasing all of this to help keep us in homeostasis
 - Even though this comes at a cost
- So some people - when they decrease the histamine - will get worse/not tolerate it.
- The ones that can help are the mast cell stabilizers like ketotifen, luteolin - as these promote NADPH levels (part of the NAD redox).

Another important loops - NO/BH4

BH4 helps enzymes make nitric oxide (NO) properly.

NO:

- Helps blood vessels relax
- Supports healthy circulation

If oxidative stress damages BH4, NO production can be uncoupled and the system produces more superoxide instead.

- NO and superoxide join to form peroxynitrite, a damaging reactive molecule.
- Peroxynitrite can inhibit mitochondrial complex I, making NAD⁺/NADH redox worse.

This links oxidative stress, poor blood flow, mitochondrial inhibition and acetaldehyde clearance into one cycle.

Loops

As these loops build - the nervous system may shift into sympathetic dominance.

- At first this is protective
 - Raises alertness, mobilizes glucose, supports BP and keeps the person functioning.
- But if the body cannot restore glycogen, clear glutamate, regenerate NAD*, calm extracellular ATP or return to PSNS, the stress response becomes maladaptive.

Loops

- Can create a situation where the body is trying to mobilize energy, but cannot store or use that energy properly.
 - Adrenaline, cAMP-PKA signalling, calcium stress, glutamate release, histamine, extracellular ATP, and inflammatory cytokines may all amplify each other.
- The person is biologically pushed to “keep going”, while the recovery systems needed to repair the damage are underpowered.
- Early signs of this - chronic niggles, pains not resolving, losing resiliency....

Connective Tissue

Part of the model - not just a “side issue”

Collagen production depends on:

- Oxygen, iron, Vitamin C, copper, silica, glycine, proline, lysine, ATP, redox balance, and enzymes such as prolyl hydroxylases.
- If the body has acidemia, lactate buildup, hypoxia signalling, oxidative stress, low minerals, poor NADPH repair and chronic inflammation → collagen maintenance will suffer.
- This can contribute to hEDS-like or vEDS-like features, gut barrier weakness, unstable blood vessels, poor lymph flow, pain, joint instability, and higher sensitivity to mechanical stress.
- Mechanical stress can then release more extracellular ATP and activate mast cells, feeding back into the same cycle.

Immune System

Over time....the immune system may then become both overactive and ineffective.

It may produce inflammation but fail to clear pathogens.

Poor sleep, low ATP, mineral misallocation, cortisol dysregulation, weak interferon responses, and poor nutrient activation may allow viral, bacterial, fungal and other reservoirs to persist.

These reservoirs can then keep triggering cytokines, hepcidin, mast cells, extracellular ATP and oxidative stress.

What came first?

In established disease - this becomes a less useful question.

While it can be useful to identify any remaining triggers and remove them - the actual “1 thing” that caused this is not the question needing to be asked.

The question is what are the threats still present that need to be treated as we treat the downstream effects to break the cycles.

Vicious Cycles

Acidemia worsens mineral wasting → worsens ATP chemistry → weakens glutathione → worsens metal retention → worsens mitochondrial redox → worsens acetaldehyde clearance → worsens histamine clearance → Worsens glycogen instability → Worsens adrenaline surges → increases extracellular ATP release → sustains inflammation → increases hepcidin → worsens metal redistribution.....

The cycle continues.....

Persistent cycles

So persistence of these cycles and illness is different from a simple lack of vitamins or calories.

Vitamins and macronutrients can change fairly quickly. Minerals and metals behave differently. They are stored, transported, locked away, released and redistributed by the liver, kidneys, gut, immune system, mitochondria, glutathione system and inflammatory signals.

Once this system is disturbed, it may become harder to get essential minerals into the right place and toxic metals out of the wrong places.

In this model: Chronic disease is maintained by a locked pattern

- Low functional minerals
- Poor ATP chemistry
- Weak NAD* and NADPH redox
- Low glutathione capacity
- Metal misallocation
- Acetaldehyde burden
- Histamine excess
- Extracellular ATP danger signalling
- Sympathetic overdrive
- Glutamate elevation
- Connective tissue instability
- Microbiome fermentation
- Immune weakness
- Repeated inflammatory triggering

Treatment implication of these locked patterns

- Fixing one input may not be enough!
 - Adding 1 vitamin, 1 antibiotic, 1 mineral, 1 diet change.....
 - May help briefly - but may fail if the wider systems remain locked.
- A symptoms like fatigue
 - Cannot be supplemented or medicated
 - Is not an easy fix
 - Can be improved by taking heat off the system
 - Can be really improved by unwinding and fixing these loops.

