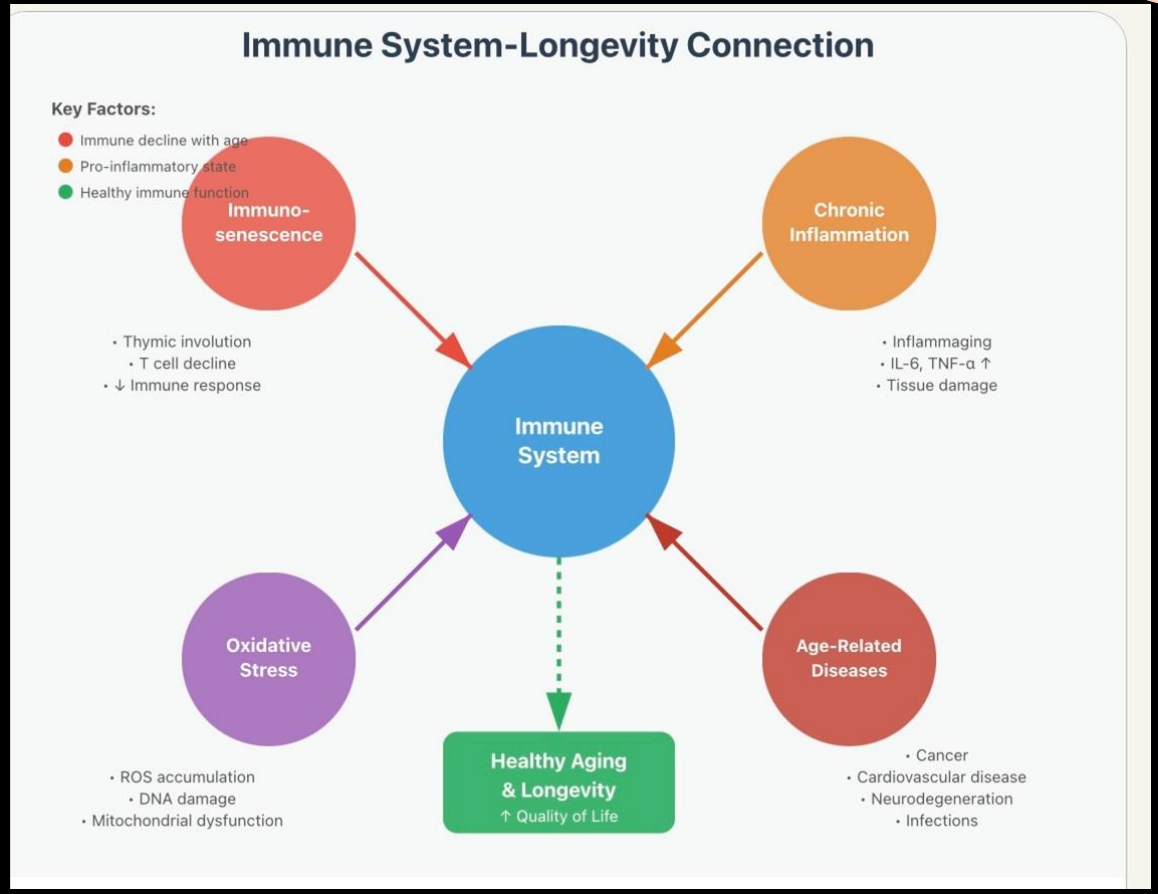
The Immune Longevity Connection

Dr. Len Brancewicz & Dr. Tracey Stroup



DISCLAIMER

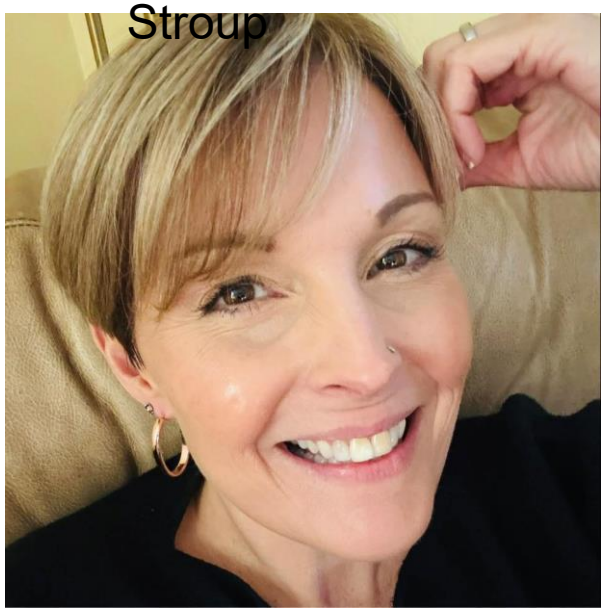
- The information, comments, and opinions expressed in this presentation are those of the speaker based on their own clinical experience and interpretation of the literature and for educational purposes only.

- Practitioners should evaluate the information, comments, and opinions using their own expertise coupled with an assessment for each patient.

- Nothing in this presentation is intended to diagnose, treat, prevent or cure any disease. This presentation is for informational and educational purposes.

Dr. Len Brancewicz

Dr. Tracey Stroup



Who We Are?

