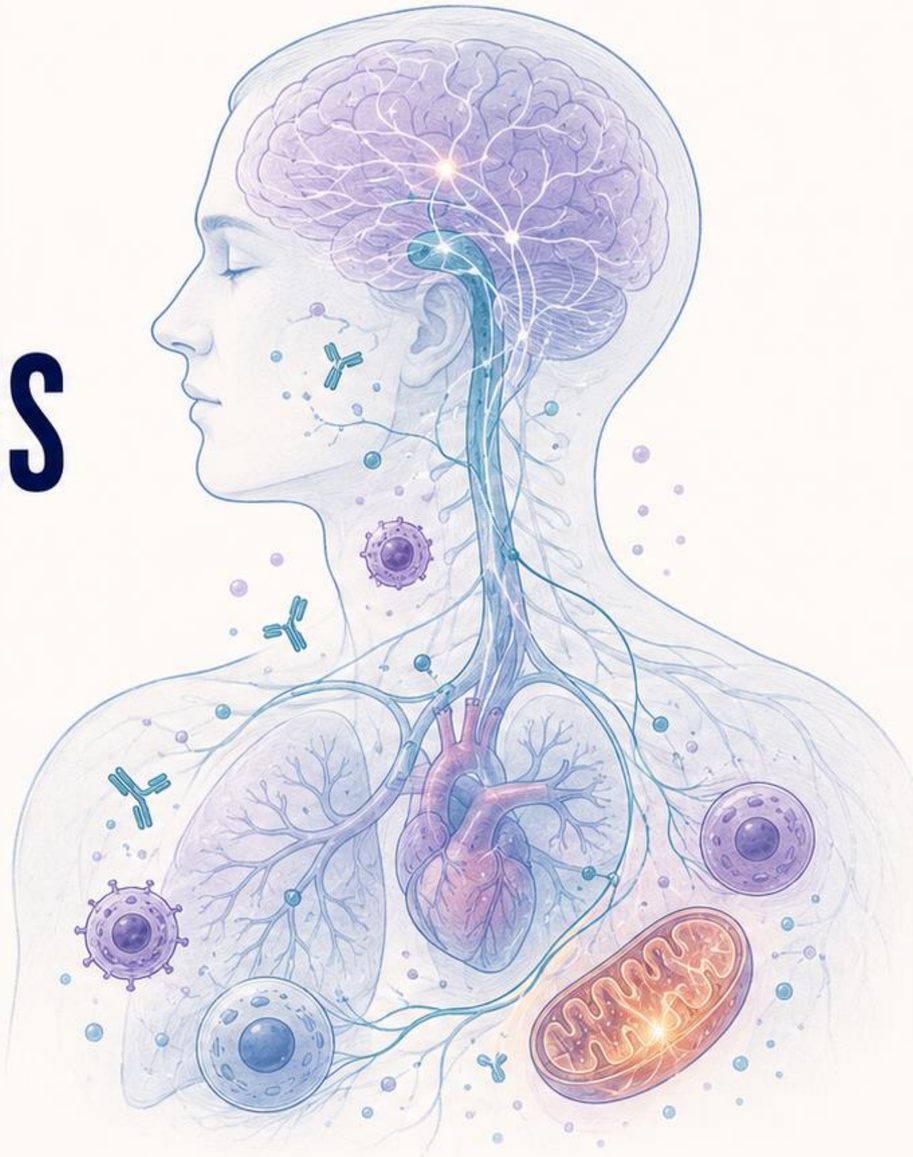
LONG COVID & POST-VIRAL SYNDROMES

Introduction & Clinical Context

Mechanisms, Diagnosis & Integrative Care



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BRB CE Group

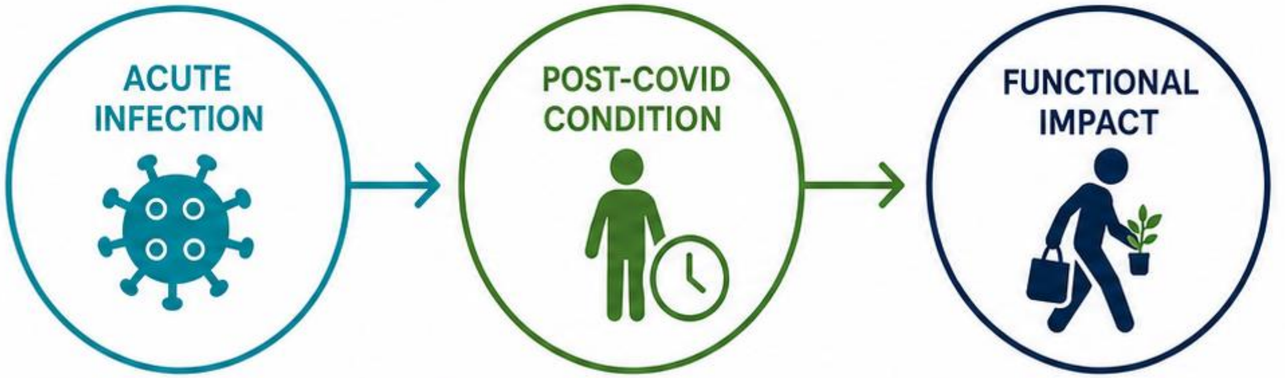
September 12-13, 2026

WHY LONG COVID MATTERS

A SIGNIFICANT ONGOING HEALTH BURDEN

19% of Canadian adults who had COVID-19 reported symptoms lasting 3 months or longer

Canadian estimate, June 2023



SARS-CoV-2 infection

Symptoms present or emerging around 3 months and continuing for at least 2 months

Daily activities, work and quality of life may be affected

COMMON SYMPTOMS
Fatigue and cognitive difficulties

MULTISYSTEM
Multiple organ systems may be affected

NO SINGLE TEST
Routine investigations may be normal

VARIABLE COURSE
Symptoms may fluctuate over time

CLINICAL OVERLAP
ME/CFS and dysautonomia

Long COVID has increased recognition of the disabling, multisystem nature of post-infectious illness.

POST-VIRAL SYNDROMES ARE NOT NEW

A HISTORY OF POST-VIRAL ILLNESS

1918
INFLUENZA

"La Grippe" survivors reported prolonged fatigue and weakness

EBV
(1950s–PRESENT)

Epstein–Barr virus linked to chronic fatigue and immune dysregulation

SARS
(2003)

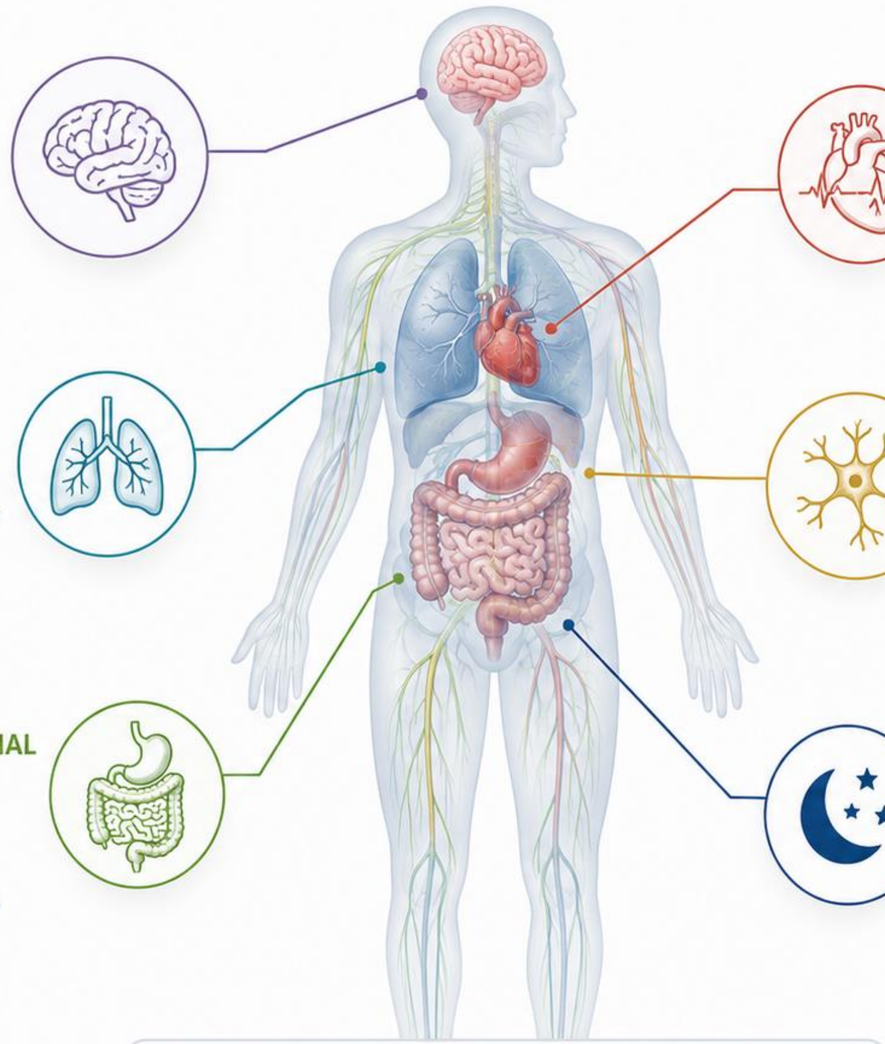
Many survivors experienced fatigue, sleep disturbance, and reduced quality of life

COVID-19
(2020–PRESENT)

Millions worldwide develop persistent, multi-system symptoms

A MULTISYSTEM ILLNESS

Affecting Multiple Body Systems



NEUROLOGIC

Brain fog
Headaches
Sleep disturbance
Paresthesia

RESPIRATORY

Shortness of breath
Exercise intolerance
Chest tightness

GASTROINTESTINAL

Bloating
Nausea
Reflux / GERD
Altered bowel habits

CARDIOVASCULAR / AUTONOMIC

Tachycardia
Dizziness / Lightheadedness
Orthostatic intolerance
Blood pressure instability

AUTONOMIC NERVOUS SYSTEM

Dysautonomia
Temperature dysregulation
Sweating abnormalities
Exercise intolerance

SYSTEMIC / GENERAL

Fatigue & PEM
Muscle & joint pain
Post-exertional malaise
Malaise

Symptoms vary in type, severity, and duration.
Often fluctuate and worsen with exertion.

PROPOSED BIOLOGICAL CONTRIBUTORS

Mechanisms under investigation in Long COVID

VIRAL PERSISTENCE

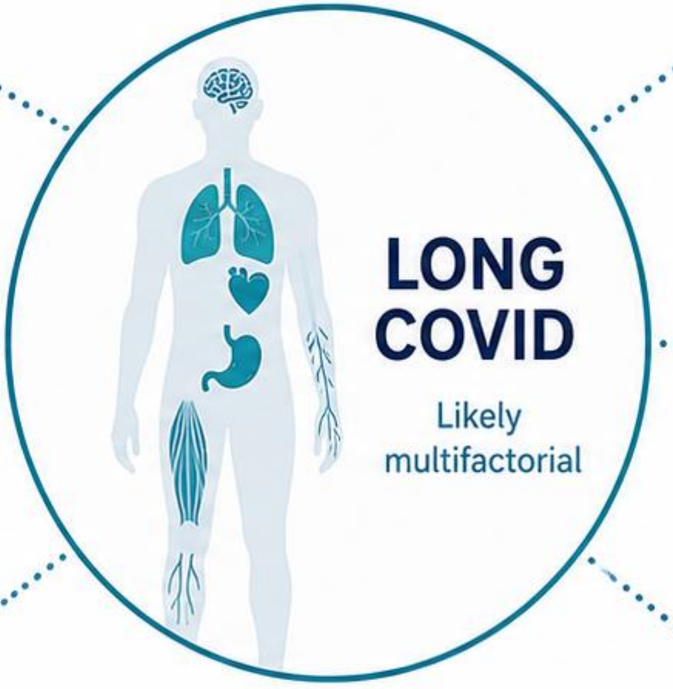
Viral RNA or antigen reported in some tissues or blood samples

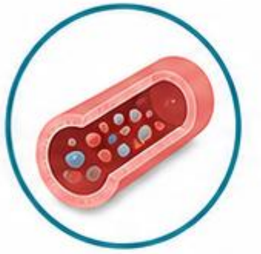
IMMUNE DYSREGULATION

Altered immune profiles reported in some cohorts

AUTOIMMUNITY

Autoantibodies and immune reactivity under investigation





VASCULAR & ENDOTHELIAL

Complement, endothelial and thromboinflammatory changes reported in subsets

ENERGY METABOLISM

Metabolic and mitochondrial abnormalities reported in selected studies

AUTONOMIC & NEUROLOGICAL

Dysautonomia and neuroimmune changes may contribute

Findings vary across patients and studies
No single mechanism explains every case

THE AUTONOMIC CONNECTION

THE VAGUS NERVE

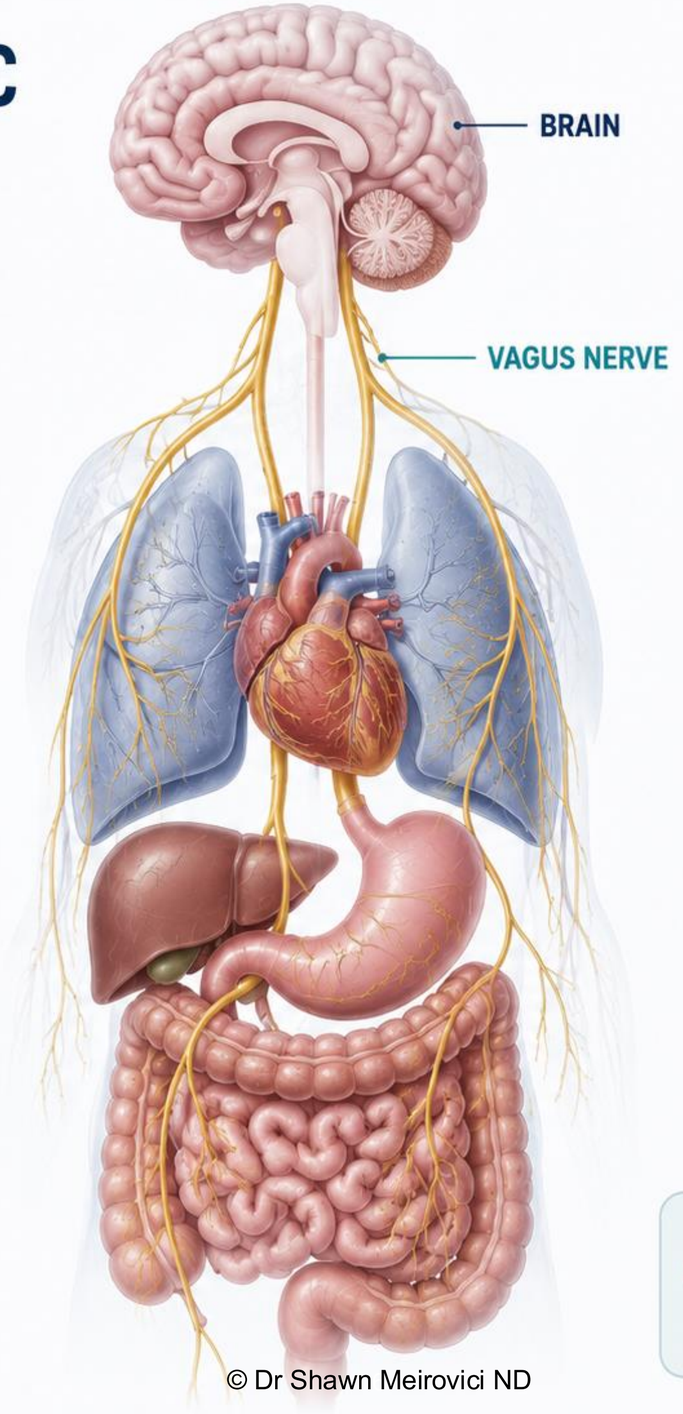
The vagus nerve is the body's major communication pathway between the brain and many vital organs.

The vagus nerve regulates heart rate, breathing, digestion, inflammation, and many other critical functions.

VAGUS NERVE PATHWAY

BRAIN ORGANS

Bidirectional communication keeps the body in balance.



WHEN DYSREGULATED, MANY SYSTEMS ARE AFFECTED

TACHYCARDIA
Elevated heart rate and palpitations

DIZZINESS
Lightheadedness and orthostatic intolerance

EXERCISE INTOLERANCE
Reduced capacity and rapid fatigue

GI DYSFUNCTION
Bloating, nausea, delayed motility

GERD / REFLUX
Impaired vagal tone can increase reflux symptoms

Supporting vagal function may help restore balance across multiple systems.

SYMPTOMS OFTEN OUTPACE TESTING

NORMAL TESTS

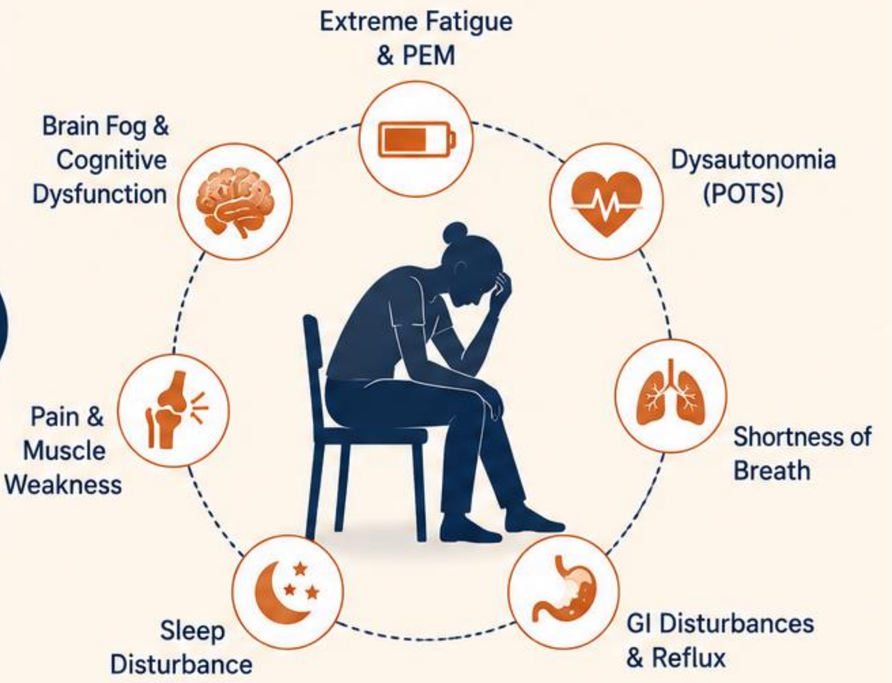
Standard labs and imaging may appear normal.

- Complete Blood Count ✓
- Metabolic Panel ✓
- Thyroid Function ✓
- Inflammatory Markers ✓
- Imaging (X-ray / MRI) ✓
- Cardiac Evaluation ✓

No abnormalities detected, but symptoms persist.

SEVERE FUNCTIONAL IMPAIRMENT

Symptoms are real, debilitating, and impact every area of life.