Goal - Restore coordination

- Improve mineral transport
- Rebuild glutathione
- Restore NAD* and NADPH balance
- Reduce acetaldehyde and peroxynitrite
- Improve glycogen storage
- Calm histamine signalling
- Reduce excessive extracellular ATP danger signalling
- Restore adenosine and inosine recovery pathways
- Reduce maladaptive sympathetic drive
- Support parasympathetic metabolism
- Stabilize collagen repair
- Gradually shift the microbiome away from harmful fermentation

Most important point

The body is not permanently broken!

It is a body that has become trapped in a defensive state that was originally meant to protect it.

Over time, the protective state becomes self-sustaining and harmful.

Recovery will require carefully interrupting the loops that keep the mineral, redox, immune, histamine, purine, microbiome, and nervous system problems locked together.

Challenges

Cyclic nature - symptoms often improve and worsen in waves.

This pattern combines with inhibited nutrient absorption in the small intestine, make it extremely difficult to correct mineral deficiency through diet or oral supplements alone.

Research shows that homeostasis for at least 12 minerals/metals may be affected at various times, depending on the state of inflammation.

Minerals and inflammation

During chronic inflammation - accurately measuring systemic mineral levels becomes very difficult

- Inflammatory signalling changes how minerals move across cell membranes throughout different tissues in the body.
- Some tissue will store higher amounts of minerals eg liver, brain, and kidneys - while other tissues will be deficient.
- Measuring mineral status via serum or RBC in this state is highly problematic.

Mineral and metal disruptions

- The disruption of key immune regulators, along with ongoing inflammation involving a hormone called hepcidin - disturbs the body's balance of many biologically essential minerals and also heavy metals.
- These minerals rely on shared transportation systems in our cells called divalent metal transporter 1 and ferroportin.
- When the mineral + metal status is disrupted, it creates a cascade of additional problems in the body

Mitochondrial dysfunction

In chronic conditions (ME/CFS, CIRS, LONG COVID...) -
The body's capacity for cellular energy production is undermined.
The underlying problem involves mitochondrial dysfunction due to

- Persistent infection
- Immune activation
- Resource insufficiency
- Or accumulated tissue damage

When mitochondria falter - cells are forced to rely more heavily on glycolysis for energy. This leads to chronic lactic acid accumulation and persistent decrease in blood pH. (acidosis)

Result of acidosis/stress

In response to ongoing metabolic stress and resulting acidosis - the body triggers a cascade of immune and neuroendocrine signals.

- Immune system: releases inflammatory cytokines - IL-6, TNF- α → drive production hepcidin by the liver.
- Hepcidin - a key regulator of mineral and metal metabolism - acts on the gut to limit the absorption of iron and related metals by downregulating importers such as DMT1 and exporters such as ferroprotein.
 - Passage of iron and other divalent metals from the diet into the circulation is reduced, and minerals+metals already in the bloodstream become sequestered inside tissues such as the kidneys, liver, spleen and brain.
 - Where glutathione synthesis is impaired - these heavy metals can accumulate

Changes in mineral/metals

This process initially protective!

- By limiting key minerals - the body restricts resources that pathogens require to thrive.
- However, in the context of chronic illness, where the original threat is not eliminated - the same mechanism persists far beyond its useful window.

So we may see blood tests showing low levels iron, phosphate, and other minerals - while specific tissue stores may be normal or elevated.

Attempts at supplementation can be ineffective, as the transport machinery that moves these nutrients to where they are needed remains switched off or actively reversed.

Acidosis

The ongoing acidosis (lactic) and inflammation also affects the kidneys, which respond by increasing the loss of phosphate, Calcium, magnesium, sodium, potassium and zinc in the urine.

These are required for the synthesis of ATP

- it's depletion further undermines energy production. (and water balance)

The end result: energy crisis that deepens with each episode of exertion.