OBJECTIVES & LEARNING GOALS

01

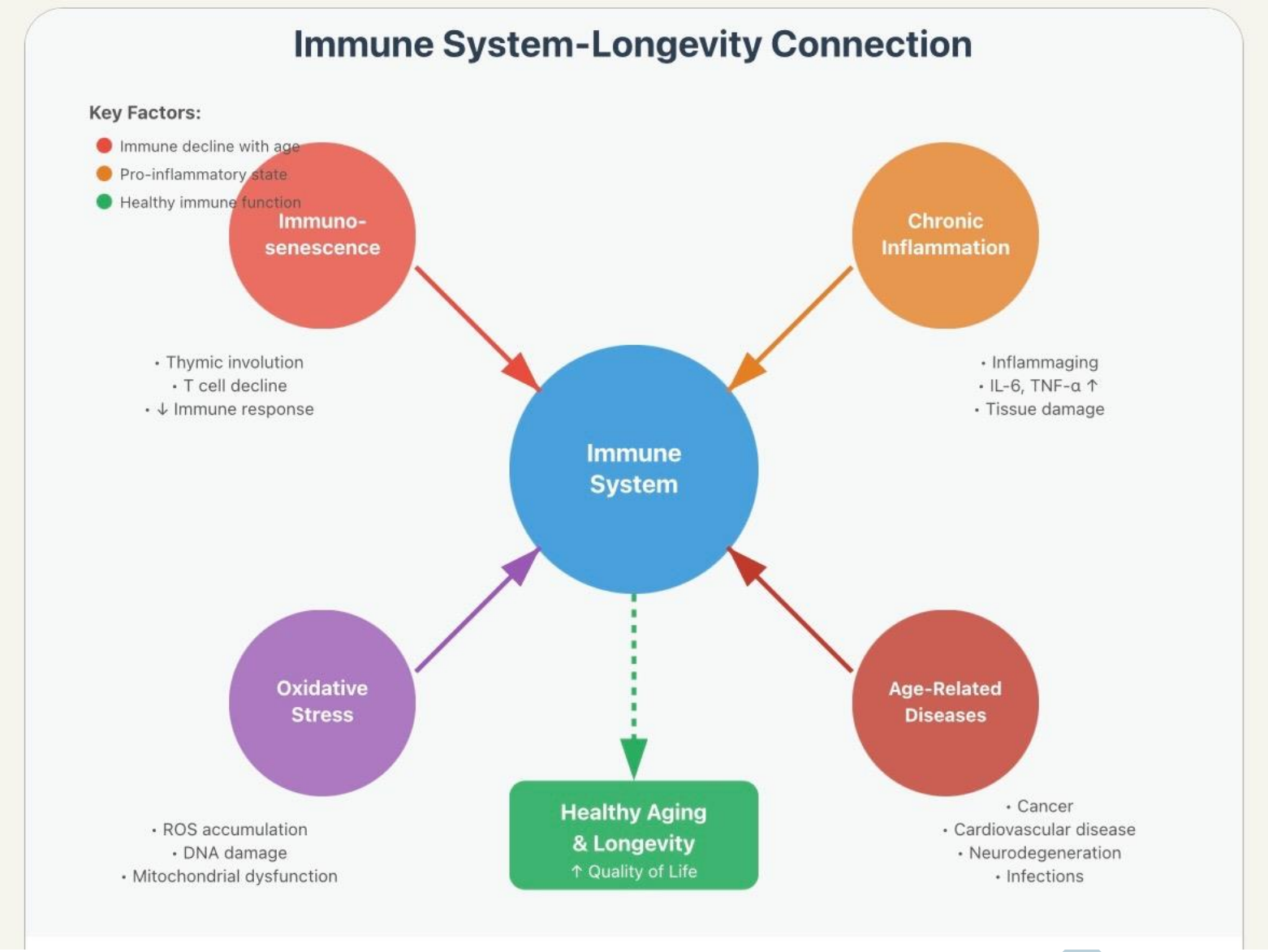
Understand the connection between immune function and longevity

02

Review innate and adaptive immunity

03

Identify clinical strategies for immune optimization


Immune System-Longevity Connection
Key Factors:
Immune decline with age
Pro-inflammatory state
Healthy immune function
Immuno-senescence
Chronic Inflammation
• Thymic involution
• T cell decline
• ↓ Immune response
• Inflammaging
• IL-6, TNF-α ↑
• Tissue damage
Immune System
Oxidative Stress
Age-Related Diseases
Healthy Aging & Longevity
↑ Quality of Life
• ROS accumulation
• DNA damage
• Mitochondrial dysfunction
• Cancer
• Cardiovascular disease
• Neurodegeneration
• Infections

Immune Dysfunction Predicts Multimorbidity, Frailty, and Mortality

When the immune system is dysregulated—whether through chronic low-grade inflammation, autoimmunity, or impaired defense—its ability to maintain balance is lost. This “immunosenescence” and “inflammaging” accelerate the development of multiple chronic diseases (multimorbidity), weaken resilience against stressors (frailty), and shorten lifespan.

- **Multimorbidity**: A dysfunctional immune system promotes persistent inflammation, oxidative stress, and impaired repair, all of which underlie conditions like diabetes, cardiovascular disease, arthritis, and neurodegeneration.

- **Frailty**: Chronic immune stress depletes stem cell reserves, diminishes muscle regeneration, and blunts hormonal signaling—leading to weakness, fatigue, and higher fall risk.

- **Mortality**: Individuals with poor immune regulation have reduced ability to fight infections, clear damaged cells, and control tumor growth, directly raising mortality risk.

NF Immune Foundations

PRODUCTS

Beta Glucan

A, C, D, E

Larch (Larix)