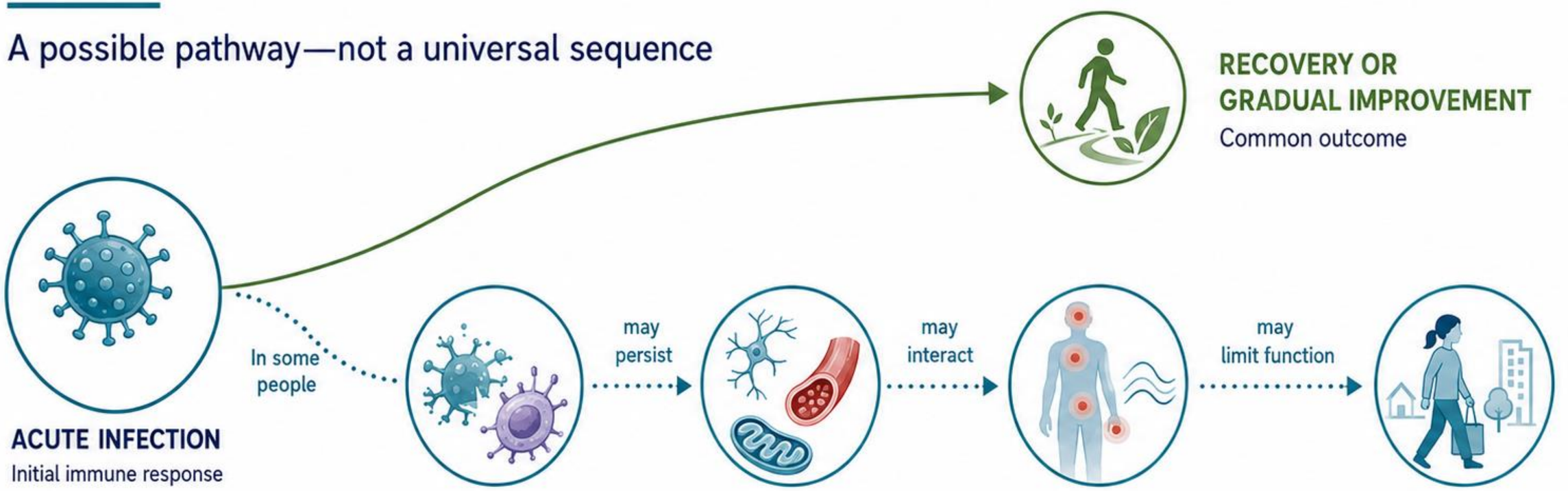


Absence of a biomarker does not mean absence of disease.

Symptoms fluctuate and exertion may worsen them.

ONE PROPOSED MODEL OF LONG COVID

A possible pathway—not a universal sequence



Patients may improve, relapse or fluctuate over time.

Not every mechanism is present in every patient.

Modifying factors: prior health • genetics • age and sex • environment • social context

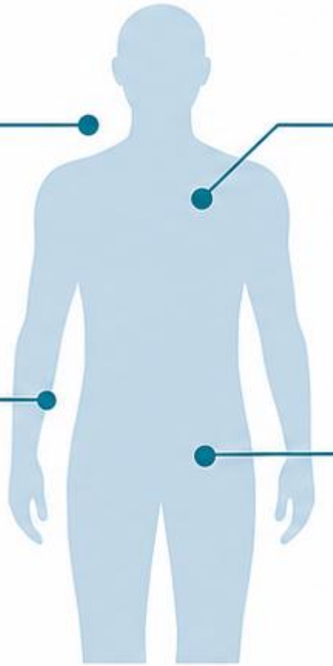
Common Post-Viral Syndromes

POST-COVID-19 CONDITION

LONG COVID

A MULTISYSTEM POST-INFECTIOUS CONDITION

Symptoms present or emerging around 3 months after COVID-19, continuing for at least 2 months, with no better explanation.



NEUROLOGICAL
Cognitive difficulties • headache • dizziness

RESPIRATORY
Breathlessness • cough • chest discomfort

AUTONOMIC & CARDIOVASCULAR
Palpitations • orthostatic intolerance • POTS

GASTROINTESTINAL
Nausea • altered bowel function • abdominal discomfort

COMMON ACROSS PHENOTYPES
Fatigue • sleep disturbance • pain • post-exertional symptom exacerbation

WHO CAN BE AFFECTED?
After mild, moderate or severe infection

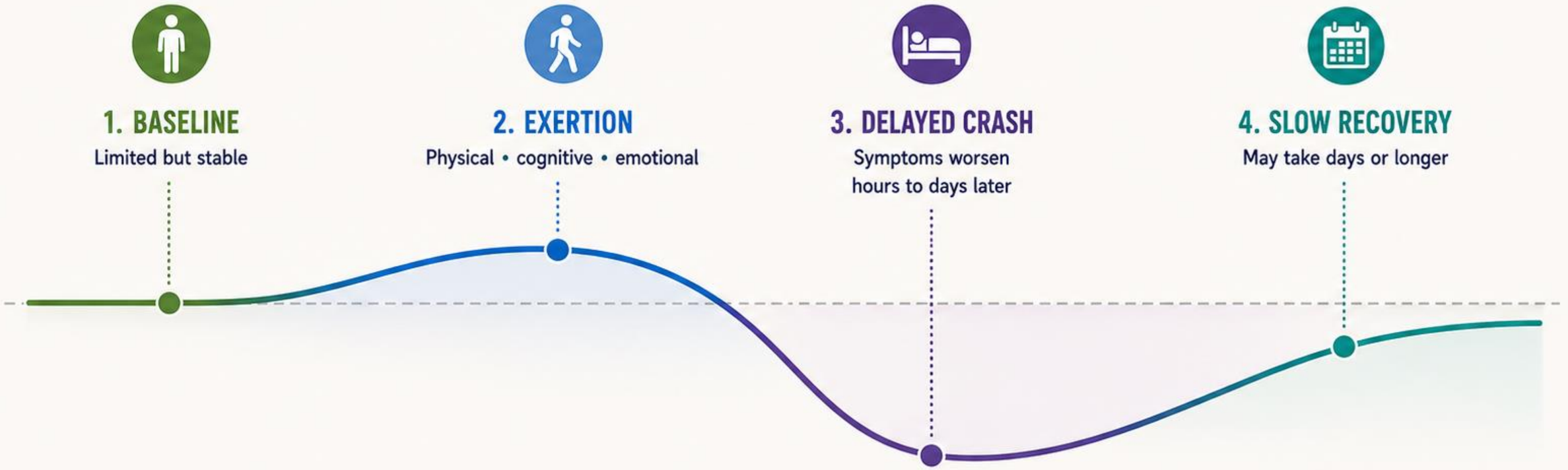
CLINICAL TIMING
COVID-19 infection → symptoms persist, recur or emerge → assessment around 3 months

Symptoms continue for at least 2 months

VARIABLE COURSE
Symptoms may improve, persist, recur or fluctuate

ME/CFS

Post-exertional malaise (PEM) is the defining feature



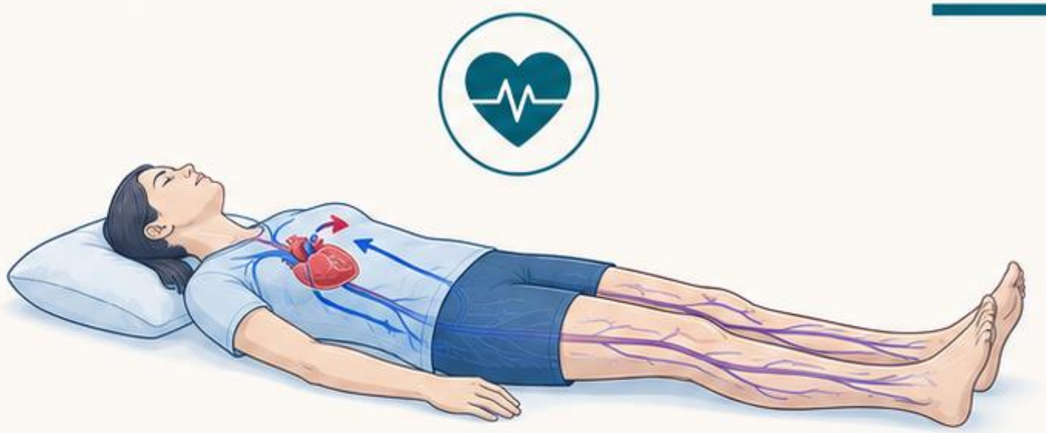
PEM is not ordinary fatigue—it is a delayed, disproportionate worsening of symptoms

POTS & POST-VIRAL DYSAUTONOMIA

Autonomic dysfunction can connect seemingly unrelated symptoms

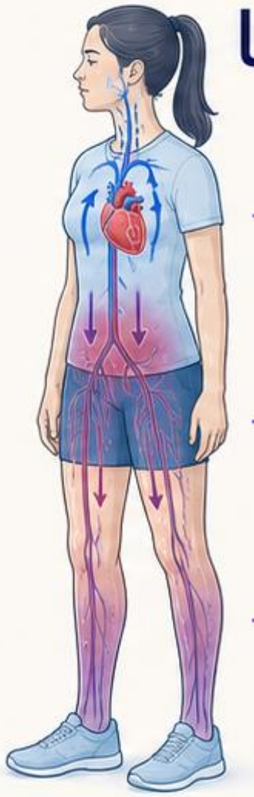
SUPINE

Blood return is relatively supported



STANDING

UPRIGHT



- Heart rate rises
- Dizziness / brain fog
- Fatigue / exercise intolerance

Symptoms may also involve the gastrointestinal and temperature-regulation systems

POTS is one phenotype within the broader spectrum of dysautonomia

POST-INFECTIOUS AUTOIMMUNITY

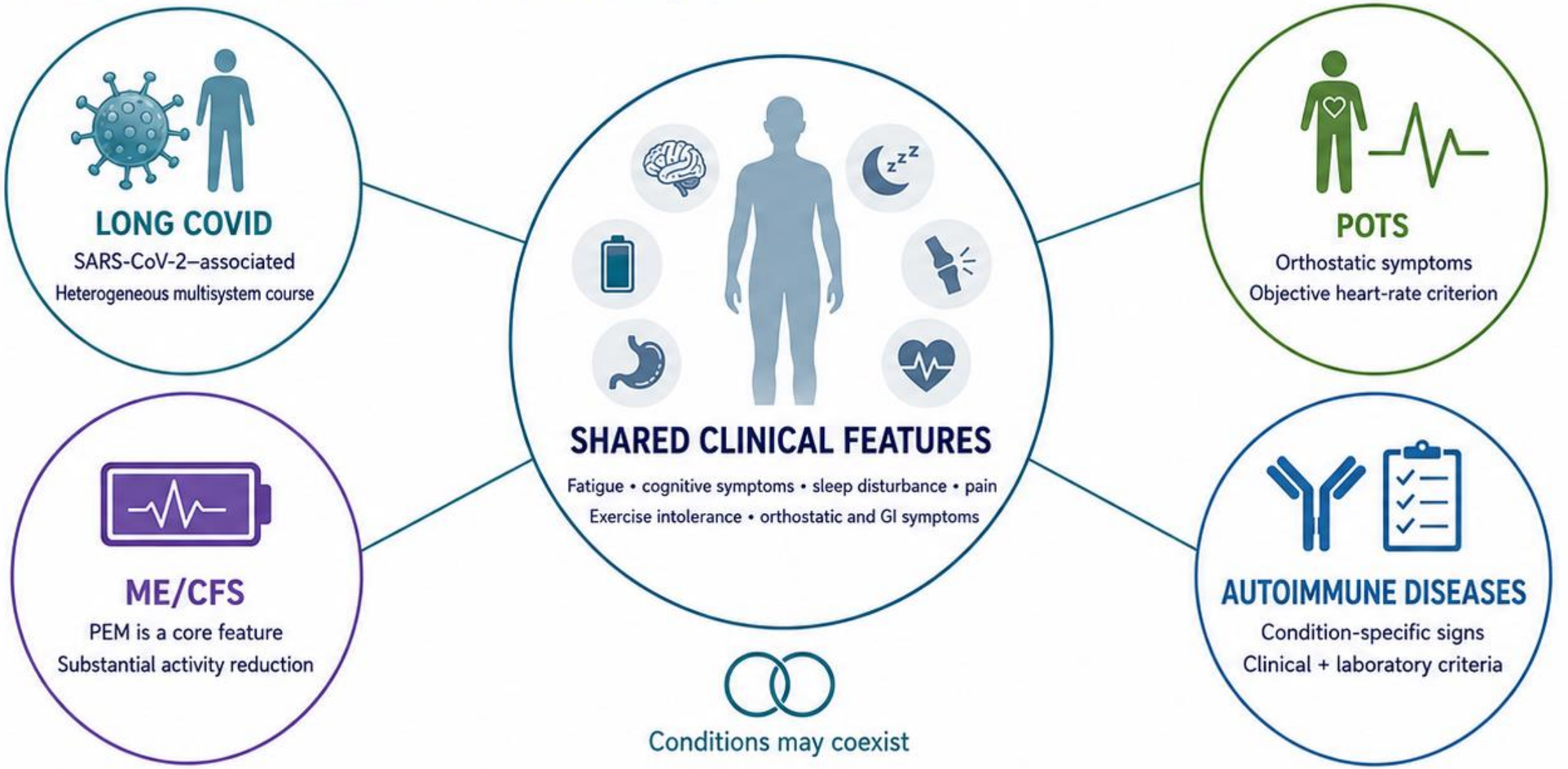
Infection may disrupt immune tolerance in susceptible individuals

Molecular mimicry • Bystander activation • Epitope spreading

Autoantibodies have been reported after infection—but their clinical significance varies

OVERLAPPING FEATURES, DISTINCT DIAGNOSES

Shared symptoms do not make these conditions interchangeable



Overlap guides assessment—but does not replace differential diagnosis.

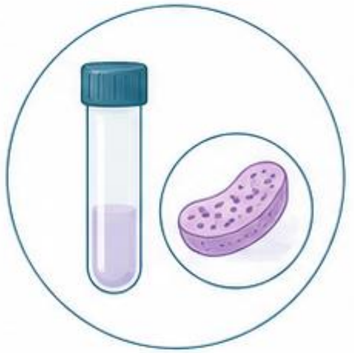
Symptoms may be shared; diagnostic criteria and management may differ.

Pathophysiology

VIRAL PERSISTENCE

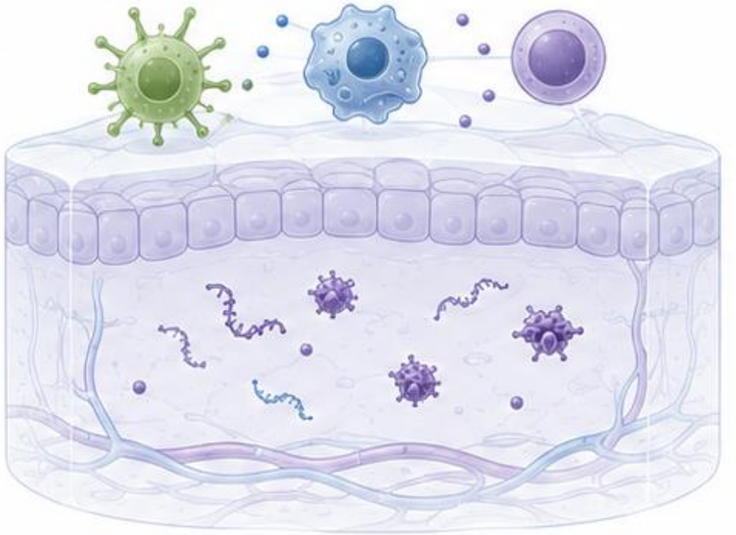
An evolving hypothesis in Long COVID

RESEARCH OBSERVATIONS



Viral RNA, protein or antigen has been detected months after infection in some studies.

POSSIBLE RESERVOIR



Reported in selected tissues and plasma cohorts

PROPOSED EFFECTS

- Immune activation
- Inflammatory signalling
- Persistent symptoms?

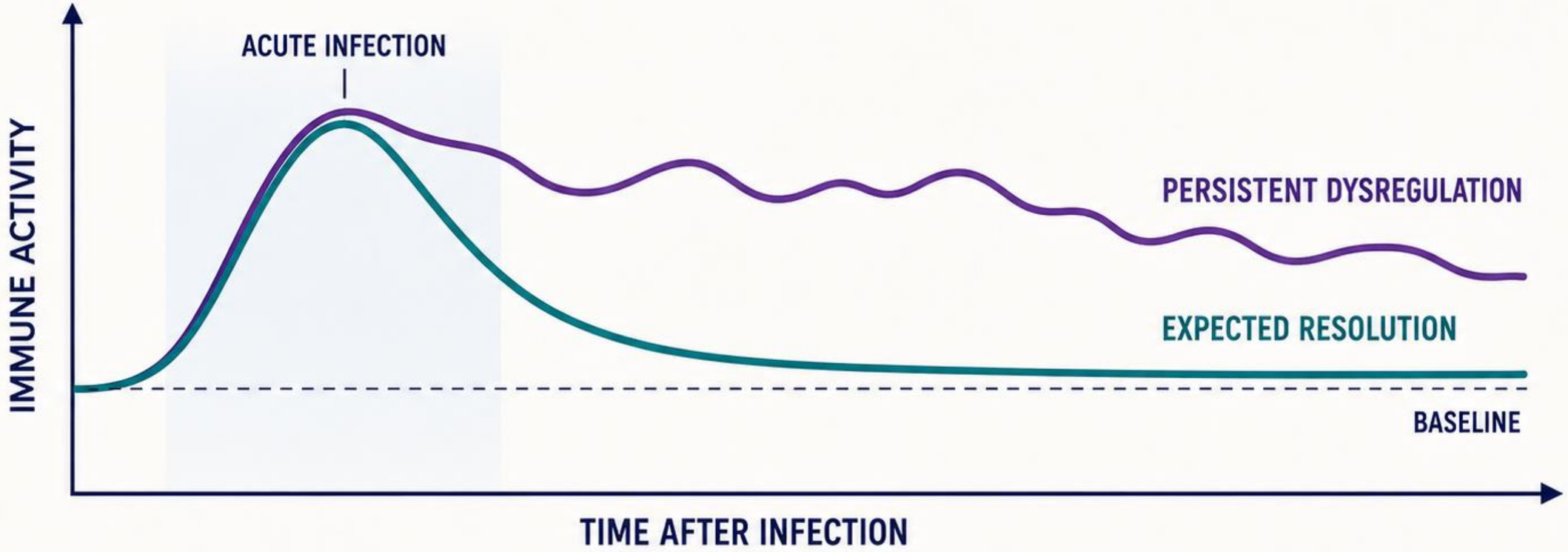
KEY UNKNOWNS

- How common is it?
- Active virus or residual material?
- Cause, contributor or bystander?