Ongoing Stress

Sensing this sustained crisis - the body turns to its last line of defense - The sympathoadrenal system.

- Persistent increase in adrenaline production as the nervous system attempts to compensate for perceived danger.
- Experienced as agitation, racing heart, tremor and anxiety - layers atop profound fatigue.

Instead of resolving the energy shortage, these stress signals only amplify the sense of physiological emergency - setting the stage for worsening symptoms after physical or mental activity

Also happening...

cAMP-PKA - CREB - sympathetic drive and endogenous morphine.

In essence - there is another cycle that pushes towards a burst of adrenaline - which strikes tissues already feeling it.

The result - sympathetic drive, already high because mito efficiency is low and hepatic glycogen scarce - now meets no opposition → adrenaline surges, blood glucose oscillates and extra synaptic NMDA receptors become fully phosphorylated by elevated levels of released glutamate, lowering activation threshold and producing familiar excitotoxic features of withdrawal.

CREB

Within this cascade - CREB serves as the molecular mimicry of every prior fluctuation.

Each bout of sympathetic overdrive or transient opioid deficit leaves behind addition CREB protein and its gene products, shortening the interval from stimulus to metabolic consequence.

We get to a state where small changes in endogenous morphine output, histamine release or catecholamine load provoke disproportionate swings in glucose availability, heart rate, and cortical excitability - instability that underlies the pacing challenge to be addressed.

cAMP and CREB

Interventions that reduce cAMP production, accelerate its breakdown or compete for CREB-dependent transcription restore margin.

The objective is not to abolish sympathetic signalling or CREB phosphorylation - but to shrink their excursions so that hepatic glycogen can recover, mitochondria redox can normalize and the system regains the elasticity lost through repeated compensatory cycles.

Clinical

Clinically the primary cycle is seen as

- Persistent fatigue that is unrelieved by rest
- Recurrent post-exertional crashes
- Lab findings of low serum iron or phosphate with dysregulated ferritin
- Poor concentration
- Temperature instability
- Orthostatic intolerance

Standard supplementation rarely produces sustained benefit

Persistence

Persistence of this state reflects the body's failure to clear the original insult.

- Unresolved infection
- Ongoing tissue injury
- Chronic immune activation
- Ongoing exposures

The alarm that should have been brief and decisive - becomes maladaptive, locking the system in a defensive posture that slowly undermines every aspect of metabolism.

What this is....

This is NOT psychological weakness or lack of effort

It is a measurable, predictable, and highly conserved biological response that has become stuck due to failure of resolving the initial cause.

Effecting recovery requires addressing the source of the ongoing alarm, not simply replacing what is lost downstream.

Minerals

Further observed the following:

Other minerals become depleted in this disease model.

- Silicon - lost when combines with acetaldehyde
- Zinc chelated by acetaldehyde and excreted during acidemia
- Food intolerance/dietary restrictions and toxins from bacteria/fungi can disrupt zinc and other mineral levels in the body.

Certain minerals affect numerous bodily functions

- Low Lithium and rubidium - worsen brain chemistry and kidney function
 - Impaired kidney function → electrolyte imbalances that disrupt energy production, nerve function, immune activity, and muscle contractions → creates a progressive array of cycles to further weaken the immune system and severely disrupt the beneficial microbe communities in the body
- The resulting chain reaction → immune system dysregulation, brain chemical balances shift, stress hormone levels change, vitamin metabolism alters, cholesterol production fluctuates, and regulation of histamine, hormones, kidney function and even body temperature becomes compromised.

Treatment of the cycles

Treatment using the model:

Showing promising results for full remission - and improvement along the way

Reversing this trajectory

Fixing mineral and other deficiencies while removing toxic metals

Crucial - as it helps restore energy metabolism pathways, manage oxidative stress, and resolve issue with dysregulated immune response pathways, allowing chronic reactivating HHV, lyme, etc....