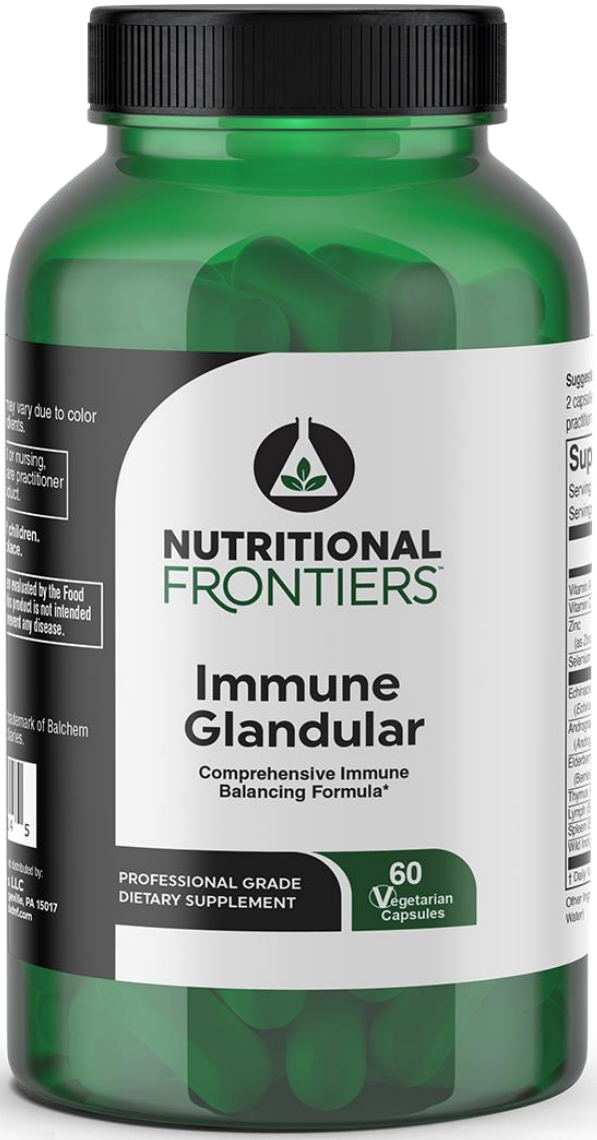
Astragalus

ElderFruit

Maitake

PRODUCTS

- Vitamin C (as Liposomal Pureway-C®) 500 mg
  Vitamin D (as Cholecalciferol) 62.5 mg (2,500 IU)
  Zinc (as Albion® Zinc Bisglycinate Chelate) 25 mg
  N-Acetyl L-Cysteine 500 mg
  Quercetin (as Quercetin Dihydrate) 500 mg
  Dimethylglycine (DMG HCL) 250 mg



PRODUCTS

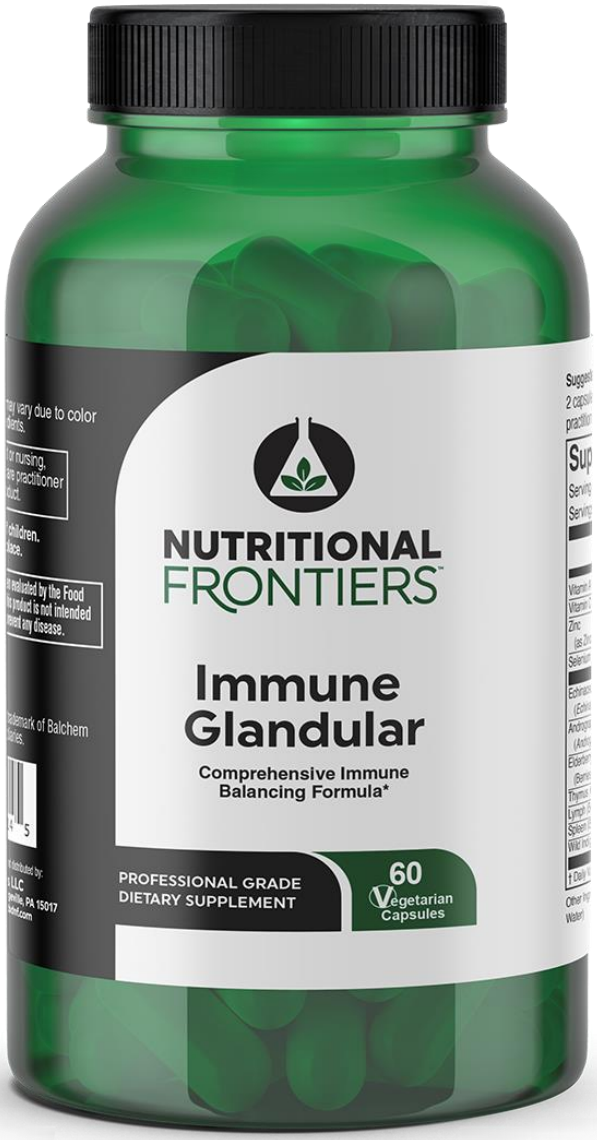
Vitamin A (Palmitate, Beta Carotene) 375 mcg
Vitamin C (Acerola) 250 mg
Zinc (Boswellia serrate) 20 mg
Selenium (L-Selenomethionine) 50 mcg
Echinacea Purpurea (Echinacea Purpurea)(Root) 150 mg
Andrographis (Andrographis Paniculata)(Leaf) 150 mg
Elderberry Extract (Sambucus Nigra)(Berries)(5:1) 120 mg
Thymus (Ovine, NZ) 100 mg
Lymph (Bovine, NZ) 100 mg
Spleen (Bovine, NZ) 100mg
Wild Indigo (Baptisia Tinctoria)(Root) 100mg

Healthy Immunity Underpins Infection Control, Tissue Repair, and Tumor Surveillance

A robust immune system does more than fight colds—it maintains the body's integrity across multiple domains:

- **Infection Control**: The adaptive immune system creates targeted responses against pathogens while the innate immune system offers immediate protection. Together, they prevent infections from becoming chronic or fatal.
- **Tissue Repair**: Immune cells such as macrophages and regulatory T cells orchestrate the resolution of inflammation and the initiation of tissue regeneration. When balanced, they clear debris and stimulate stem cell activity to restore function.
- **Tumor Surveillance**: Immune cells (especially NK cells and cytotoxic T lymphocytes) constantly patrol for abnormal or precancerous cells. A competent immune system identifies and destroys these before they develop into overt cancers.

NF Solutions for Immune Modulation



PRODUCTS

Beta Glucan

A, C, D, E

Larch (Larix)