Research mechanism • No validated routine biomarker • Treatment implications remain investigational

IMMUNE DYSREGULATION

In some patients, immune activity may not fully return to baseline



Studies report varied cytokine, T-cell, B-cell and interferon patterns

No single immune signature defines Long COVID

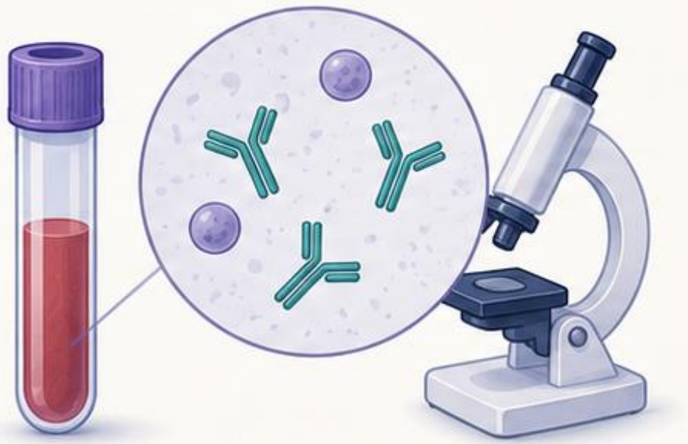
AUTOIMMUNITY IN LONG COVID

Autoimmune mechanisms may contribute in a subset of patients

? ASSOCIATION ≠ CAUSATION

RESEARCH FINDING

Autoantibodies reported in some cohorts



POSSIBLE BIOLOGIC EFFECT

Some antibodies may interact with receptors or tissues

CLINICAL RELEVANCE

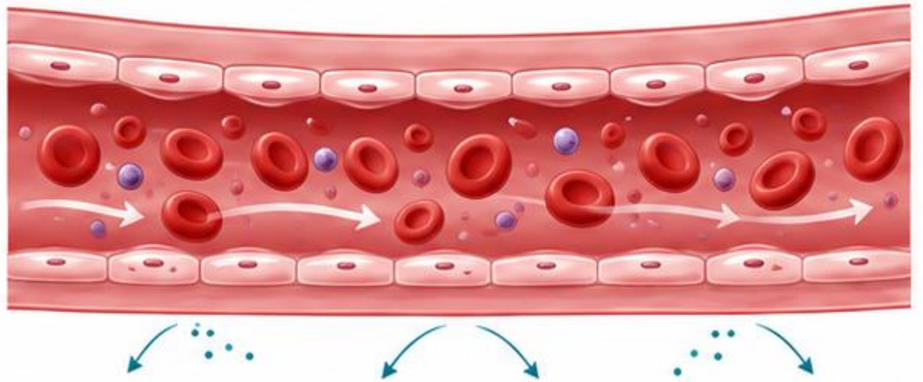
Varies by target, function and patient

Autoantibodies alone do not establish an autoimmune diagnosis

ENDOTHELIAL & MICROCIRCULATORY CHANGES

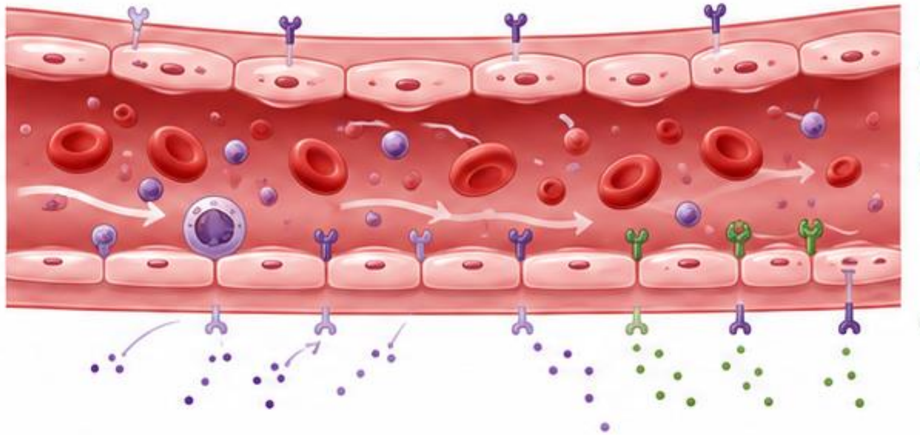
Vascular abnormalities have been reported in some Long COVID cohorts

HEALTHY MICROVESSEL



Responsive lining • efficient flow

ALTERED FUNCTION REPORTED IN SOME STUDIES



- Endothelial activation markers
- Altered vasodilation or microvascular function
- Complement and coagulation signals

POSSIBLE CLINICAL RELEVANCE ?

- Tissue perfusion
- Exercise intolerance
- Autonomic or cardiopulmonary symptoms

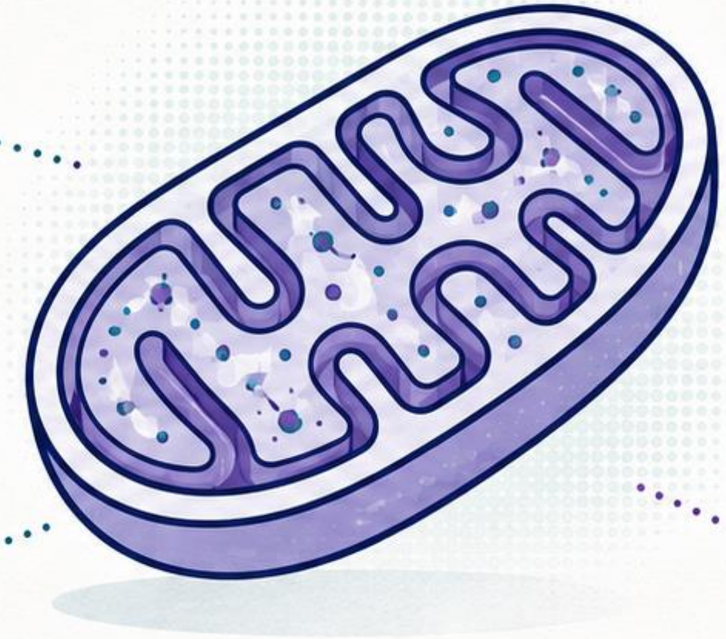
Microclot findings remain preliminary • No validated routine test • Treatment targets remain investigational

MITOCHONDRIAL CHANGES UNDER INVESTIGATION

A possible contributor to fatigue and reduced exercise tolerance in some patients

REPORTED IN SOME COHORTS

- Lower oxidative phosphorylation
- Altered fuel use
- Exercise-related metabolic changes



POSSIBLE CLINICAL RELEVANCE

- Fatigue & reduced stamina
- Post-exertional worsening
- Slower recovery

Findings are heterogeneous • Not a validated biomarker or universal mechanism

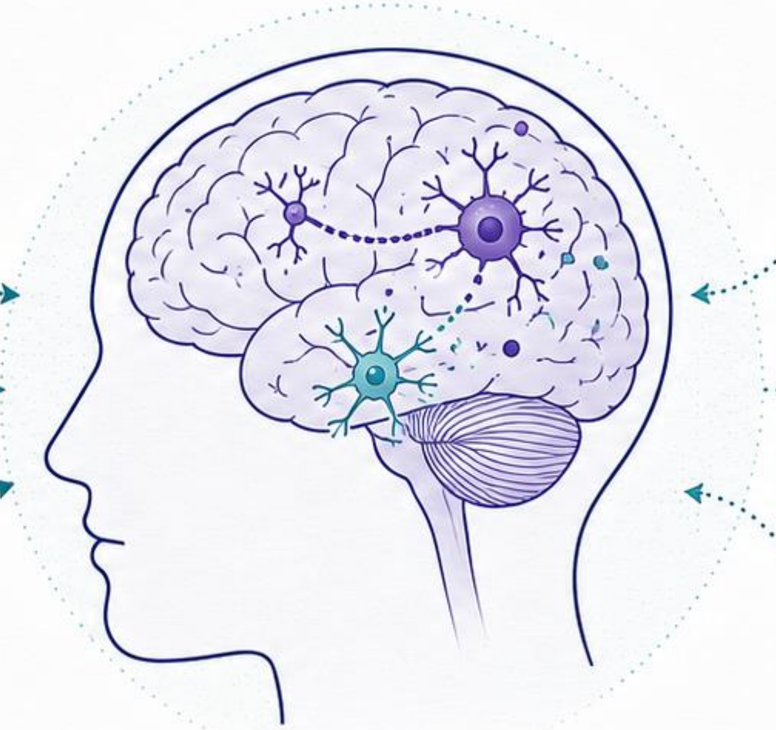
Association does not establish causation in an individual patient

NEUROINFLAMMATION: A PROPOSED CONTRIBUTOR

Neuroimmune findings have been reported—but results vary across studies

POSSIBLE INPUTS

- Systemic immune signalling
- Vascular or barrier changes
- Persistent antigen signals



RESEARCH OBSERVATIONS

- CSF immune differences
- Glial-related PET signals
- Imaging or connectivity changes

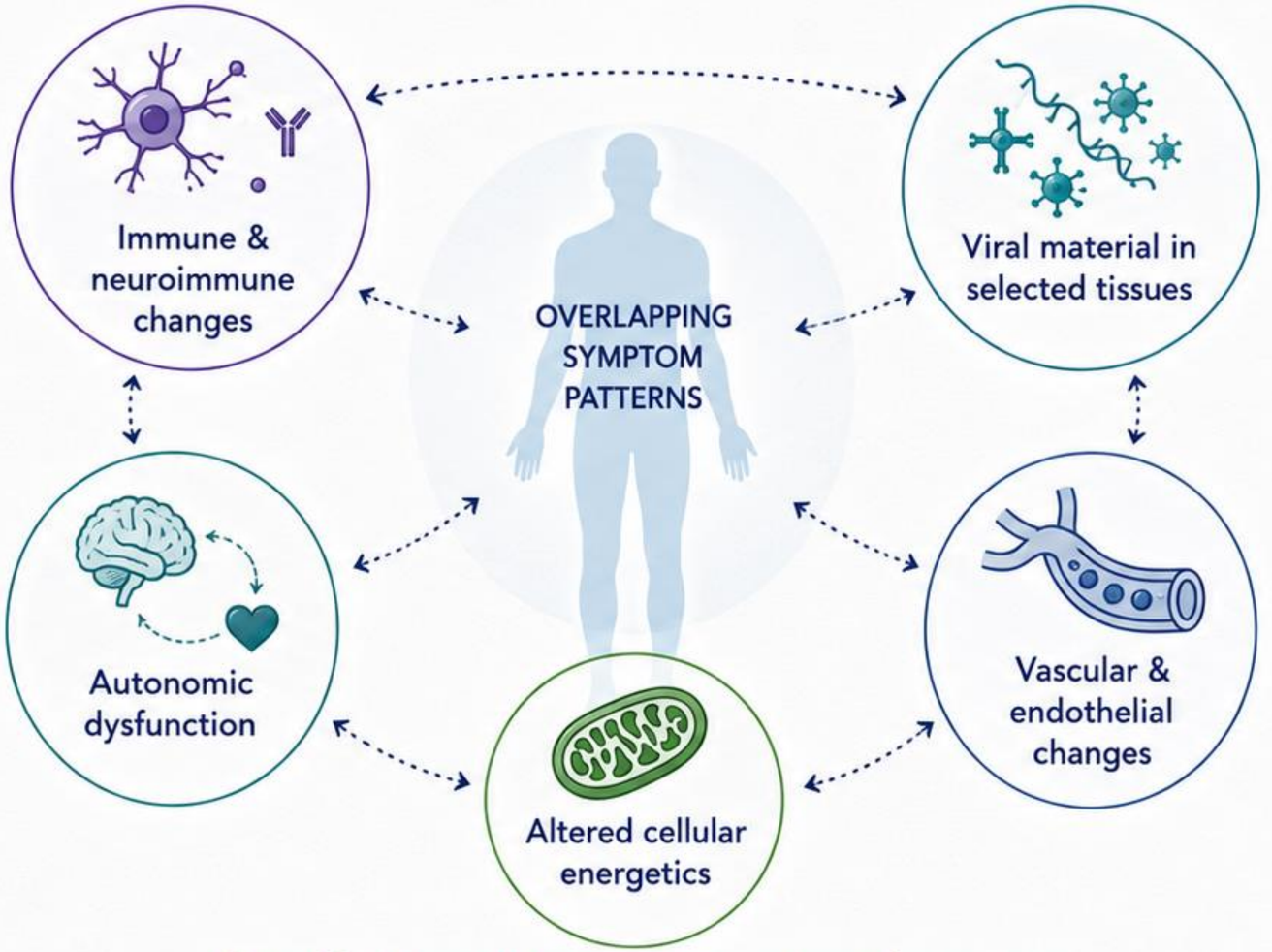
POSSIBLE CLINICAL LINKS

- Cognition
- Headache & sensory symptoms
- Sleep & pain

Group-level evidence is mixed • No validated clinical test confirms neuroinflammation in an individual

ONE PROPOSED MULTISYSTEM MODEL

Long COVID is heterogeneous; different pathways may dominate in different people



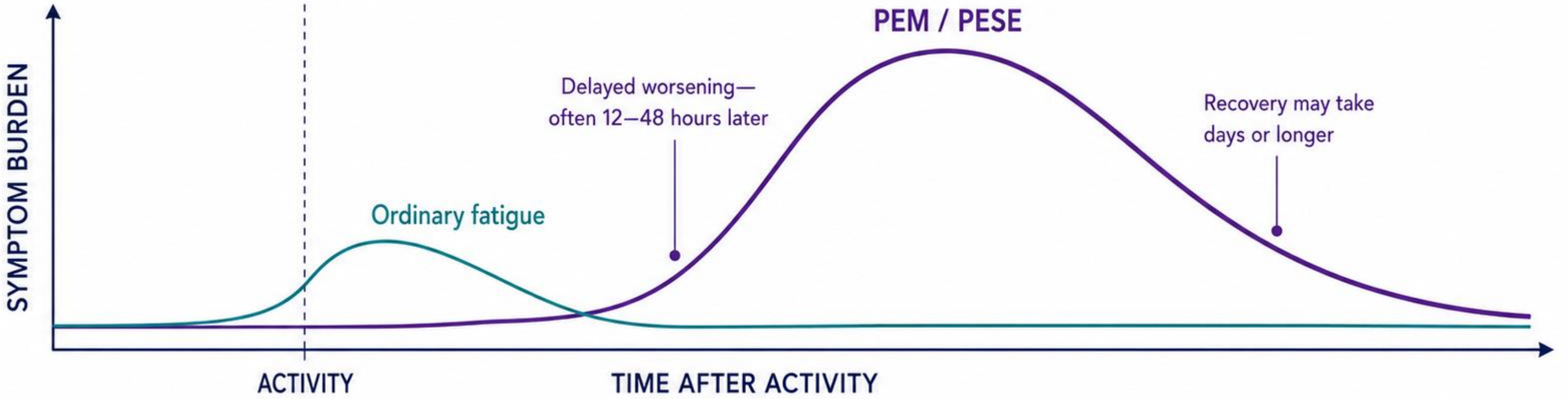
Possible interactions—not a universal sequence

Research framework, not a validated diagnostic model • Individual assessment remains symptom- and function-led

Clinical Presentation

FATIGUE IS NOT THE SAME AS PEM

PEM/PESE is a delayed, disproportionate worsening of symptoms after exertion



TRIGGERS CAN INCLUDE

- Physical activity
- Cognitive effort
- Emotional exertion
- Sensory or orthostatic load

Common in Long COVID—but not universal. When present, it changes activity recommendations.

NEUROLOGICAL SYMPTOMS

Brain fog represents objective neurological dysfunction—not simply tiredness.

COGNITIVE DYSFUNCTION

Brain fog, slowed thinking, mental fatigue

ATTENTION & CONCENTRATION

Difficulty focusing, sustaining attention or multitasking

MEMORY IMPAIRMENT

Problems with short-term memory and recall

VESTIBULAR SYMPTOMS

Dizziness, imbalance, lightheadedness, motion sensitivity

WORD-FINDING DIFFICULTY

Trouble finding the right words or completing sentences

HEADACHES

New or worsening headaches, migraine flares

SLEEP DISTURBANCE

Poor sleep quality, non-restorative sleep, frequent waking

SENSORY OVERLOAD

Sensitivity to light, sound, smells, crowds

These symptoms reflect real, measurable changes in brain function linked to neuroinflammation, reduced cerebral blood flow, and altered neural networks.

AUTONOMIC DYSFUNCTION

The autonomic nervous system connects symptoms across multiple organ systems.

AUTONOMIC NERVOUS SYSTEM

HEART & CIRCULATION

- POTS
- Palpitations
- Tachycardia
- Dizziness / Lightheadedness
- Fainting or near-fainting

GUT & DIGESTION

- Nausea
- Bloating
- Constipation or diarrhea
- GERD / Reflux
- Early satiety

TEMPERATURE REGULATION

- Heat intolerance
- Cold intolerance
- Excessive or reduced sweating

RESPIRATION

- Shortness of breath
- Air hunger
- Poor exercise tolerance

BLOOD VESSELS

- Blood pressure fluctuations
- Poor circulation
- Hands/feet cold or discolored

ENERGY & FUNCTION

- Profound fatigue
- Exercise intolerance
- Post-exertional malaise

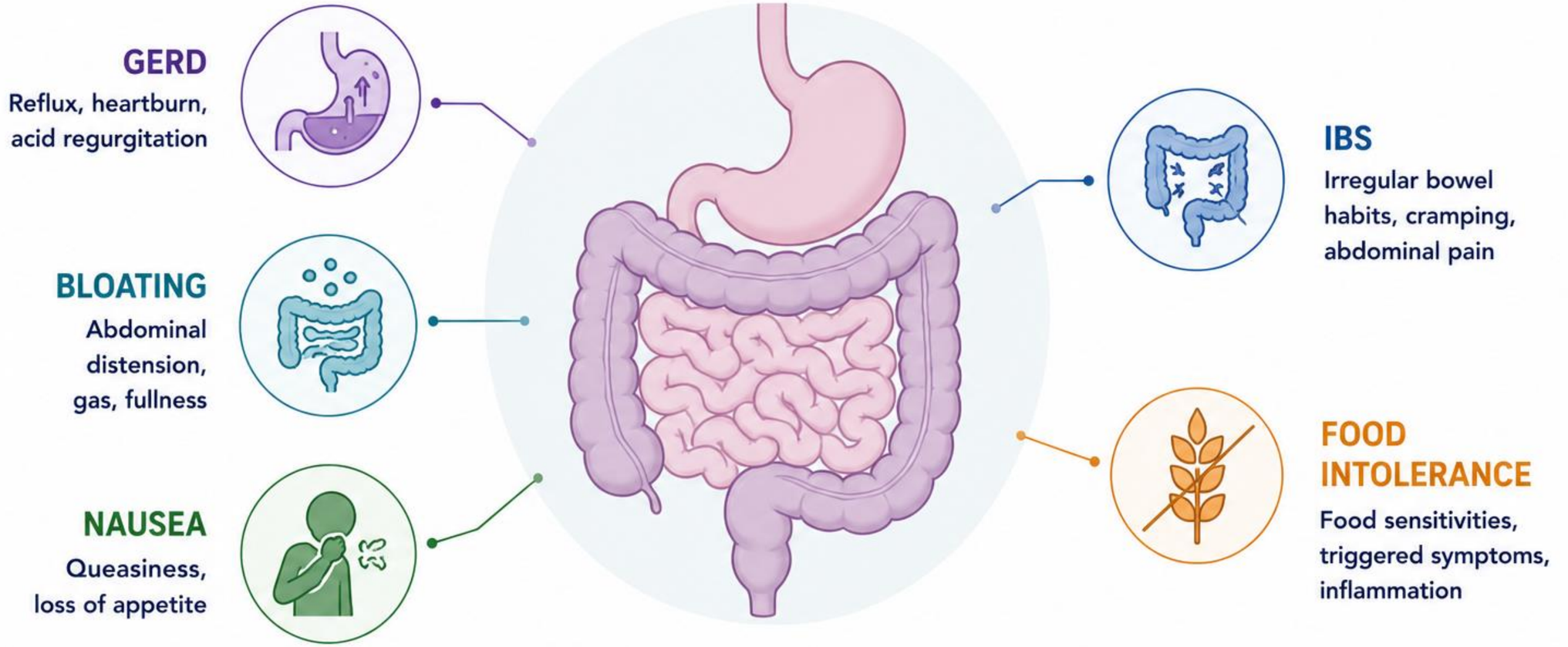
When the autonomic nervous system is dysregulated, multiple body systems are affected—often at the same time.

Key Takeaway

Dysautonomia is common in Long COVID and can drive many of the most disabling symptoms.

GASTROINTESTINAL MANIFESTATIONS

GI symptoms are common and can significantly impact quality of life.



Gut symptoms may reflect vagal dysfunction, altered motility, microbiome disruption, and persistent immune activation.

RESPIRATORY & CARDIOVASCULAR MANIFESTATIONS

Symptoms are real—even when imaging and standard tests appear normal.