Correcting imbalances in the microbiome, biofilms, and infections

Treating all mucosal surfaces and bloodstream. Removing reservoirs of pathogens and ongoing production of mycotoxins/endotoxins. Employing lifestyle changes that cultivate healthy microbiomes also helps create ongoing resilience against future dysbiosis/infections

Reversing the trajectory

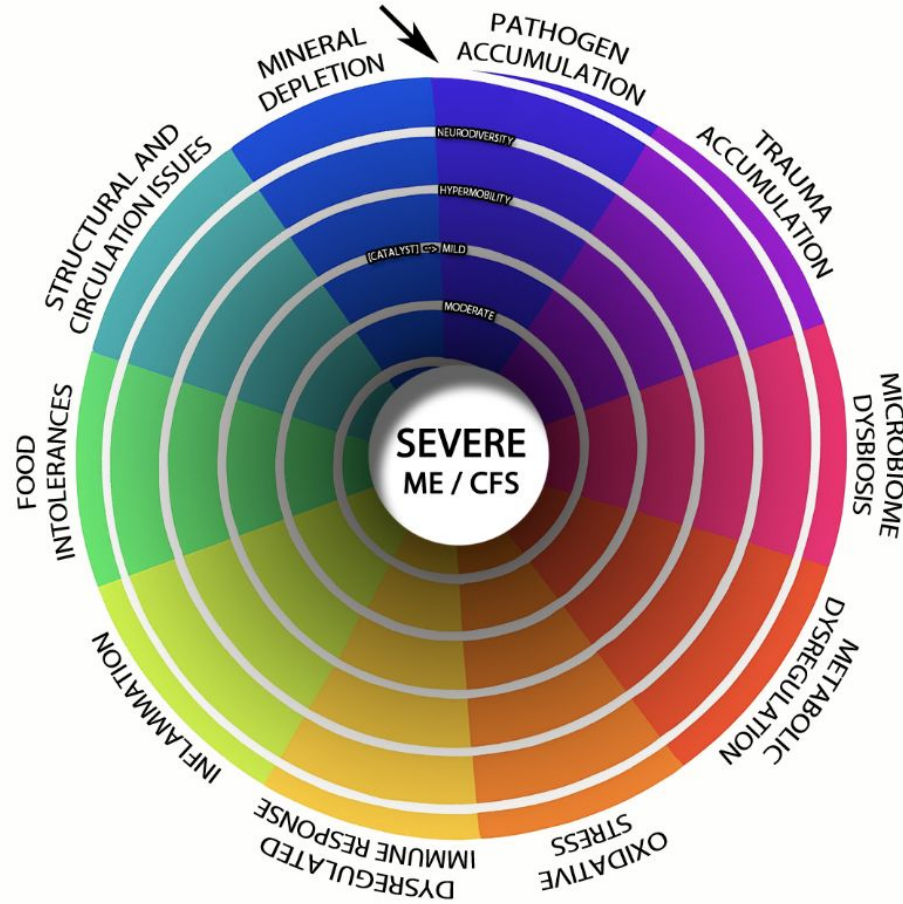
Addressing structural problems

Involving posture and/or the lymphatic system, plus related structures can improve blood flow and reduce hypoxia

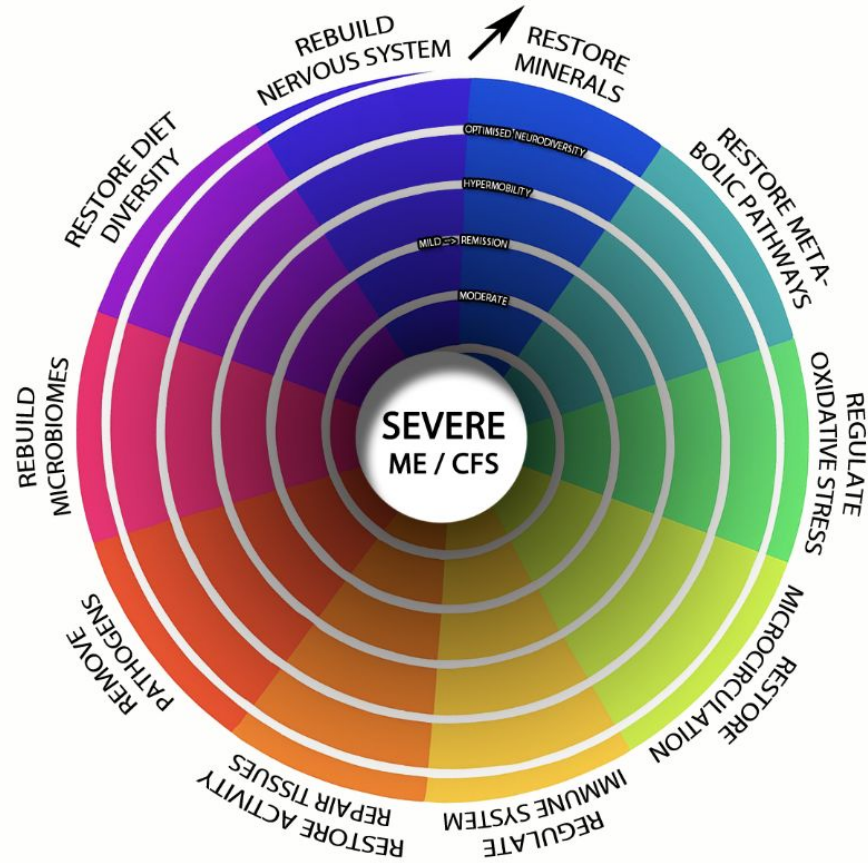
Dealing with trauma/PTSD (from the daily experience, medical missteps or gaslighting) - after sufficiently treating the hypometabolism and impaired PSNS signalling/glycogen metabolism created by infections and induced malnutrition.