Astragalus

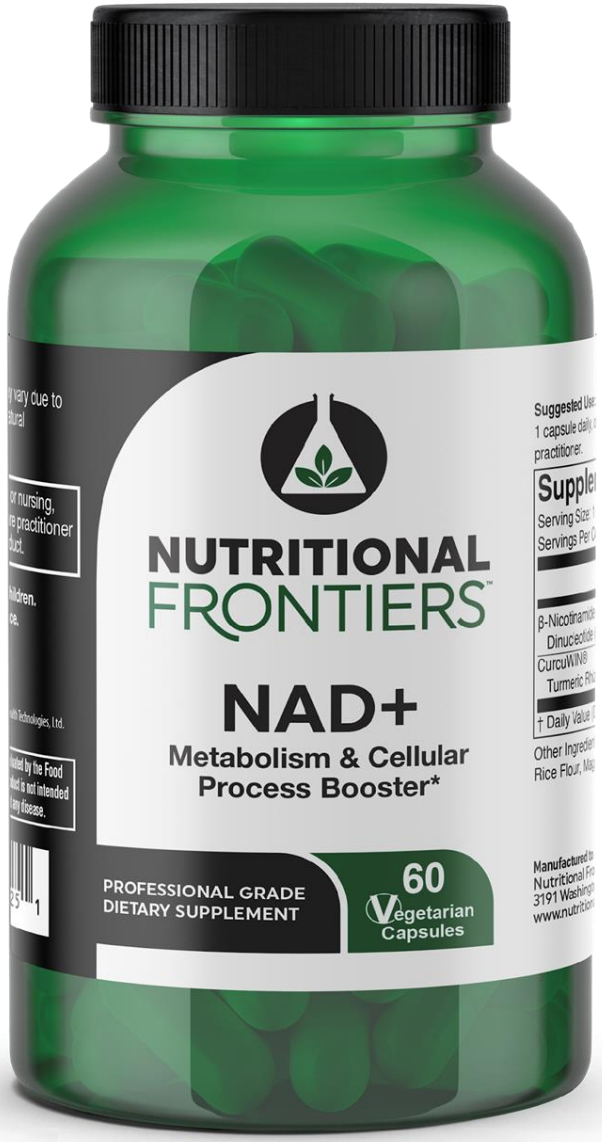
ElderFruit

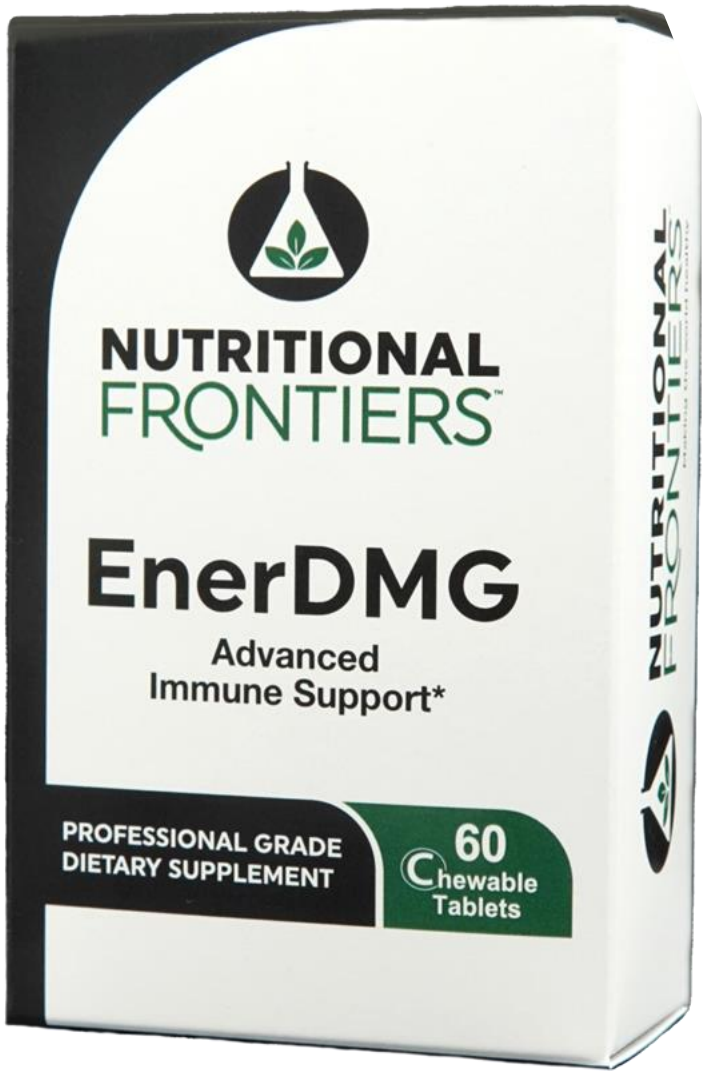
Maitake

PRODUCTS

- ß-Nicotinamide Adenine Dinucleotide (NAD) 250 mg

- CurcuWIN® Turmeric Rhizome Extract 250 mg





PRODUCTS

N,N-Dimethylglycine (DMG) 500 mg

Functional Medicine Aligns Prevention + Personalization to Extend Healthspan

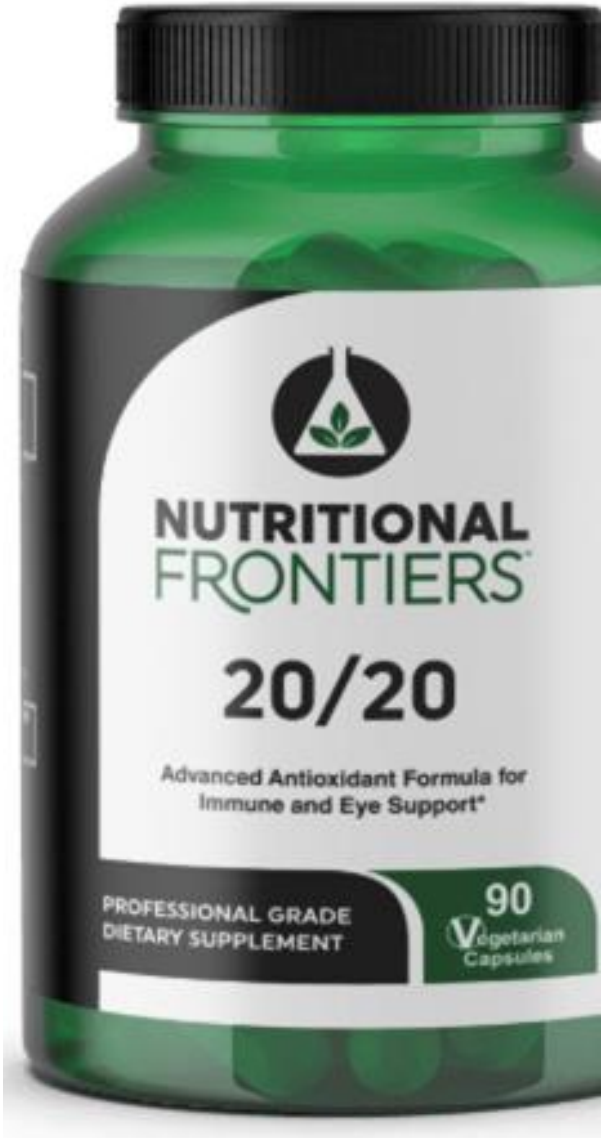
Functional medicine takes the science of immunology and translates it into **proactive, individualized strategies**:

- **Prevention**: By identifying triggers of immune dysfunction early—such as chronic infections, gut dysbiosis, nutrient deficiencies, or toxin exposure—functional medicine prevents the cascade into chronic disease.
- **Personalization**: Instead of one-size-fits-all, functional practitioners tailor nutrition, supplementation, lifestyle interventions, and detoxification strategies to an individual's genetics, microbiome, and environmental exposures.
- **Extending Healthspan**: The goal is not just to add years to life but to add **life to years**—maximizing vitality, mobility, cognitive sharpness, and resilience against disease well into older age.

NF Solutions for ProActive Immunity

PRODUCTS

- A, C, E, Zinc, Selenium
- NAC
- Bilberry
- Quercetin
- Lutein



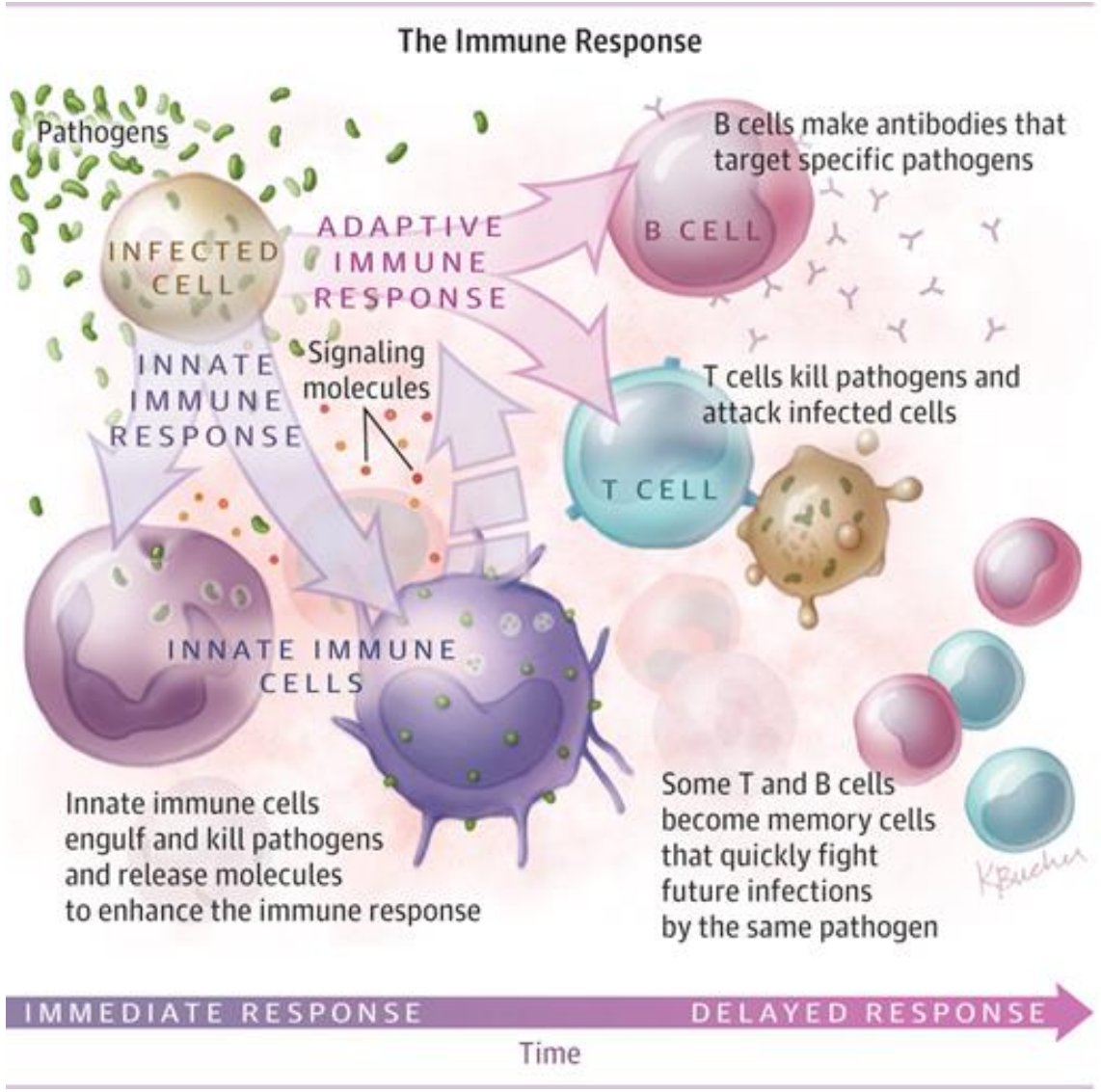
Quercetin 500 mg
(as Quercetin Dihydrate 95%)

PRODUCTS

PRODUCTS

•Vitamin C (as Calcium Ascorbate) 1,000 mg
Calcium (as Calcium Ascorbate) 121 mg
Citrus Bioflavoinoids Peel Powder Complex 200 mg

HOW DOES OUR BODY RESPOND TO AN INFECTION...



IMMUNE SYSTEM IN REVIEW

Innate Immunity

Innate Immunity – *The First Line of Defense*

- **Speed**: Immediate, non-specific response (minutes to hours).
- **Memory**: None. Reacts the same way every time, regardless of past exposures.
- **Key Players**:
  - **Physical barriers**: Skin, mucous membranes, stomach acid.
  - **Cells**: Neutrophils, macrophages, natural killer (NK) cells, dendritic cells, mast cells.
  - **Proteins**: Complement system, acute-phase proteins, antimicrobial peptides.
- **Role**:
  - Recognizes broad patterns (like bacterial cell walls or viral RNA).
  - Contains infection until adaptive immunity is activated.
  - Initiates inflammation and recruits other immune cells.