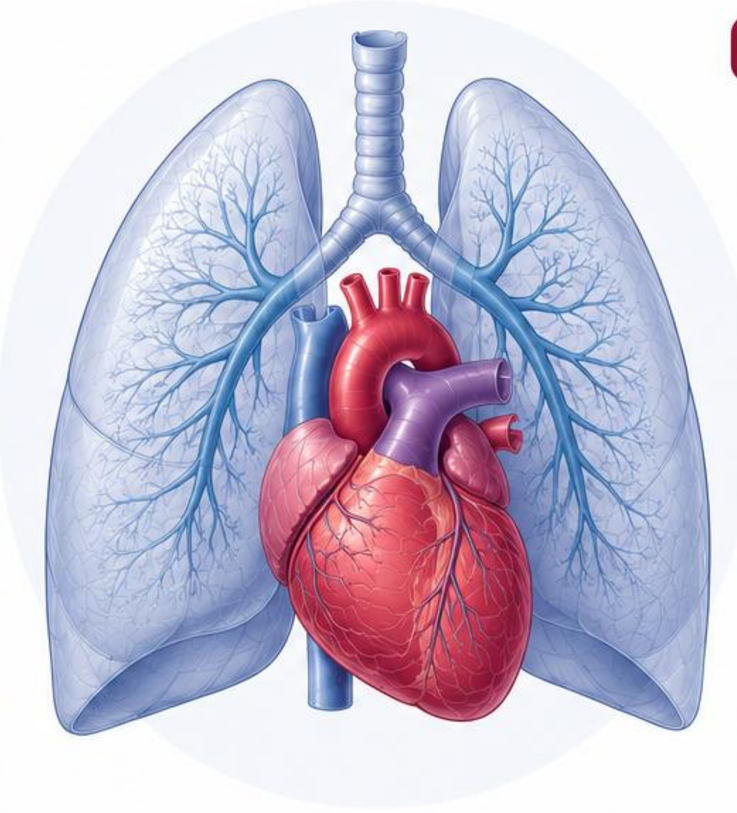
RESPIRATORY SYMPTOMS

SHORTNESS OF BREATH
At rest or with minimal exertion, often out of proportion to test results

AIR HUNGER
Feeling of not getting enough air or needing to take a deep satisfying breath

EXERCISE INTOLERANCE
Reduced stamina, fatigue, and breathlessness

CHEST TIGHTNESS / DISCOMFORT
Pressure, tightness, or non-specific chest pain



CARDIOVASCULAR SYMPTOMS

PALPITATIONS
Awareness of heartbeat, skipped beats, or racing heart

TACHYCARDIA
Elevated heart rate at rest or with minimal activity

POTS & ORTHOSTATIC INTOLERANCE
Dizziness, lightheadedness, or fatigue on standing

EXERCISE INTOLERANCE
Rapid heart rate, shortness of breath, or exhaustion with exertion

WHY SYMPTOMS OCCUR DESPITE "NORMAL" TESTS

MICROCIRCULATION & ENDOTHELIAL DYSFUNCTION
Impaired blood flow at the capillary level

IMPAIRED OXYGEN EXTRACTION
Cells cannot utilize oxygen efficiently

MITOCHONDRIAL DYSFUNCTION
Reduced cellular energy production

AUTONOMIC DYSFUNCTION
Abnormal regulation of heart rate & breathing

PERSISTENT INFLAMMATION
Immune activation affecting multiple organs

PSYCHOLOGICAL MANIFESTATIONS

Emotional symptoms are real—and must be understood in context.

ANXIETY

Worry, panic, health anxiety, feeling on edge

DEPRESSION

Low mood, hopelessness, loss of interest or pleasure

COGNITIVE IMPACT

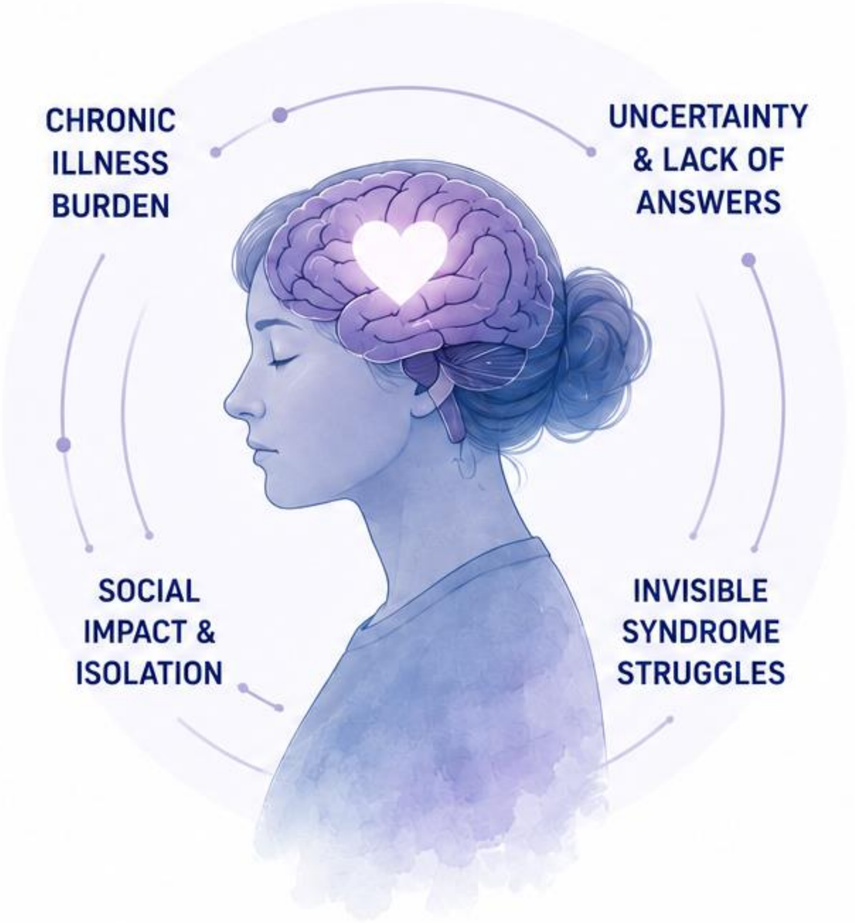
Brain fog, poor concentration, memory problems

EMOTIONAL DYSREGULATION

Mood swings, irritability, overwhelm, low frustration tolerance

GRIEF & IDENTITY LOSS

Grieving health, lost roles, and future uncertainty



POST-VIRAL SEQUELAE: A NATUROPATHIC CASE STUDY

Male, early–mid 40s • Competitive amateur cyclist • High-stress leadership role

18 MONTHS

Recurrent bacterial sinusitis

5 COURSES

Antibiotics in 6 months

FEB 2025

High-fever flu + extreme ski race during recovery

MAY 2025

Persistent multisystem symptoms

Systemic warmth • PEM
Cognitive fatigue • Exercise intolerance
Anxiety & depression

Context: overtraining • occupational stress • repeated viral exposures • possible mould exposure

SpO_2 98% • Pulse 66 • Temp 36.8°C • BP 135/85 • Phase angle 5.9

Family physician diagnosis: Long COVID / post-viral sequelae with PEM and autonomic dysregulation

FOUR INTERSECTING SYSTEMS UNDER STRESS

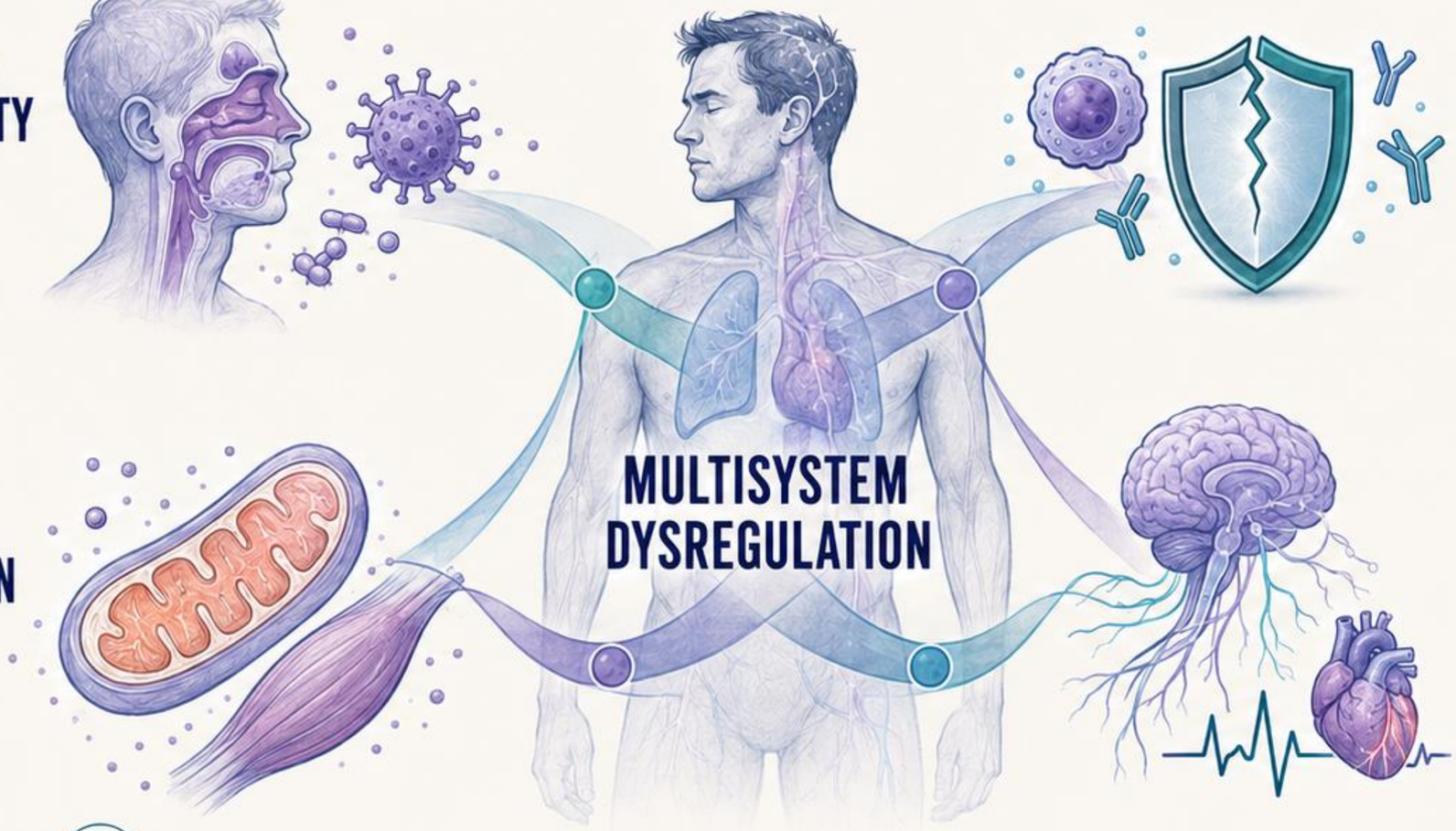
One patient, multiple interacting contributors

UPPER AIRWAY & MUCOSAL IMMUNITY

- Recurrent infections
- antibiotic exposure
- sinonasal microbiome disruption

SYSTEMIC IMMUNE REGULATION

- Possible persistent immune activation
- systemic warmth
- malaise



MITOCHONDRIAL & METABOLIC FUNCTION

- Reduced energy availability
- exercise intolerance
- PEM

AUTONOMIC NERVOUS SYSTEM REGULATION

- Sympathetic activation
- ↓ HRV
- tachycardia
- disrupted sleep

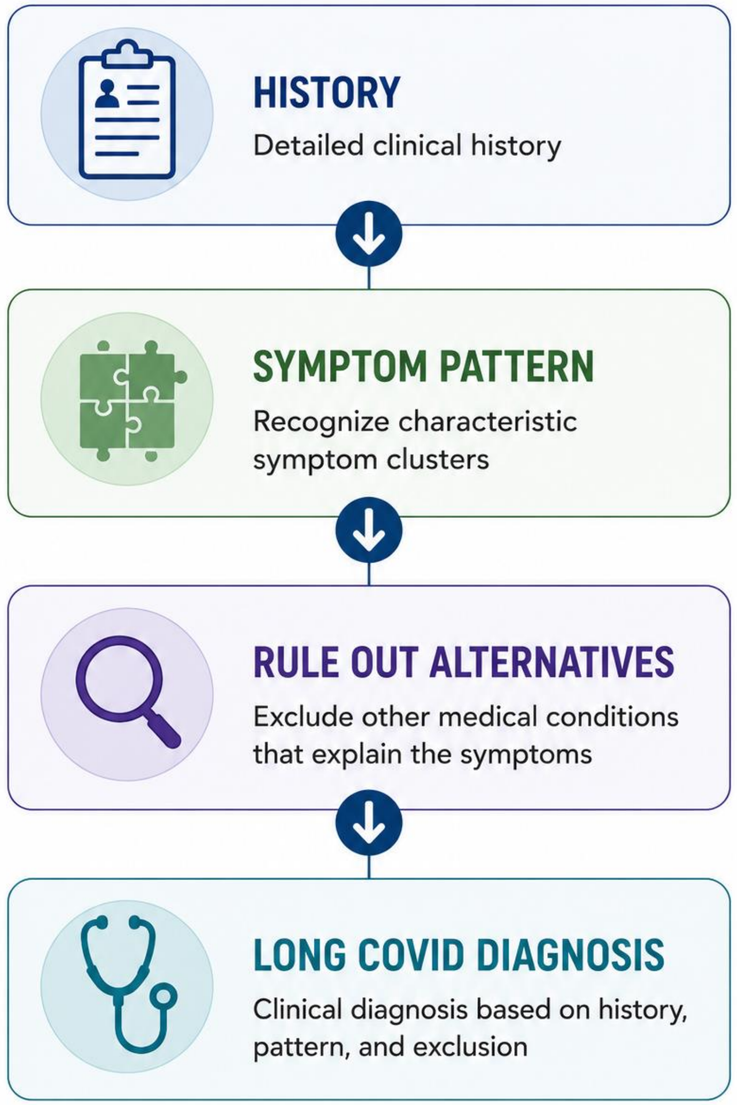
Converging context: overtraining • repeated infection • occupational stress • treatment burden

Clinical synthesis—not a confirmed causal pathway

Diagnostic Approach

DIAGNOSING LONG COVID: A CLINICAL DIAGNOSIS

There is currently no single diagnostic test for Long COVID.



HISTORY: THE MOST IMPORTANT DIAGNOSTIC TOOL

The history provides more diagnostic information than any laboratory test.

TIMELINE
- Onset after COVID-19
- Course: continuous, fluctuating, relapsing
- Improve / worsen / plateau

COVID-19 HISTORY
- Severity of acute illness
- Hospitalization / ICU
- Vaccination status
- Reinfection

SYMPTOMS
- Fatigue & PEM
- Cognitive issues
- Autonomic symptoms
- GI, respiratory, pain, sleep, mood

TRIGGERS
- Physical exertion
- Stress
- Infection
- Overstimulation

RECOVERY PATTERN
- Post-exertional malaise
- Delayed symptom flares
- Relapses & setbacks
- What helps vs. harms

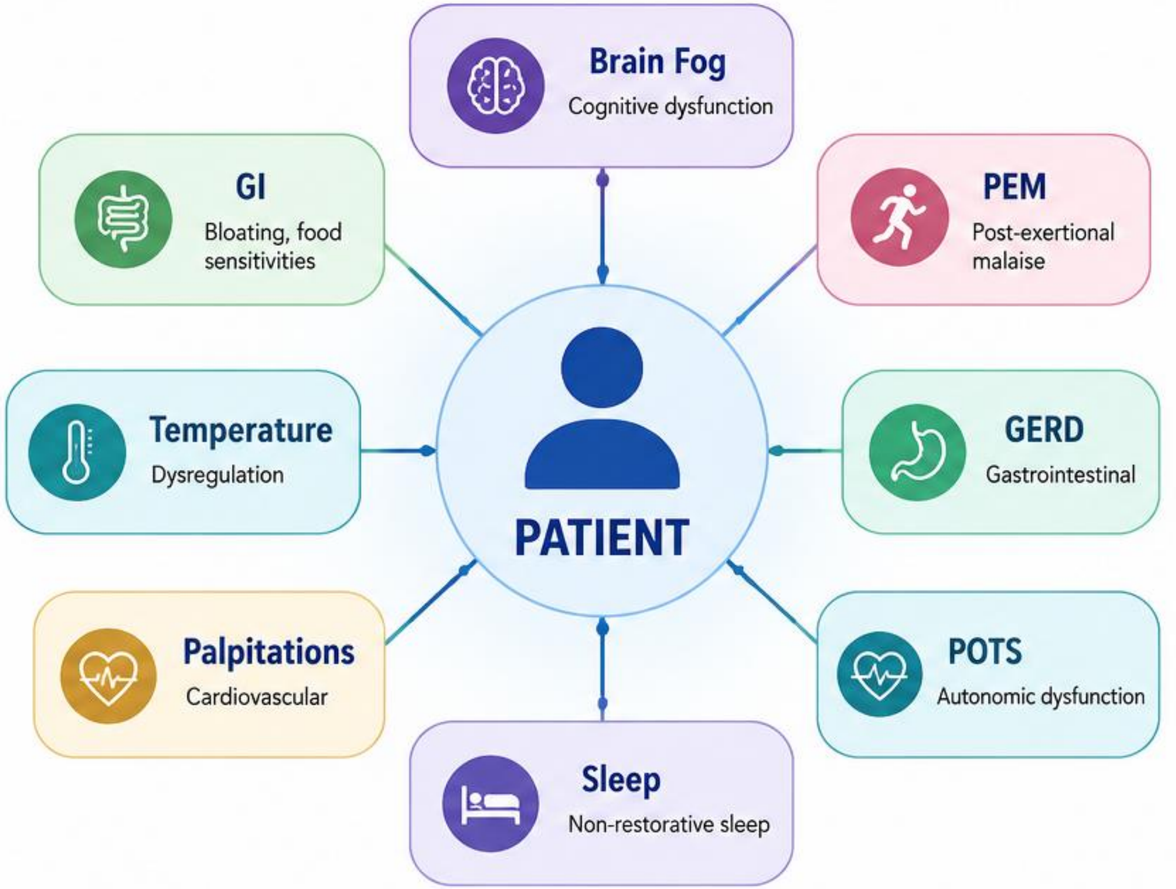
FUNCTION & IMPACT
- Work / school ability
- Daily activities
- Exercise tolerance
- Quality of life

A thorough, empathetic history builds trust and reveals the full clinical picture.

It is the foundation of accurate diagnosis and effective care.

IDENTIFYING SYMPTOM CLUSTERS

Don't count symptoms—recognize patterns.



RECOGNIZABLE SYMPTOM CLUSTERS

Neurological	• Brain fog • Headaches • Word-finding difficulty
Autonomic	• Orthostatic dizziness • Palpitations • Temperature intolerance
Fatigue & PEM	• Profound fatigue • Post-exertional malaise • Sleep disturbance
Cardiopulmonary	• Exercise intolerance • Shortness of breath • Chest discomfort
Gastrointestinal	• GERD • Bloating / constipation • Food sensitivities
Psychological	• Anxiety / depression • Mood changes • Cognitive overload

It's not about counting individual symptoms — it's about recognizing the pattern.

Symptom clusters reveal the underlying clinical syndrome and guide effective care.