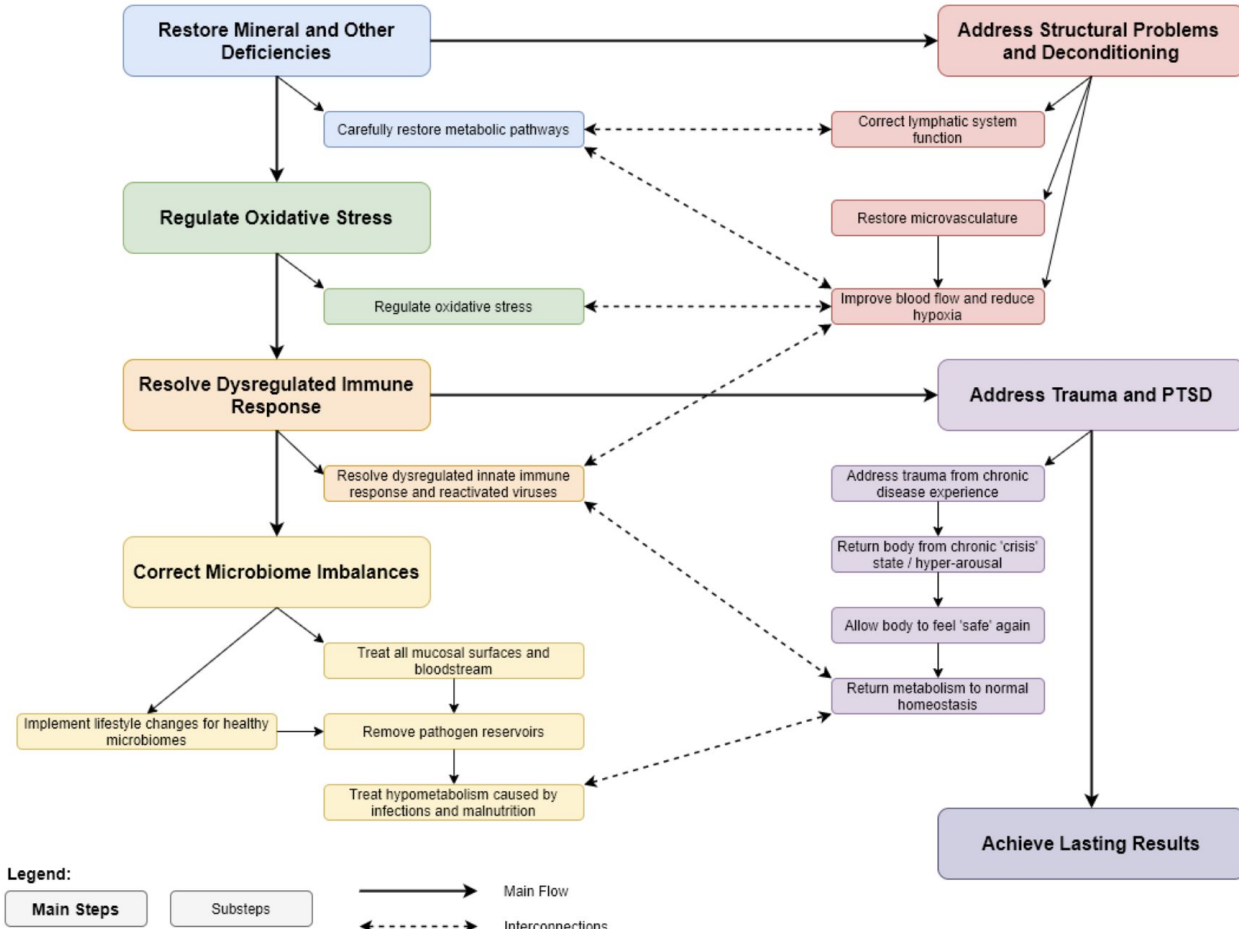
Allows the body to return from a chronic crisis state