Think of it as the **“rapid-response team”**—fast, but not very precise.

IMMUNE SYSTEM IN REVIEW

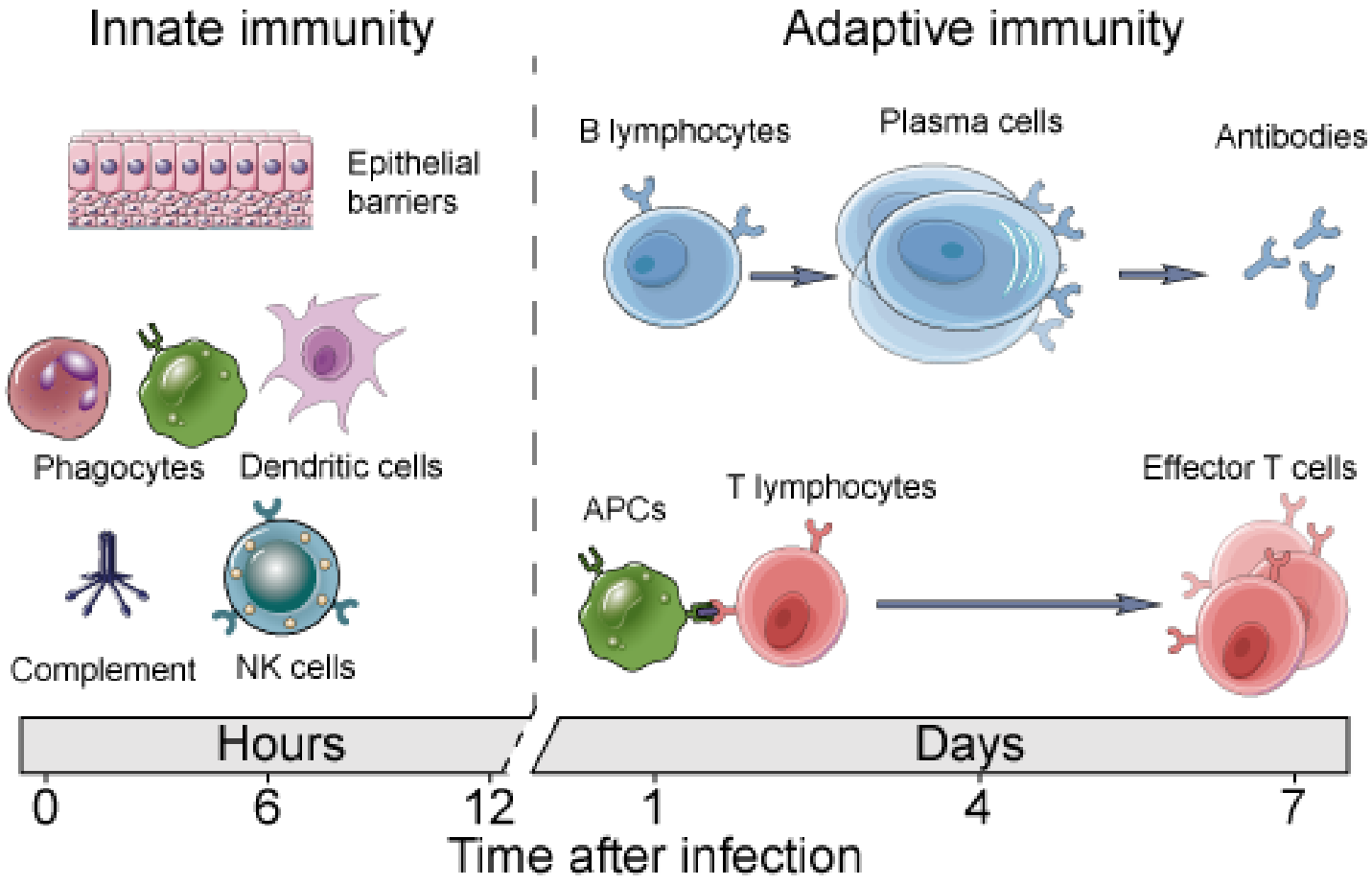
Adaptive Immunity

Adaptive Immunity – *The Specialized Defense*

- **Speed**: Slower to activate on first exposure (days to weeks).
- **Memory**: Has memory. On re-exposure, responds much faster and stronger (basis of vaccines).
- **Key Players**:
  - **B cells**: Produce antibodies that neutralize pathogens or tag them for destruction.
  - **T cells**:
    - **Helper T cells (CD4+)** – coordinate and activate other immune cells.
    - **Cytotoxic T cells (CD8+)** – directly kill infected or cancerous cells.
  - **Antibodies**: Highly specific proteins that recognize unique antigens.
- **Role**:
  - Provides targeted, highly specific defense against particular pathogens.
  - Generates long-term protection via memory B and T cells.
  - Essential for tumor surveillance and clearing chronic infections.

Think of it as the **“elite special forces”**—slower to mobilize, but highly accurate and long-lasting.

SOURCE: INNATE AND ADAPTIVE IMMUNITY. HTTPS://WWW.CREATIVE-DIAGNOSTICS.COM/INNATE-AND-ADAPTIVE-IMMUNITY.HTM



INFLAMMATION IN REVIEW…

- Inflammation – the only way our body can use to heal itself.
- Triggering of inflammation when innate immune cells have either tissue injury or detect infection.
- Pro-inflammatory factors: IL-1, IL-6, TNF alpha
- Pro-inflammatory pathway: NF Kappa B promotes cytokine production and recruitment of inflammatory cells which cause inflammatory response.
- Inflammatory cytokines bring leukocytes to the site of infection.
- Inflammation may or may not resolve the initial injury/ problem.
- When it doesn’t, it starts the vicious cycle of inflammation/ healing, turning into chronic inflammatory process
- Chronic inflammation is a major cause of disease at large.