PHYSICAL EXAM: TARGET THE PATIENT'S SYMPTOMS

Find red flags, alternative diagnoses and treatable comorbidities

ORTHOSTATIC ASSESSMENT

1 — 2 — 3

SUPINE REST 5–10 MIN
HR • BP • symptoms

STAND SAFELY
Repeat at 1, 3, 5 & 10 min

DOCUMENT
Symptoms • HR change • BP response

A POTS PATTERN REQUIRES

- Orthostatic symptoms
- Sustained HR rise within 10 min: ≥30 bpm adults • ≥40 bpm ages 12–19
- No sustained BP fall of ≥20 mmHg systolic or ≥10 mmHg diastolic

TARGETED EXAM

Cardiovascular & respiratory

Neurological & cognitive

Musculoskeletal, gait & strength

General appearance, skin & perfusion

Normal findings do not rule out Long COVID • Examination and testing are guided by symptoms and red flags

LAB TESTING: ANSWER A CLINICAL QUESTION

No laboratory panel confirms or excludes Long COVID

BASIC EVALUATION

Selected from history, examination & prior results

- CBC
- Electrolytes, kidney & liver function
- TSH
- Glucose or HbA1c
- Urinalysis

SYMPTOM-DIRECTED

Order when findings could change management

- Iron studies • B12 • folate
- ECG • troponin • BNP
- CRP, ESR or autoimmune tests
- CK • chest imaging • PFTs
- D-dimer only when VTE is suspected

SPECIALIST / RESEARCH

Not routine Long COVID testing

- Specialist endocrine, immune or coagulation studies
- Cytokines, metabolomics & microclot assays
- Broad viral panels & commercial microbiome tests

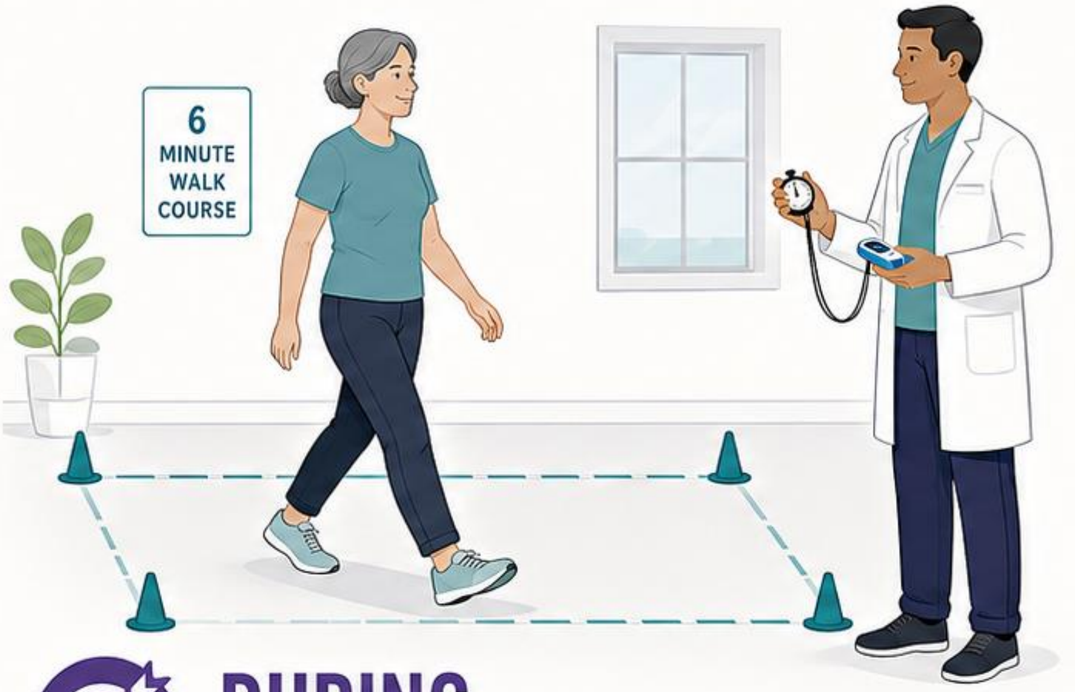
Test for alternative diagnoses and treatable comorbidities—not to prove Long COVID

6-MINUTE WALK TEST: SELECTED USE

A functional assessment—not a post-exertional malaise test

BEFORE

- Confirm a clinical reason
- Screen cardiopulmonary red flags
- Check baseline HR, BP, SpO_2 & symptoms
- Discuss PEM/PESE risk and patient preference



DURING

- Use a standardized, self-paced protocol
- Record distance, HR, SpO_2 & symptoms
- Allow rest; stop for concerning symptoms

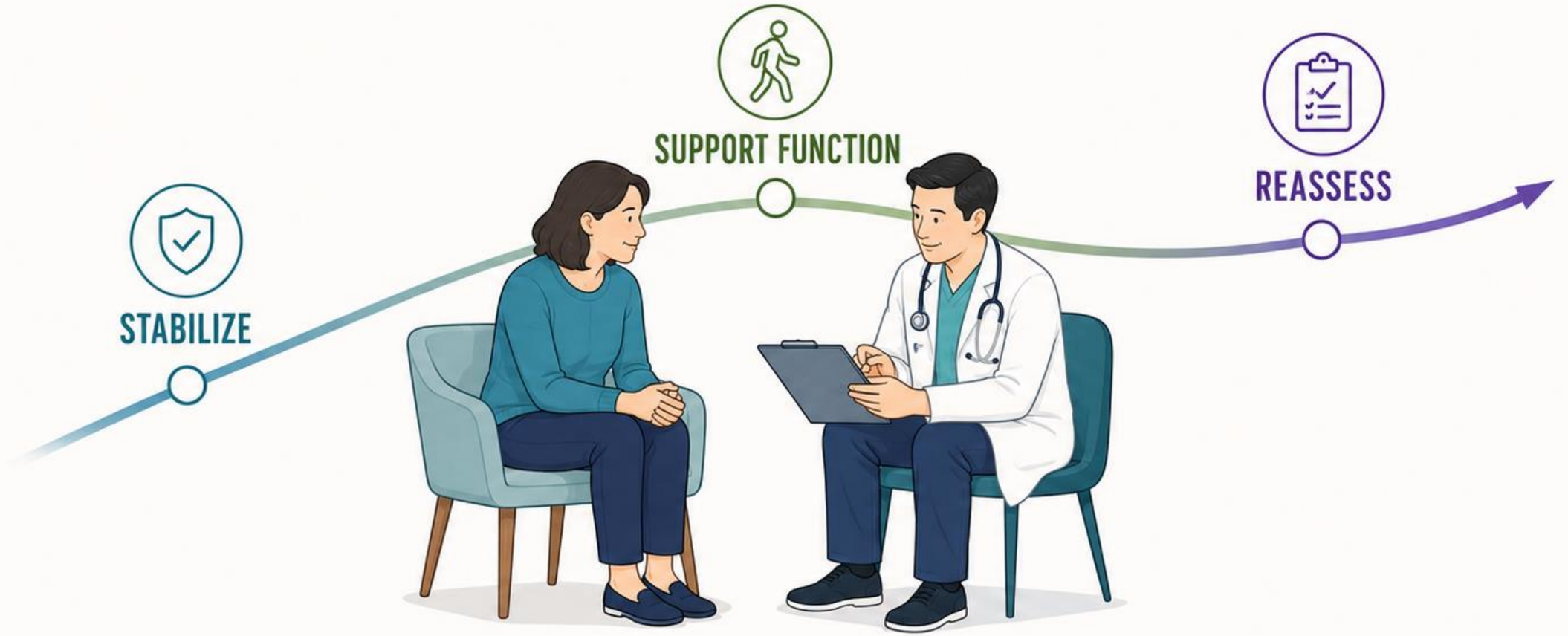
AFTER

- Document the immediate response
- Ask about delayed worsening over 12–48 hours
- Interpret as functional data—not diagnosis

Not appropriate for every patient • Does not confirm or exclude Long COVID or PEM

TREATMENT & REHABILITATION

Individualized • symptom-directed • explicitly PEM-aware



Care begins with the patient's priorities and current capacity

EVIDENCE-INFORMED INTERVENTIONS

Current evidence for pharmacologic, nutraceutical, and integrative therapies in Long COVID.

KEY MESSAGE: Evidence is evolving. Use an individualized approach, start low, go slow, and monitor response and tolerance.

IMMUNE & INFLAMMATION

- NSAIDs (short-term)
- Low-dose naltrexone (LDN)
- Colchicine (selected patients)
- Anti-histamines & mast cell stabilizers
- Omega-3 fatty acids, curcumin

EVIDENCE STRENGTH

●●○○○

Emerging

AUTONOMIC DYSFUNCTION

- Fludrocortisone
- Midodrine
- Beta-blockers
- Ivabradine (selected patients)
- Increased fluids & salt, compression garments
- Autonomic rehabilitation

EVIDENCE STRENGTH

●●●○○

Moderate

MITOCHONDRIAL & ENERGY SUPPORT

- Coenzyme Q10
- Acetyl-L-carnitine
- PQQ
- NAD+ precursors (NMN, NR)
- B vitamins (B1, B6, B12), magnesium
- Antioxidants (NAC, ALA)

EVIDENCE STRENGTH

●●○○○

Emerging

NEUROCOGNITIVE & MOOD SUPPORT

- Omega-3 fatty acids
- Phosphatidylserine
- Magnesium (glycinate, threonate)
- Saffron, Rhodiola
- Adaptogens (ashwagandha, bacopa)
- TCA/SNRI or gabapentinoids for neuropathic pain

EVIDENCE STRENGTH

●●○○○

Emerging

ANTIVIRAL & ANTIMICROBIAL

- Antivirals (e.g., famciclovir, valacyclovir) – selected patients
- Ivermectin (limited evidence, use with caution)
- Disinfectants (e.g., niclosamide) – early research
- Targeted antimicrobial therapy if indicated

EVIDENCE STRENGTH

●○○○○

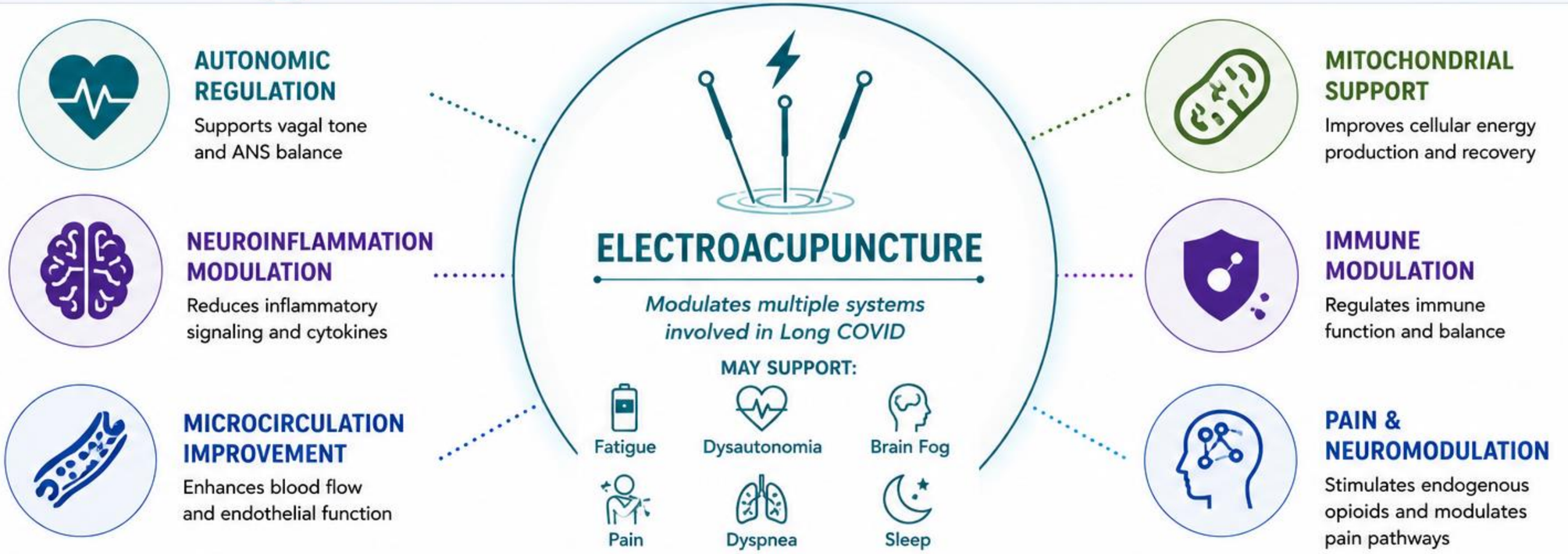
Limited

Sources: See references slide.

INTEGRATIVE THERAPIES

Emerging evidence in Long COVID

KEY MESSAGE: Promising adjuncts that may support recovery by targeting multiple systems involved in Long COVID pathophysiology.



OTHER EMERGING INTEGRATIVE THERAPIES

PHOTOBIOMODULATION (RED / NEAR-INFRARED LIGHT)
Supports cellular energy and reduces inflammation

LOW-DOSE NALTREXONE (LDN)
Modulates immune function and neuroinflammation

HYPERBARIC OXYGEN THERAPY (HBOT)
Enhances oxygen delivery, reduces inflammation, and supports tissue repair

MIND–BODY MEDICINE
Reduces stress, improves autonomic balance, and supports resilience

These therapies are adjuncts to pacing, lifestyle optimization, and conventional medical care.