THE SPIRAL TOWARDS SEVERE ME/CFS



RECOVERY SPIRAL FROM SEVERE ME/CFS





Note: This diagram illustrates the interconnected processes involved in reversing chronic disease. Each step builds upon the previous ones, with bidirectional relationships showing how improvements in one area positively impact others.

Recovering from severe metabolic and immune collapse

Not an easy journey

The system has been locked down, in part to prevent further damage, but also as a side effect of depleted resources and chronic acetaldehyde → endogenous morphine toxicity.

Recovery requires not just reversing this shutdown, but restoring the underlying machinery that allows for energy, repair and regulation.

Rarely smooth. It can bring both physical and psychological challenges, many of which are misunderstood or unexpected.

Avoid rapid reversal

Aggressive protocol - high doses of multiple things - all at once
System will not be ready!

May feel initially great - clarity and surge energy.
But then followed by severe symptoms. Feeling of being
“stripped raw”.

Emotions blunted by the previous metabolic state can re-emerge
with intensity. Old traumas can resurface.
Feel worse instead of better and more hopeless.

Staged recovery, while maintaining honest expectations

- Must recognize the system cannot simply be “switched back on”
- The more severe the symptoms/disease - the more gentle the reversal process needs to be.
- Involves slow, methodical rebuilding
 - Supporting the most fragile processes first, before removing the blocks that have accumulated.
 - Recovery starts with the smallest possible doses of NAD⁺, active B vitamins, and minerals.
 - In severe cases, much lower doses than expected.
 - Toxic metals are removed
 - Carbohydrate intakes are usually increased significantly as the metabolism is restored.

Other tools

Acetaldehyde scavengers: NAC, DHM, Acetium, Z-biotics, or L-carnosine are introduced cautiously - increasing doses only if stable.

Antioxidant buffers are included early on

Lifestyle interventions - light exposure, gentle movement, and sleep support are prioritized.

Protocol

May only notice subtle changes at first.

- Brief windows of mental clarity, a slight reduction in heaviness, or return of appetite.

Occasionally there are small setbacks:

- Night poor sleep, muscle aches, or old symptoms resurfacing.

These are not failures - but signs that the old machinery is coming back online.

The protocol is adjusted in response, slowing down or pausing when symptoms flare.

Protocol

Only after the foundation is established are cAMP-PKA modulators and NAD⁺ precursors introduced.

- And always at low doses!
- The body's response is carefully monitored.

If symptoms of withdrawal, anxiety or immune flares reappear, the approach is paused or scaled back.

As more is tolerated, the protocol expands to include targeted antimicrobials, more significant dietary shifts, and finally prebiotics and probiotics.

Recovery

Recovery is non-linear!

- Setbacks are part of the process.

Can expect periods of improved mood and energy, followed by plateaus or short-lived regressions.

Emotions may feel more “alive” but also less buffered.

There is often a phase of emotional thaw, where old memories or unresolved stress emerge.

The most important factor is that progress is gradual and symptoms are manageable.

Each setback is an opportunity to learn and recalibrate - not a sign of failure!

Protocol and healing

Sense of agency will grow - and you notice and interpret your own responses.

Trust in the process - and know you have the ability to pause, recover, and continue.