NF Solutions for Inflammation

PRODUCTS

Total Fat 2 g
Cholesterol 10 mg
Protein <1 g
Marine Lipid Concentrate providing 2.1g
PRMs 400 mcg
(including 18-hydroxy-eicosapentaeoic acid (18-HEPE), 17-hydroxy-docosahexaenoic acid (17- HDHA), and 14-hydroxy-docosahexaenoic acid (14-HDHA)

PRODUCTS

- Curcuwin
- Boswelia
- Green Tea
- Ginger
- Scullcap
- Bromelain

IMMUNE SYSTEM IN REVIEW...
Unchecked Infection

Infections lead to an immune response. When body acting properly, it will be quickly eliminated.

Disease will occur when immune function is low, number of pathogens in the body itself are high, or the virulence of the pathogen itself is high.

IMMUNE SURVEILLANCE & INFLAMMAGING

Chronic, low-grade inflammation (IL-6, TNF-α, CRP) rises with age.

Drivers: senescent cells (SASP), microbiome shifts, mitochondrial stress. Senescent cells cannot divide and have accumulated DNA damage and resistant to programmed cell death.

Clinical targets: reduce inflammation while preserving host defense

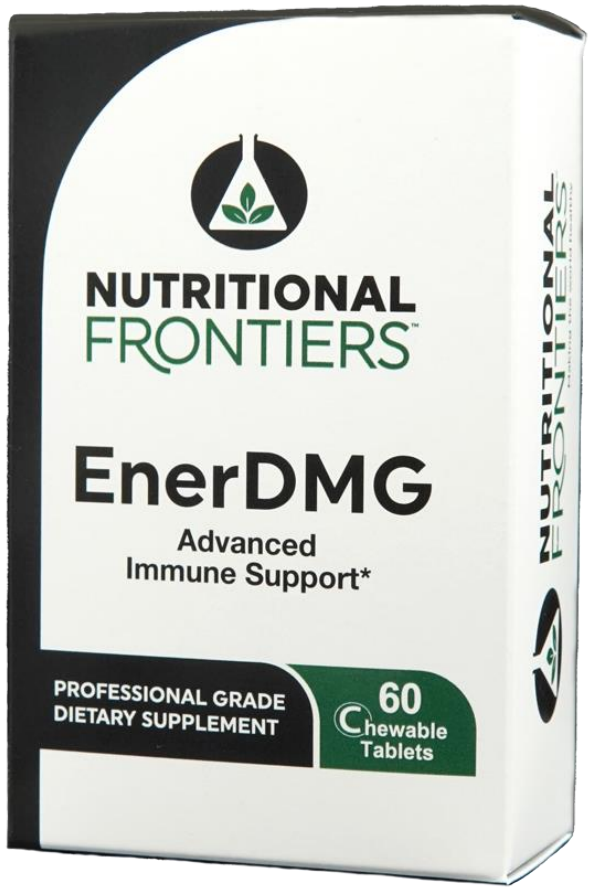
NF Solutions for Cellular Senescence

PRODUCTS

- ß-Nicotinamide Adenine Dinucleotide (NAD) 250 mg
- CurcuWIN® Turmeric Rhizome Extract 250 mg

PRODUCTS

N,N-Dimethylglycine (DMG)
500 mg



Gut Health And Immunity

- Gut Integrity
- Microbiota Balance
- Assimilation and Absorption

GUT HEALTH & INNATE IMMUNITY

- **Integrity** keeps the “walls” of the gut strong and selectively permeable.
- **Microbiota health** determines the balance between inflammation and immune tolerance.
- **Assimilation/absorption** ensures the body has the raw materials to fuel immune defenses.

Gut Integrity – The Physical + Immune Barrier

The gut lining is only one cell layer thick, yet it protects the body from trillions of microbes and food antigens.

- **Tight Junctions**: Proteins like occludin and claudins hold intestinal cells together, preventing “leaky gut.”
- **Mucus Layer**: Provides a physical shield and contains secretory IgA (sIgA), which neutralizes pathogens before they reach the epithelial cells.
- **Immune Cells**: About 70% of the immune system resides in the gut-associated lymphoid tissue (GALT), ready to respond if the barrier is breached.
- **Dysfunction**: If barrier integrity is lost, microbial toxins (like LPS) and undigested food particles cross into circulation, triggering systemic inflammation, autoimmunity, and metabolic dysfunction.

NF Solutions Gut Integrity

PRODUCTS

Serum-derived immunoglobulin concentrate (ImmunoLin®) 1g
Immunoglobulin G (IgG) 506mg
Immunoglobulin M (IgM) 9.2mg
Immunoglobulin A (IgA) 46 mg
Transferrin 55.2mg

PRODUCTS

L-Glutamine 5,000 mg
Galactoarabinan (Arabinogalactans) 1,000 mg
DMG HCL 500 mg
DGL (Deglyrrhizinated Licorice) 500 mg
Aloe Vera Leaf Extract (200:1) 250 mg
Slippery Elm Bark (ulmus rubra) 200 mg
Marshmallow Root (Althhaea Officinalis) 100 mg
Red Beet Powder 100 mg
Zinc Carnosine 75 mg
Stevia 60 mg

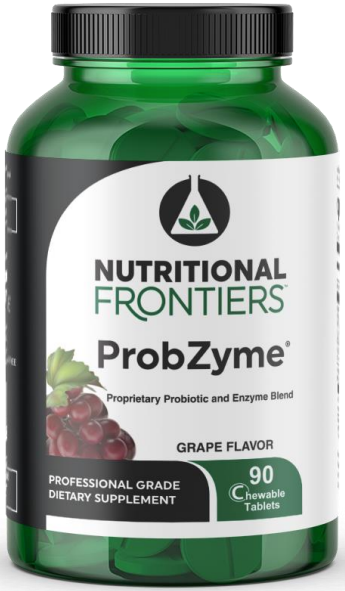
Microbiota Health – The Ecological Balance

The trillions of microbes in the gut (bacteria, fungi, viruses) directly “educate” and modulate the immune system.