Conventional Management

Conventional Management

Identify the Dominant Phenotype

↓

Symptom-Directed Care

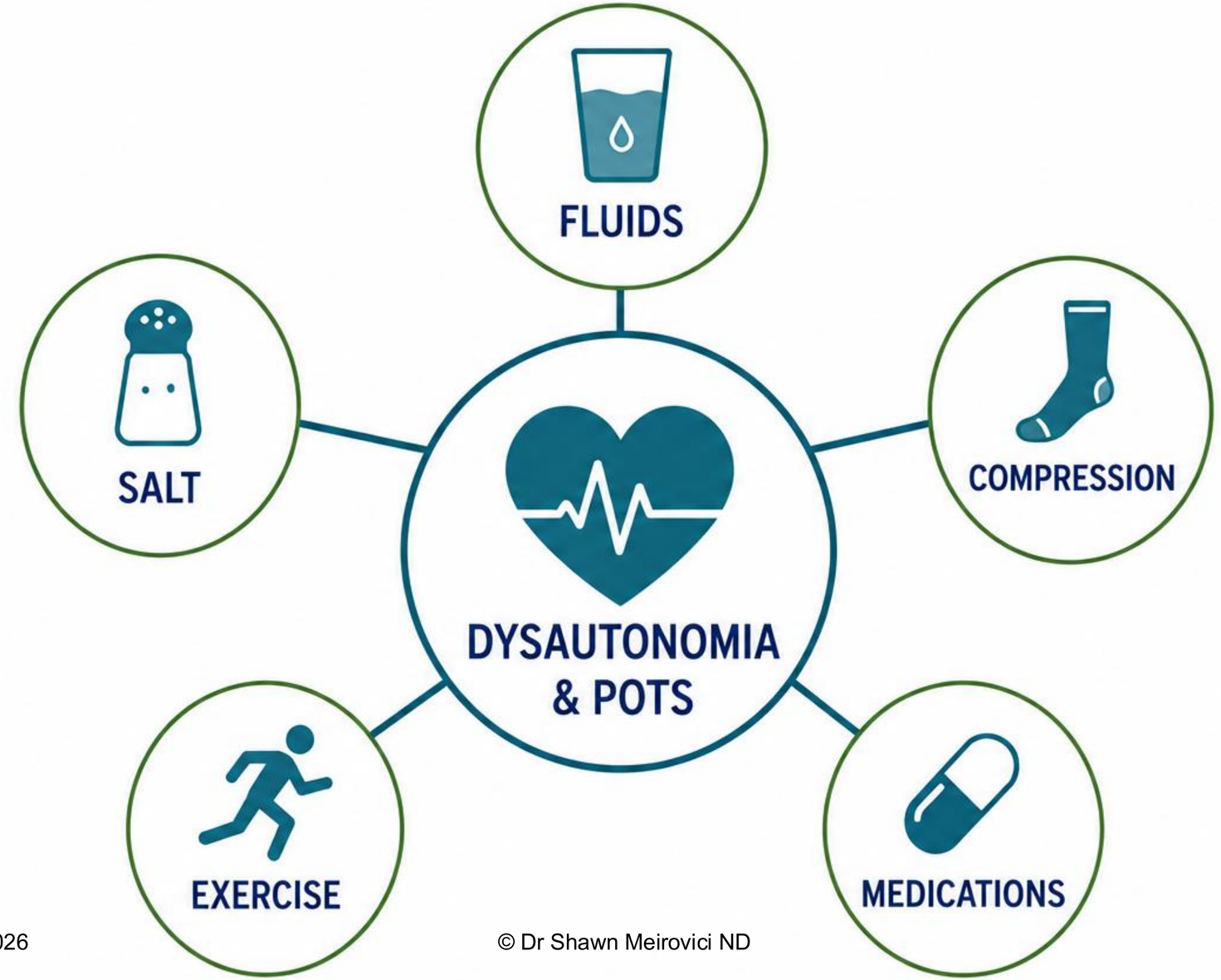
↓

Restore Function

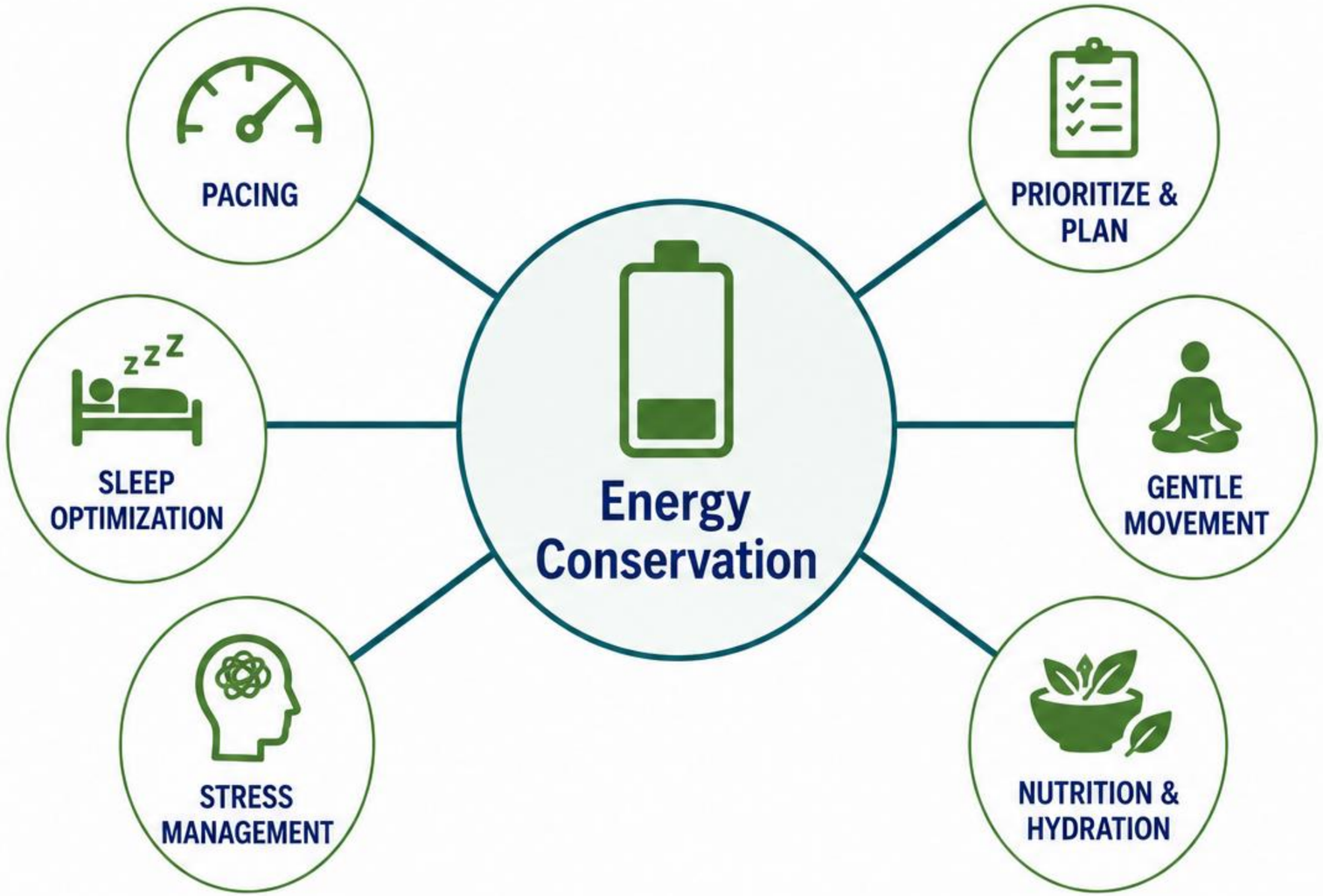
↓

Prevent Relapse

Managing Dysautonomia & POTS

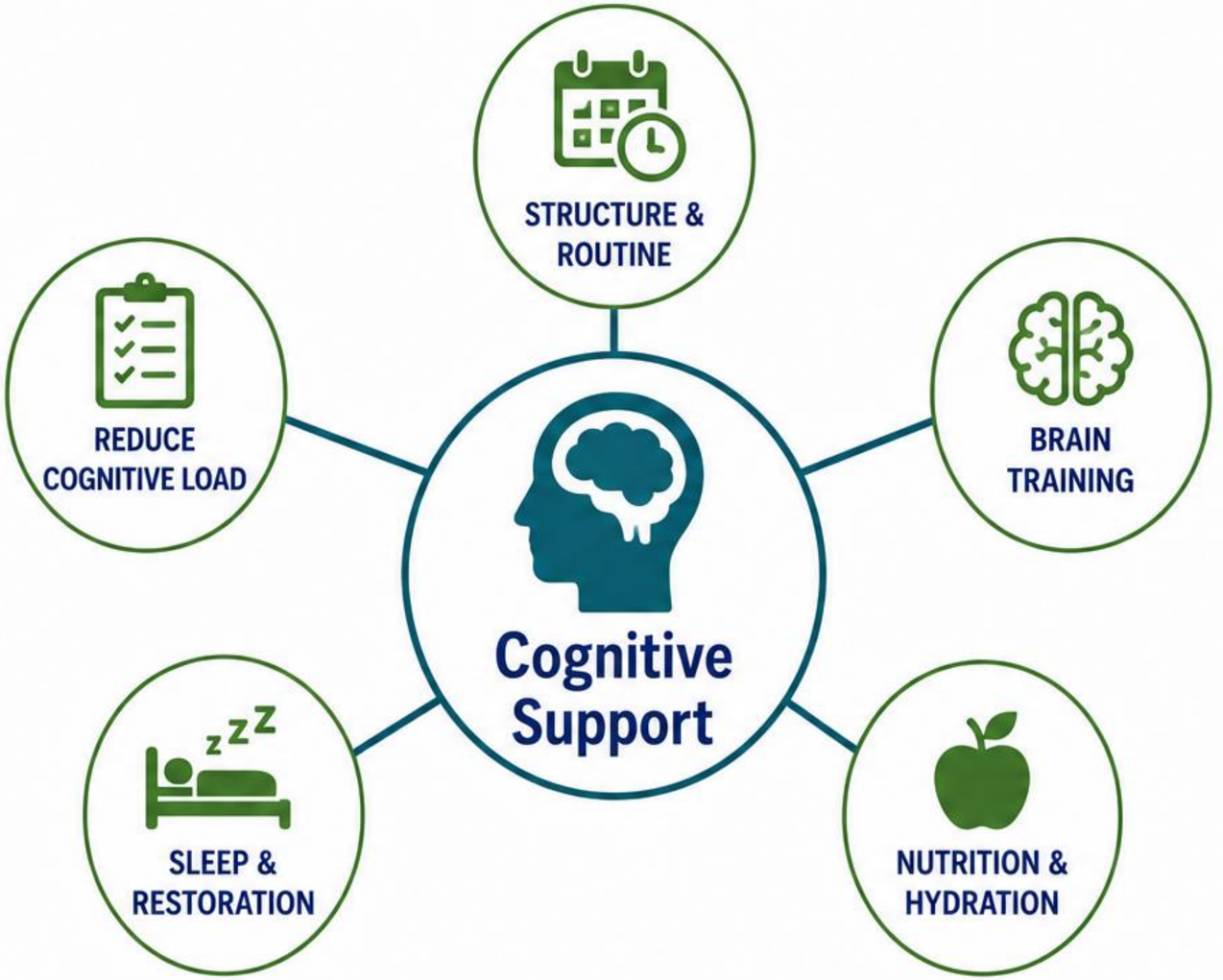


Managing Fatigue & PEM



Do less today, so you can do more tomorrow.

Managing Brain Fog & Cognitive Dysfunction



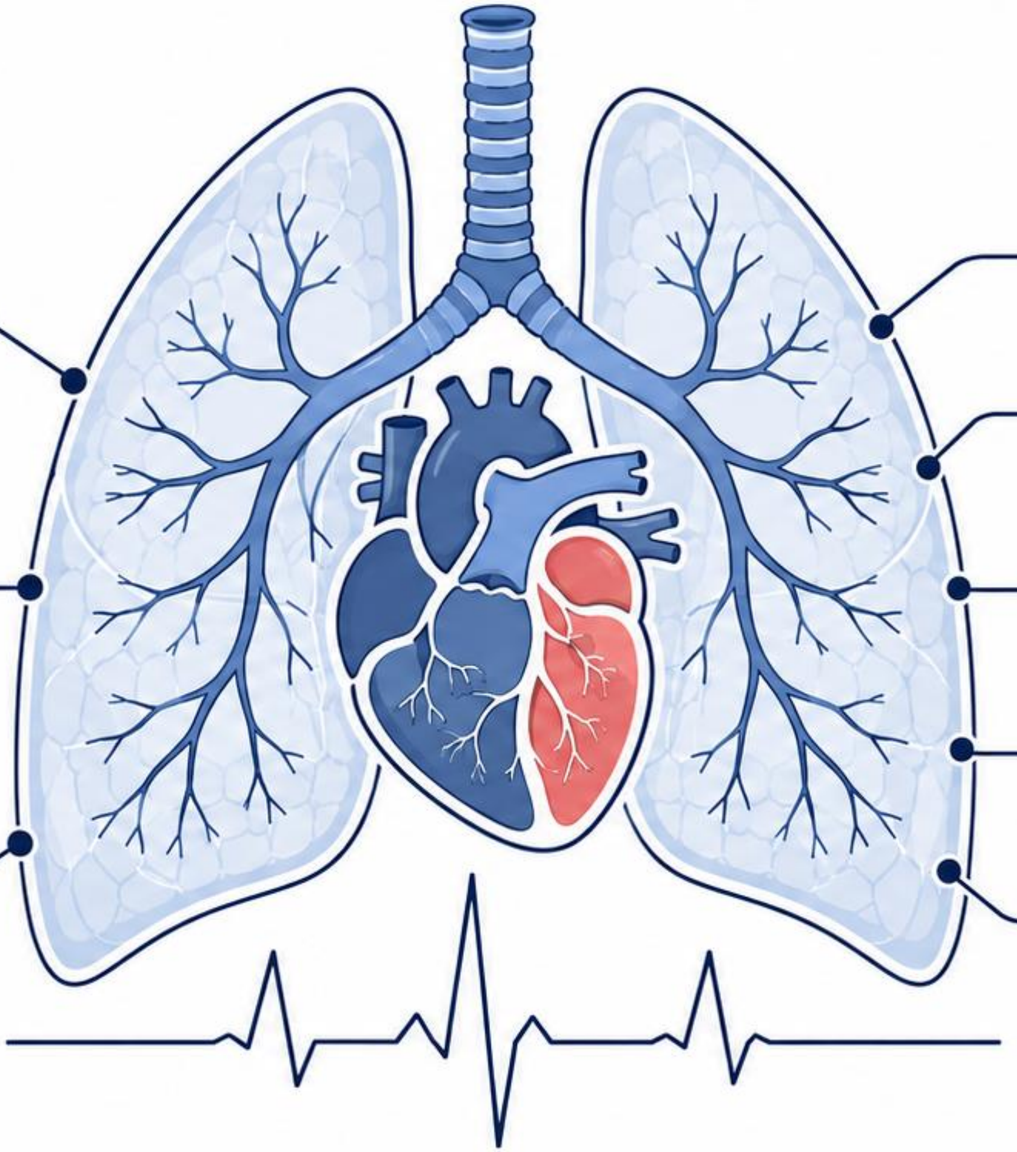
Managing Pain & Musculoskeletal Symptoms

Managing Sleep Disorders in Long COVID

Respiratory & Cardiovascular Symptoms

PERSISTENT SYMPTOMS

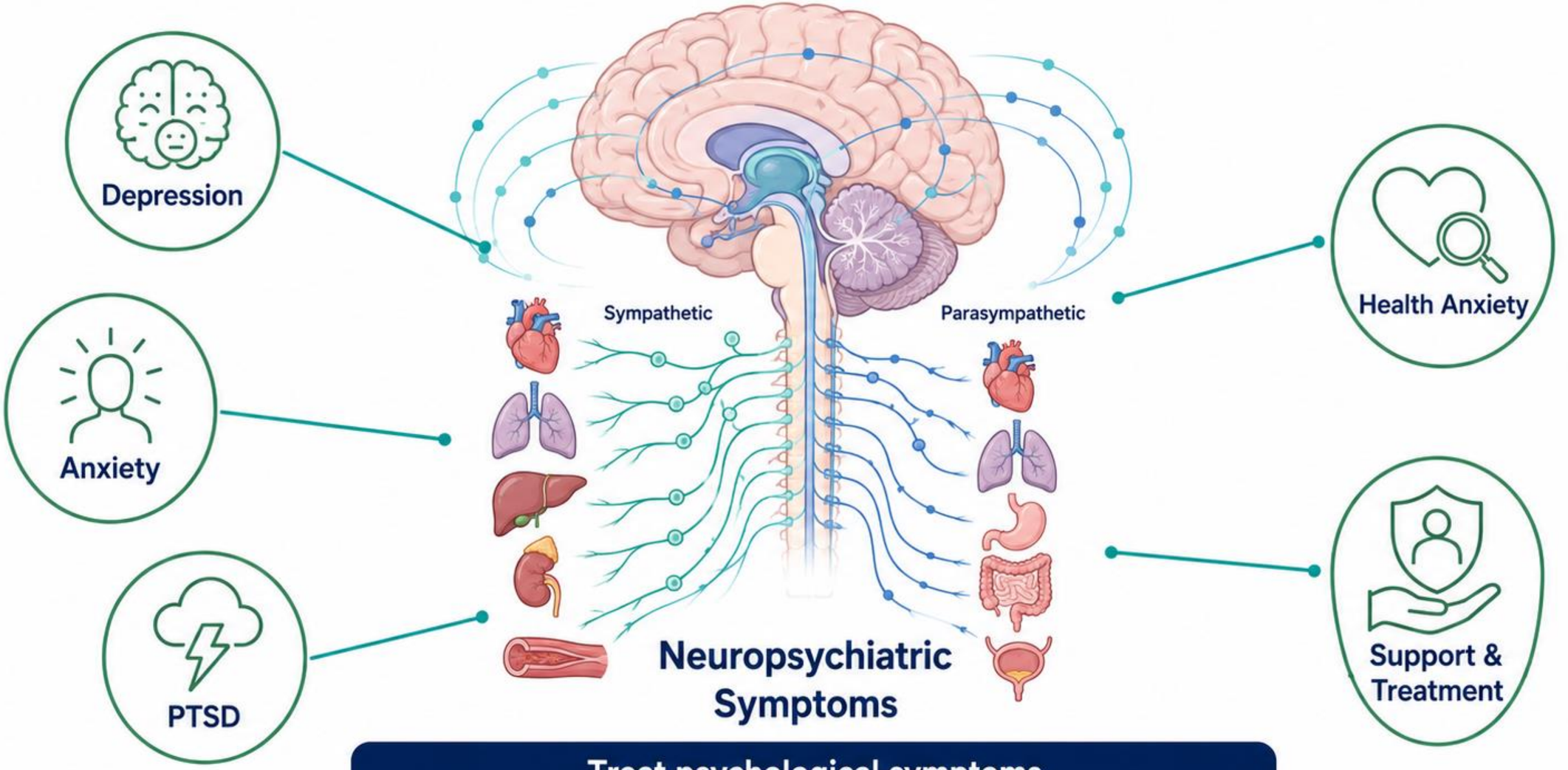
- Dyspnea
- Chest pain
- Palpitations



MANAGEMENT

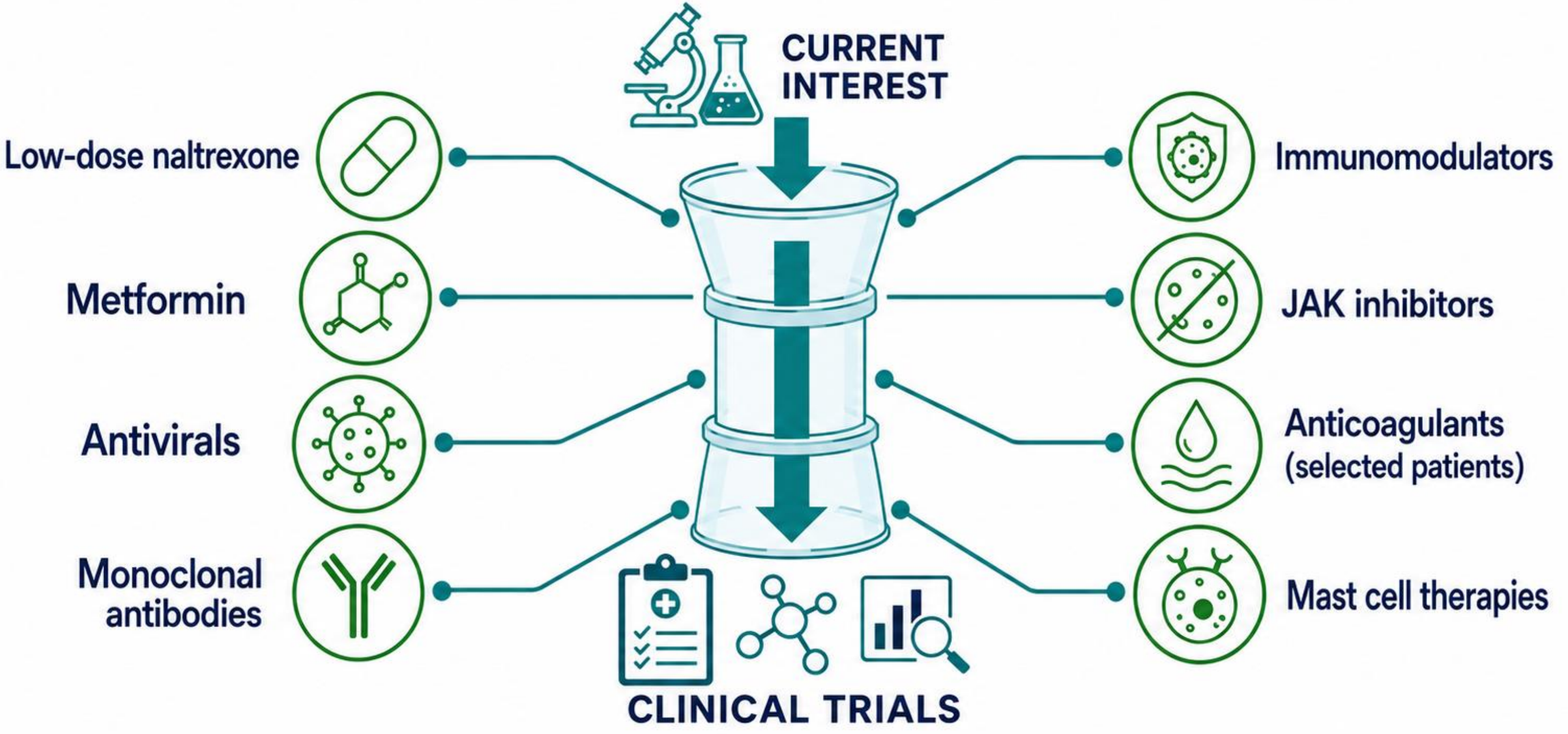
- Breathing retraining
- Pulmonary rehab
- Inhalers when indicated
- Cardiology referral
- Anticoagulation only when indicated

Managing Neuropsychiatric Symptoms



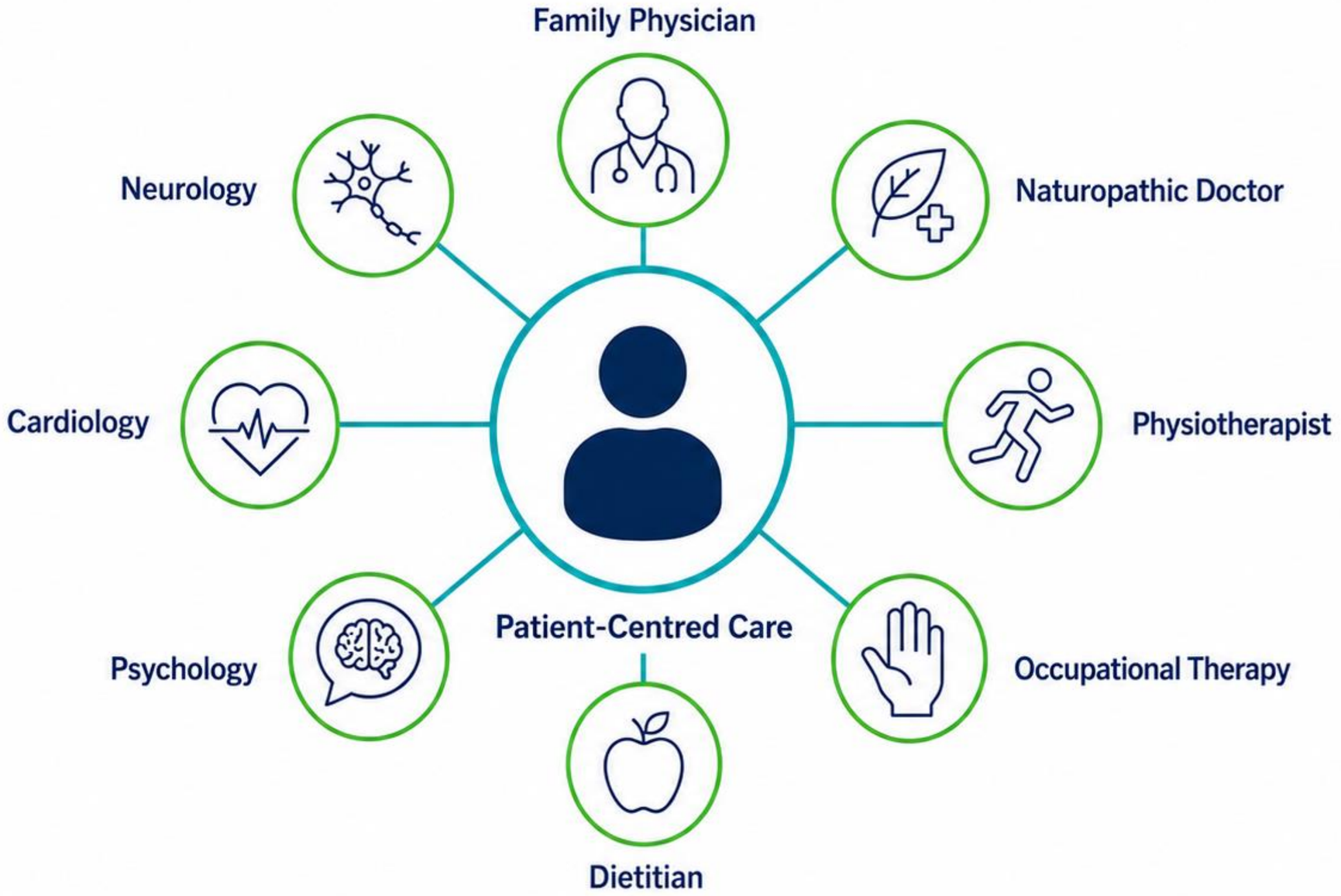
Treat psychological symptoms
↓
Without implying symptoms are psychological in origin