Protocol Expectations

In collapse - the body is stuck in emergency mode.

Glycolysis is inefficient, fatty acid oxidation is blunted, and lactic acid accumulates quickly even with mild exertion.

Most energy come from “burning sugar poorly” - which leave you exhausted after trivial effort.

Muscle aches and small exertions can bring on a disproportionate sense of heaviness or even mild acidosis.

After activity, recovery is slow. There may be a background sense of internal soreness and sleep does little to replenish energy.

Protocol Expectations

As the protocol progresses, and the first cracks appear in this rigid metabolic state - changes can be both subtle.

When cAMP-PKA tone begins to improve - and the first traces of mitochondrial support arrive, you may notice short bursts of energy - windows where movement feels lighter and less taxing.

This is the nervous system and muscle tissue rediscovering how to use glycolysis more efficiently, instead of every effort being punished by burning muscles and a leaden fatigue.

Protocol and recovery

Fatty acid oxidation often lags behind.

- When it begins to recover, it may be heralded by a curious combination of sensations.
- Steadier background energy, reduced need for snacking/sugar, and a less dramatic crash after activity.

For some - this comes with a brief resurgence of “keto-flu” symptoms - headache, brain fog, mild nausea or a peculiar sensation of metabolic unease - as the body relearns how to mobilize and process fats.

Old symptoms such as mild hypoglycemia or even transient palpitations can flare, but now they respond more quickly to rest or a small snack.

Protocol and expectations

During the metabolic recalibration - there can also be sudden swings in energy systems.

A good day followed by a day of heaviness - as the system “practices” new flexibility.

It is normal for the body to default to the old, rigid state during stress, infection, or a poor night’s sleep.

With patience and support - these fluctuations even out.

Activity can be sustained for longer, with less muscle soreness or lactic “burn” and post-exertional malaise becomes less severe and shorter in duration.

Carbohydrate intake requirements may rapidly increase

Expectations

Sleep also shifts.

Early in recovery - sleep may feel light, fractured, or unrefreshing.

As mitochondrial and fatty acid pathways revive, sleep deepens, dreams become more vivid, and the feeling upon awakening gradually improves.

Hunger and satiety cues become clearer.

Cravings for sugar or stimulants diminish as the brain and muscles regain access to stored energy.

Expectations

Throughout the recovery - you should expect this journey to feel unfamiliar.

The return of metabolic flexibility often means confronting both old symptoms and new sensations.

Some will feel bursts of restlessness or drive, as the nervous system recalibrates.

Others will notice mood swings or emotional thaw, reflecting not just the lifting of metabolic brakes but the return of a more “awake” brain. These are all signs that the underlying system is no longer stuck, even if the new equilibrium is fragile.

Systems turning back online

Depending on the priorities in your body when the system comes back on-line and energy is available:

- The immune system will start to see and go after pathogens
 - This will cause symptoms - as we are now recognizing and killing these pathogens.
- Less endogenous morphine can leave us feeling a little off/needing something.....
 - Find ways to fulfill this
 - Slow down the process if needed
 - Support the neurotransmitters

A few other cell basics

Cells downregulate receptors due to various factors

- Stress
- Too much of the substance it is supposed to transport
- Too much or not enough of the shared transport substance
- And more

Certain nutrients/compounds also have multiple factors that affect how much is able to be used

- Absorption
- Active/inactive compound
- Ability to cross the cell membrane/barriers
- Carrier compounds and binding
- Etc....

Cell Basics

Because of these issues

- Just giving a nutrient does not mean it is usable and helpful.

Where peptides may come in:

- They are bringing receptors back to the cell membrane
- Turning things back on-line.....

But expensive

It's the wild west out there with them

And - is it going back far enough??

Fixing something the body “meant to do” to survive

Iron

Iron is often low - but can be high as well

- Just giving iron is not the answer
 - Gut absorption
 - Receptors to get it into the cell
 - Redistribution
 - Infections using the iron
 - Active forms versus inactive forms (cofactors or energy to change)

Resource on energy:

<https://www.metabolics.com/blogs/news/how-does-the-body-produce-energy?srsId=AU7gw4XCqWFqtDrzKK3tV3rOdTgjP84cu3YZbZHpdTb-YLnpkLIYgu-e>