Emerging Pharmacologic Therapies



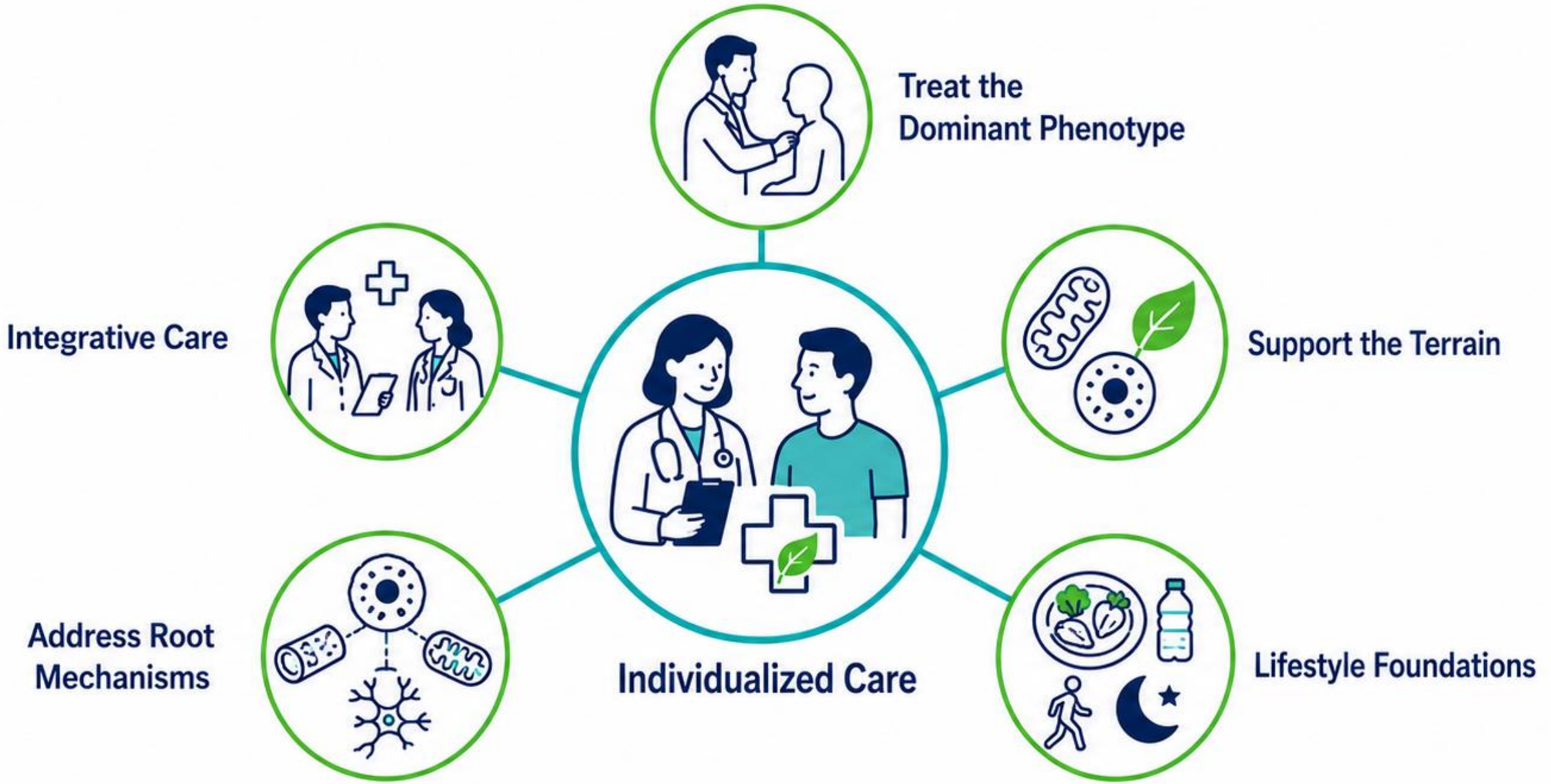
"Promising" ≠ "Established"

Multidisciplinary Care



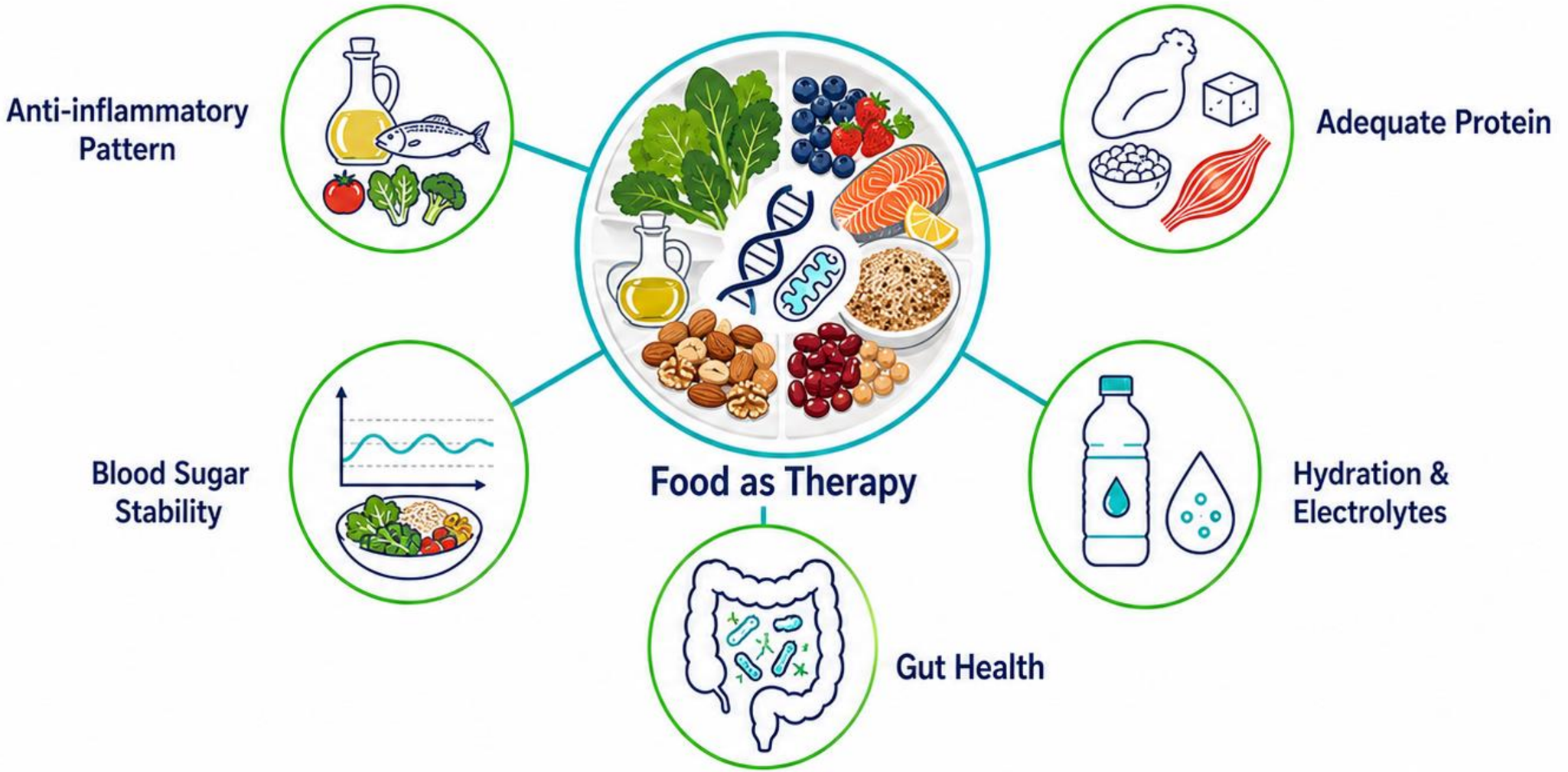
Naturopathic & Integrative Approaches

Naturopathic Principles in Long COVID



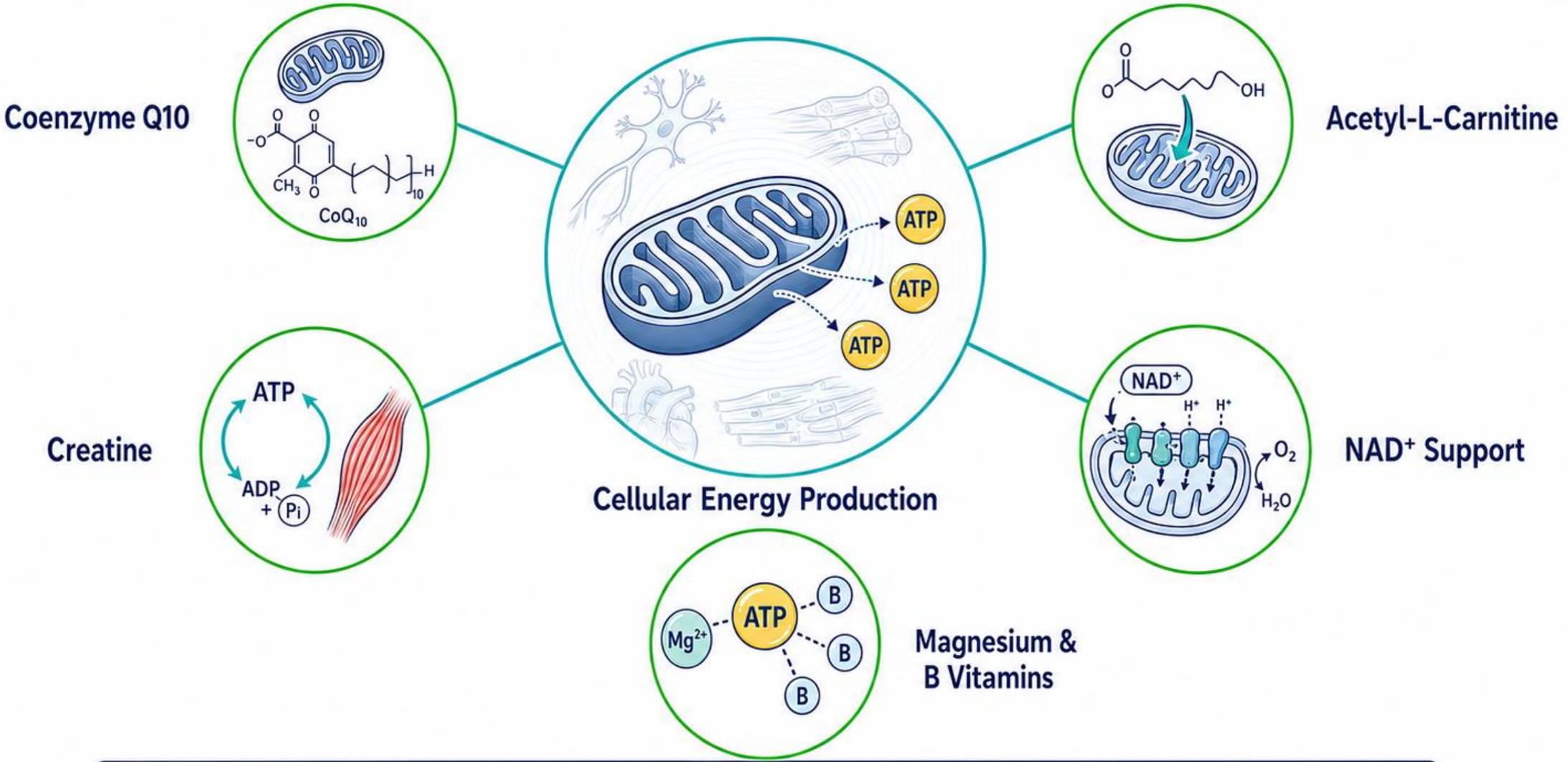
Evidence-informed naturopathic care complements multidisciplinary Long COVID management.

Nutrition as Medicine



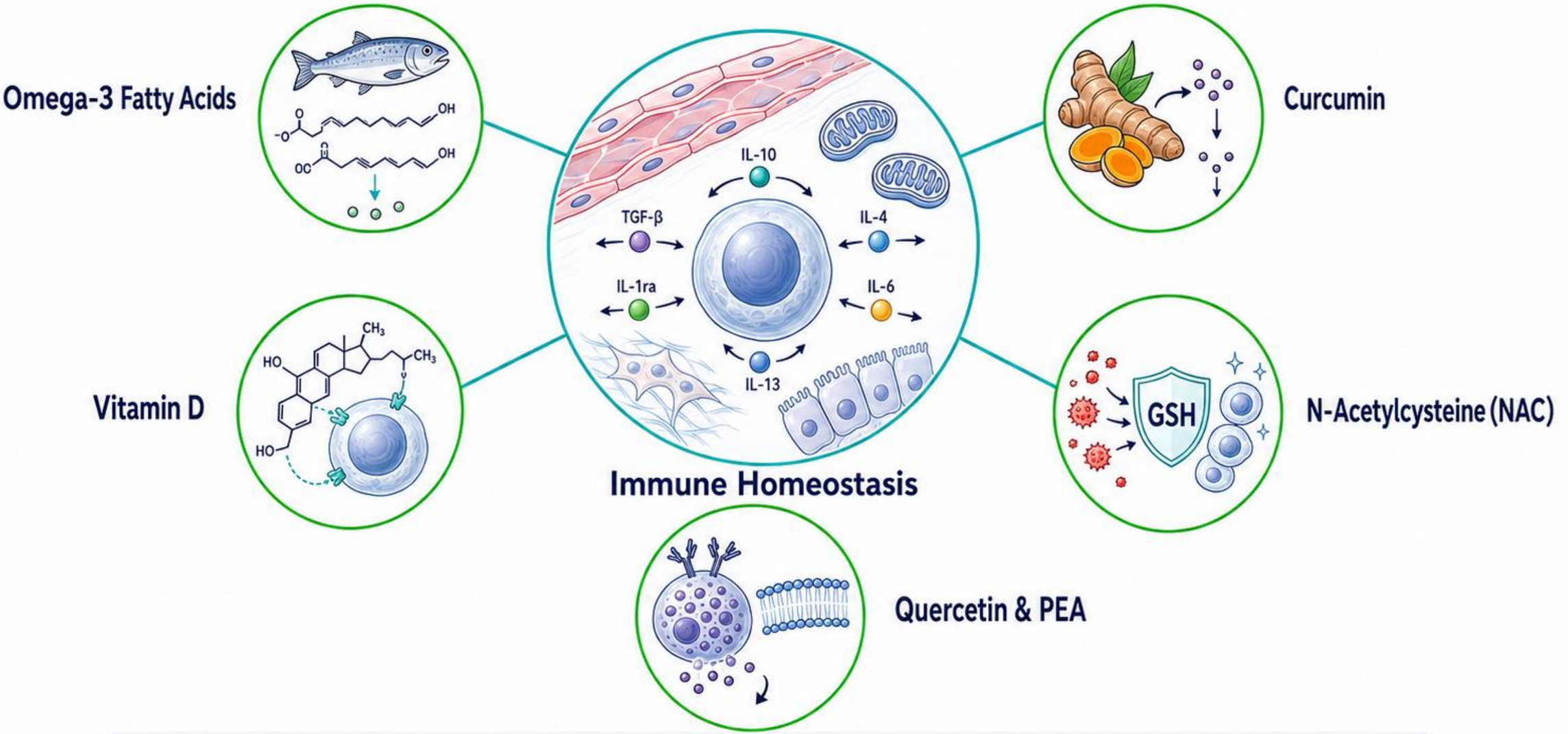
Nutrition supports recovery by reducing inflammation, supporting metabolism, and optimizing physiological resilience.

Mitochondrial & Energy Support



Optimize mitochondrial function to support ATP production, fatigue recovery, and cellular resilience.

Immune & Inflammatory Modulation

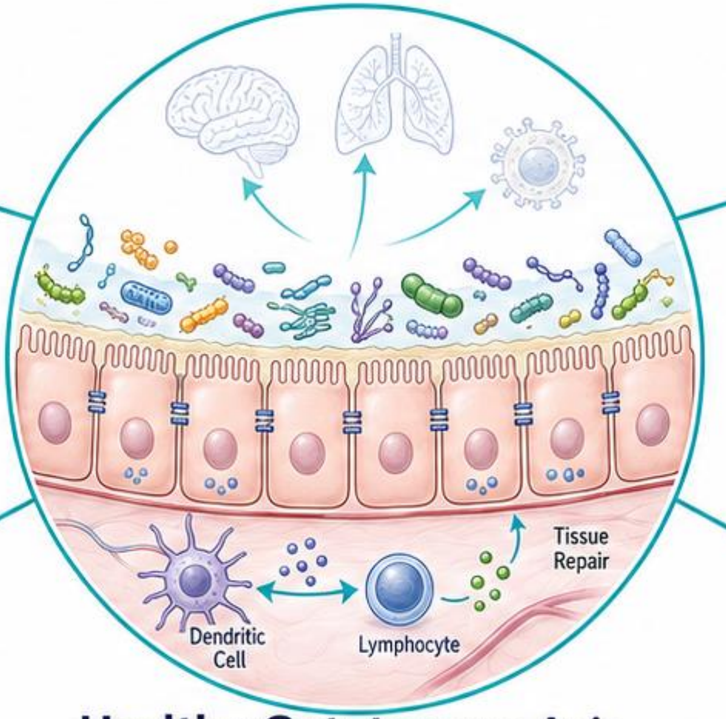


Support immune regulation and reduce chronic inflammation without suppressing normal immune function.

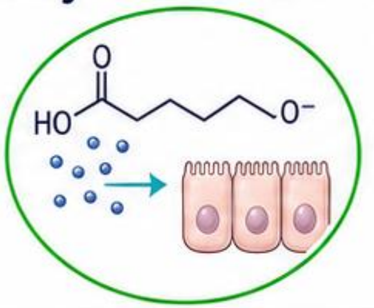
Gut Health & the Microbiome

Dietary Fiber

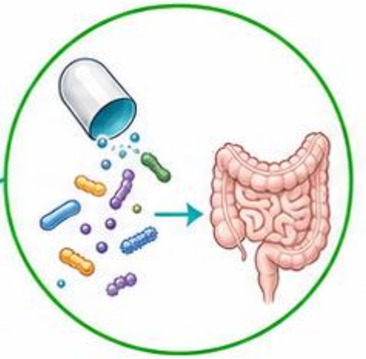
Prebiotics



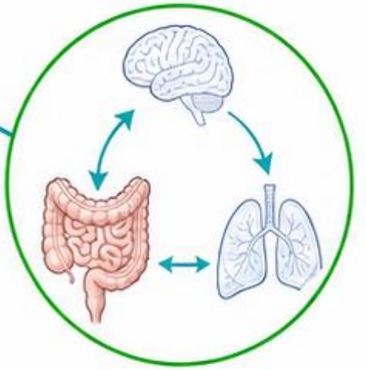
Healthy Gut–Immune Axis



Butyrate Production



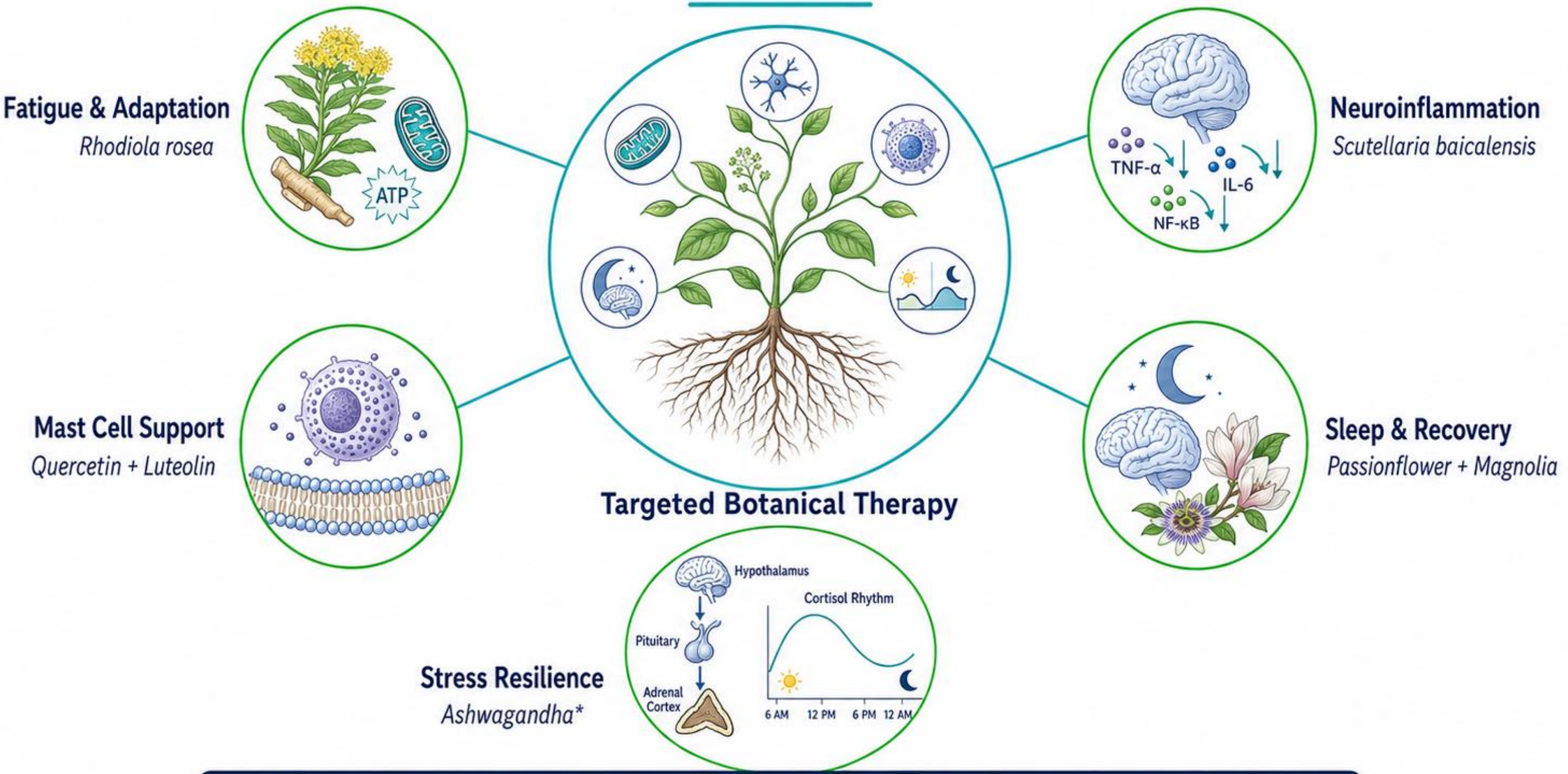
Probiotics



Gut–Brain & Gut–Lung Axis

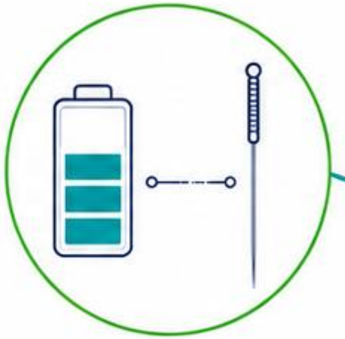
A healthy microbiome supports immune regulation, intestinal barrier function, and systemic recovery.

Botanical Medicine



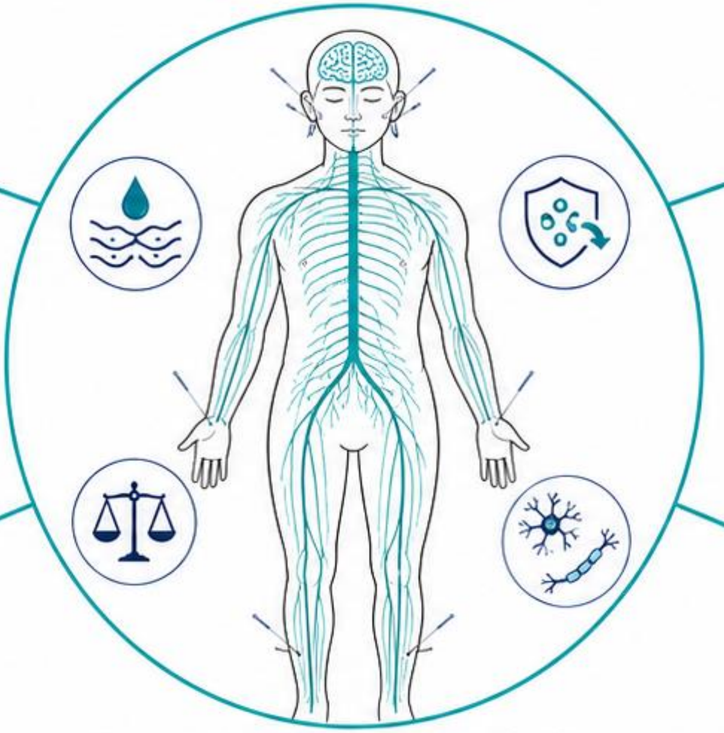
Choose botanicals based on the patient's dominant symptom pattern and underlying physiology—not simply the diagnosis of Long COVID.

Acupuncture & Physical Medicine



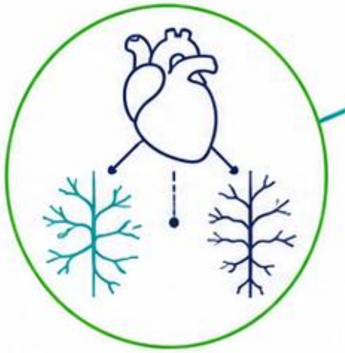
Fatigue & Energy

Autonomic regulation and energy conservation



Brain Fog & Headache

Neurovascular regulation and cognitive recovery



Dysautonomia & POTS

Autonomic balance and orthostatic symptom support

Pain & Musculoskeletal Recovery

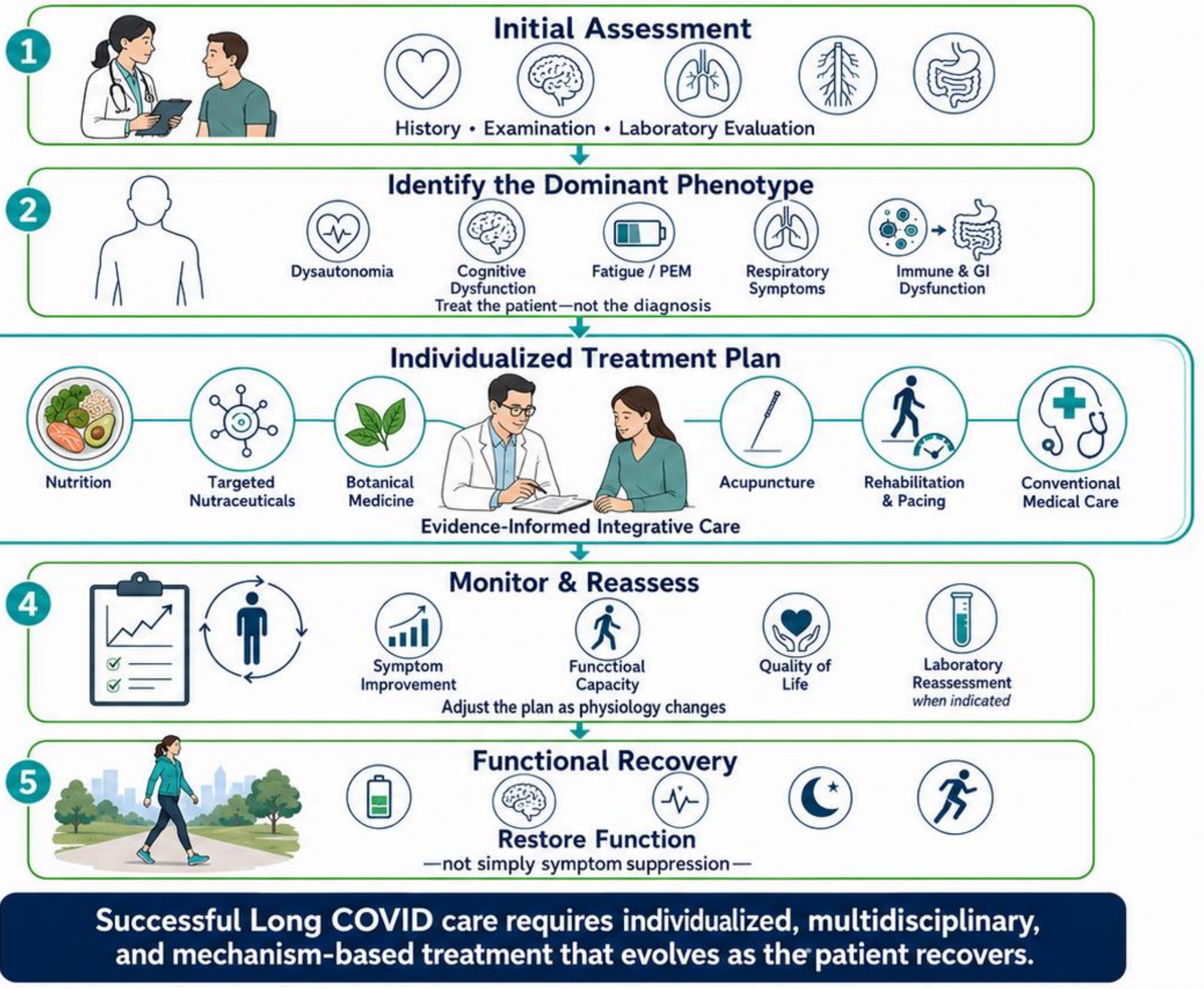
Pain modulation and restoration of movement

Sleep & Stress Regulation

Improved sleep quality and reduced sympathetic overactivity

Acupuncture and physical medicine support autonomic regulation, symptom management, and functional recovery as part of an individualized rehabilitation plan.

Putting It All Together

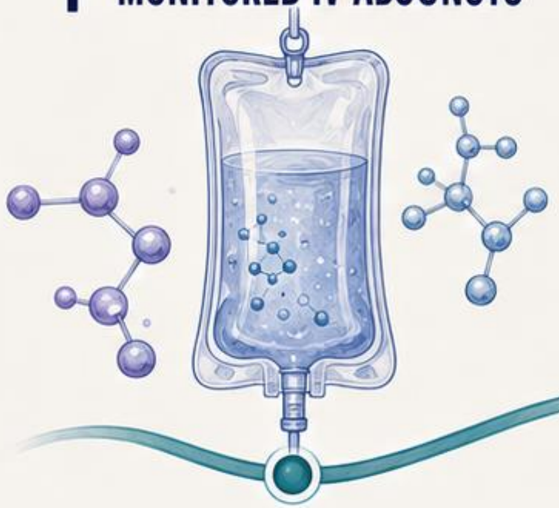


Successful Long COVID care requires individualized, multidisciplinary, and mechanism-based treatment that evolves as the patient recovers.

S.P. — LONG COVID TREATMENT PLAN

Individualized adjunctive care—not a standardized Long COVID protocol

1 MONITORED IV ADJUNCTS



Vitamin C • B-complex • magnesium • trace minerals • glutathione • NAD+

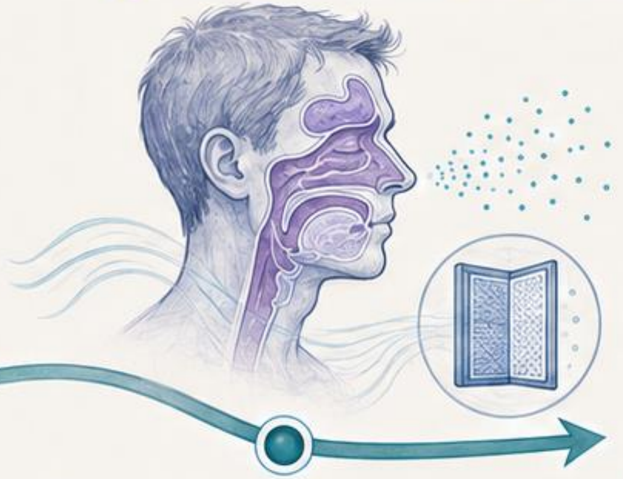
Case-specific • limited evidence

2 SYMPTOM-ORIENTED SUPPORT

Curcumin • CBD • multistrain probiotic

Adjunctive—not antiviral clearance

3 SINUS & ENVIRONMENTAL CARE



Saline/xylitol irrigation • specialist-guided nasal therapy • HEPA filtration • bedding covers

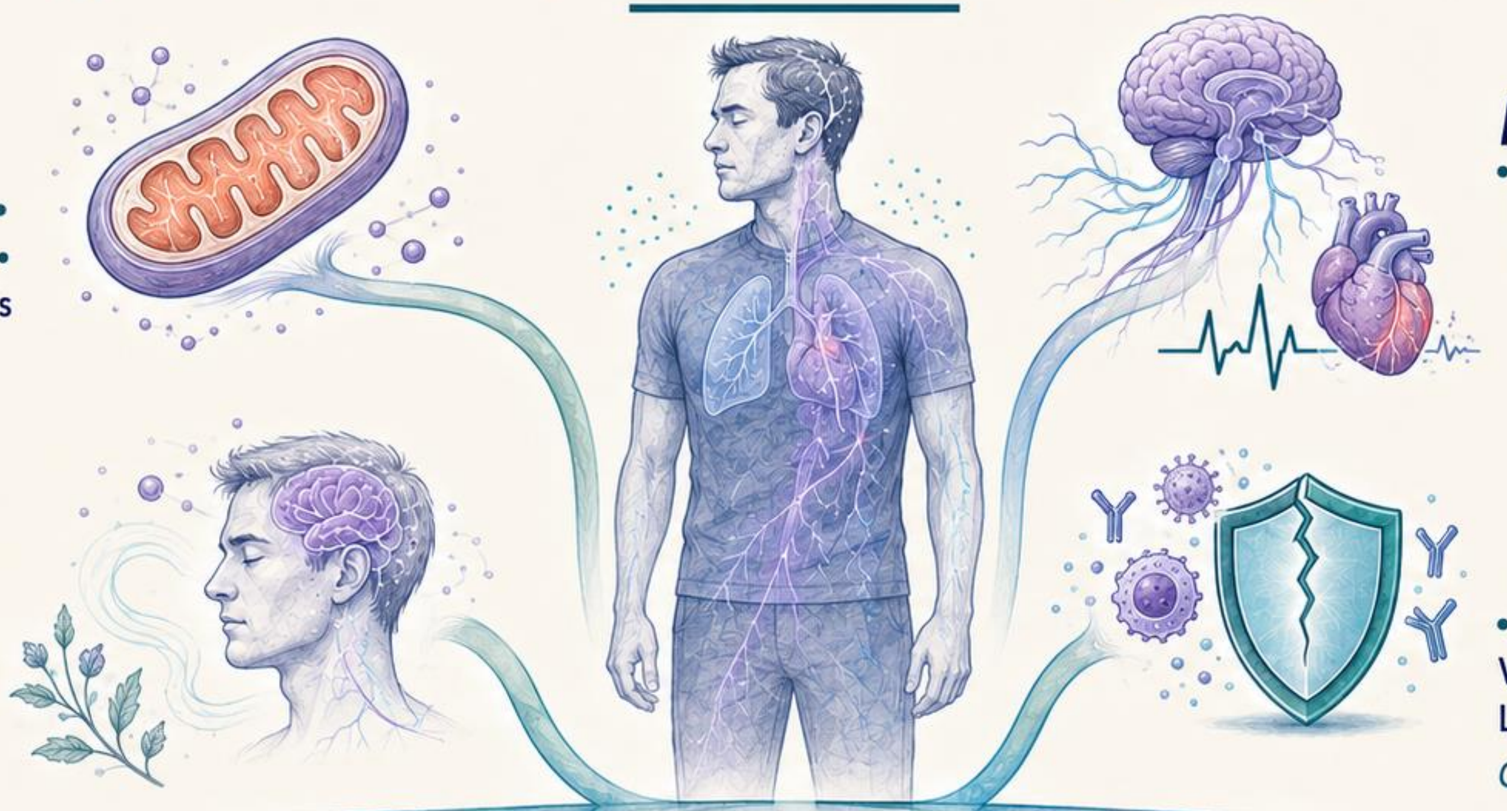
Local symptom care • environmental load reduction

GOALS: reduce symptom burden • support function • reassess response

Clinician-supervised • introduced in stages • monitored for benefit and harm

TARGETED ORAL PROTOCOL

Support the dominant phenotype • introduce gradually • reassess



ENERGY & CELLULAR SUPPORT

CoQ10 • acetyl-L-carnitine • alpha-lipoic acid • omega-3s

AUTONOMIC SUPPORT

Magnesium • selected botanical support

NEUROCOGNITIVE & MOOD

L-theanine • calming supports

IMMUNE FOUNDATION

Vitamin D based on status • LDN consideration

Off-label • clinician-directed

FOUNDATION

Pacing | energy conservation | HRV as context | breathing/ mindfulness | work modification

Case-specific adjunctis—not a standardized Long COVID protocol

Key Takeaways

Long COVID is a Biological Illness

Validated by rapidly evolving scientific evidence.

Integrate Conventional & Naturopathic Care

Collaboration improves outcomes.

The Goal is Functional Recovery

Quality of life is the primary outcome.

Treat the Individual, Not the Diagnosis

Identify the dominant phenotype.

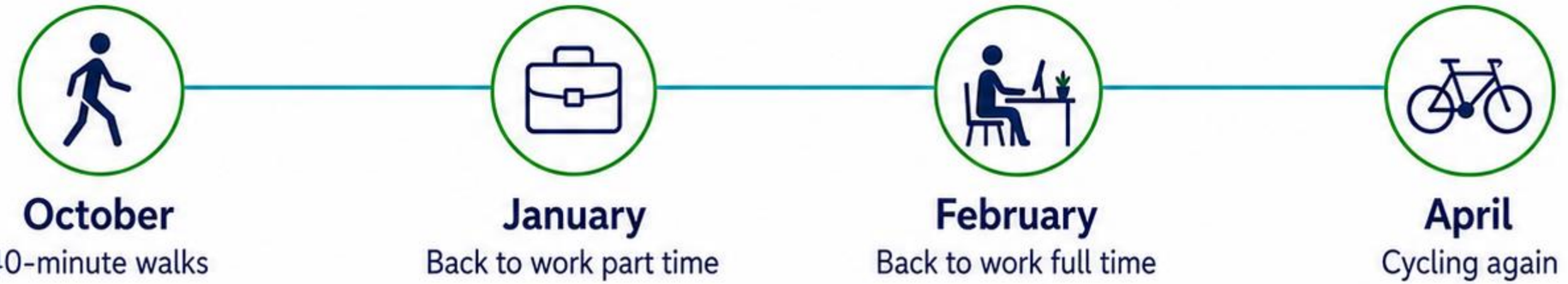
Recovery Requires Reassessment

Adapt treatment as physiology changes.

“By the end of February, I was back to work full time. In April, I started riding my bike again and felt normal, although deconditioned.

POTS, fatigue, brain fog, insomnia and the other symptoms had all gone into remission.

I’m still cautiously—but optimistically—increasing my activity.



Thank You

Dr. Shawn N.D.

PHYSIO-LOGIC / TORONTO KIDS HEALTH