- **Diversity Matters**: A diverse microbiome produces a wide array of metabolites (e.g., short-chain fatty acids like butyrate) that nourish gut cells and promote regulatory immune responses.
- **Immune Tuning**: Beneficial bacteria stimulate regulatory T cells and dampen overactive immune responses, lowering risk of allergies, autoimmunity, and chronic inflammation.
- **Colonization Resistance**: A balanced microbiota prevents pathogenic bacteria from overgrowing by competing for nutrients and producing antimicrobial compounds.
- **Dysbiosis**: Overgrowth of harmful species or loss of beneficial ones weakens immune defenses, drives inflammation, and increases infection risk.

NF Solutions for Microbiota Balance

PRODUCTS


NUTRITIONAL
FRONTIERS
ProbZyme
Proprietary Probiotic and Enzyme Blend
GRAPE FLAVOR
PROFESSIONAL GRADE
DIETARY SUPPLEMENT
90
Chewable
Tablets

NUTRITIONAL
FRONTIERS
Frontier Biotics
Foundational Probiotic for
Digestive Health*
PROFESSIONAL GRADE
DIETARY SUPPLEMENT
180
Vegetarian
Capsules

NUTRITIONAL
FRONTIERS
Super Biotics
50 Billion CFU
Therapeutic Dose
PROFESSIONAL GRADE
DIETARY SUPPLEMENT
90
Vegetarian
Capsules

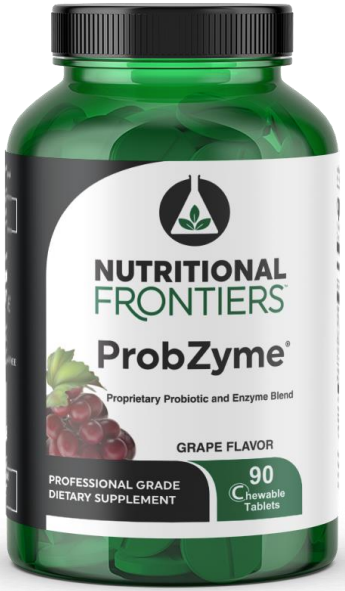
Assimilation & Absorption – Fueling Immune Resilience

•The gut is where nutrients from food are broken down and absorbed—critical for powering immunity.

- **Digestive Function**: Adequate stomach acid, pancreatic enzymes, and bile acids ensure proteins, fats, and carbs are properly broken down.
- **Nutrient Absorption**:
  - **Vitamins A, D, E, K** – essential for mucosal immunity and anti-inflammatory balance.
  - **B vitamins** – support immune cell energy and DNA synthesis.
  - **Minerals (zinc, selenium, iron, magnesium)** – critical for antibody formation, antioxidant defense, and white blood cell activity.
- **Malabsorption**: If digestion or villi function is impaired (celiac disease, enzyme insufficiency, dysbiosis), nutrient gaps weaken the immune system, leaving the body prone to infection and poor healing.

NF Solutions for Assimilation & Absorption

Products


NUTRITIONAL
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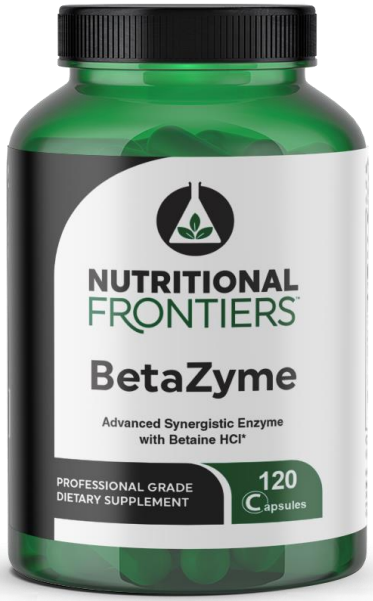
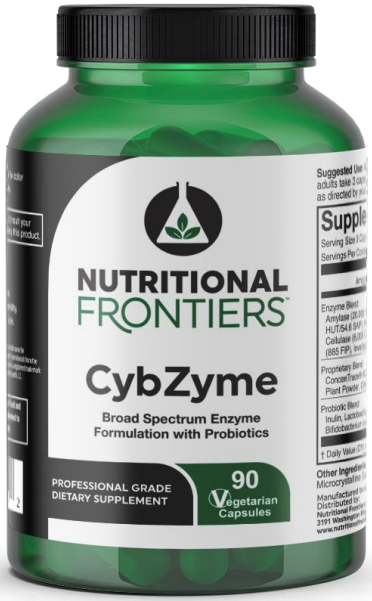

NUTRITIONAL
FRONTIERS
BetaZyme
Advanced Synergistic Enzyme
with Betaine HCl*
PROFESSIONAL GRADE
DIETARY SUPPLEMENT
120
Capsules


NUTRITIONAL
FRONTIERS
CybZyme
Broad Spectrum Enzyme
Formulation with Probiotics
PROFESSIONAL GRADE
DIETARY SUPPLEMENT
90
Vegetarian
Capsules

PHENOTYPES: CHRONIC CRP ELEVATION, NLR SHIFT (BIND TO PAMPS OR DAMPS), POOR WOUND HEALING.

CONTRIBUTORS: POLLUTION, ENDOTOXEMIA, METABOLIC STRESS, SLEEP LOSS.

PLAN: RESTORE BARRIERS, REMOVE TRIGGERS, REPLETE NUTRIENTS, IMPROVE RHYTHMS

INNATE IMMUNE DYSREGULATION

OVERVIEW OF ADAPTIVE IMMUNITY

B CELLS (ANTIBODIES, MEMORY PLASMA CELLS) AND T CELLS (CD4/CD8 EFFECTORS)

AFFINITY MATURATION (GERMINAL CENTERS) AND IMMUNOLOGIC MEMORY

GOAL: ROBUST RESPONSE WITH CONTROLLED INFLAMMATION AND DURABLE PROTECTION

T CELL SUBSETS

- Th1 (IFN-γ) vs Th2 (IL-4/5/13); Th17 (IL-17) vs Treg (IL-10/TGF-β) balance.
- Clinical patterns: antiviral, antibacterial; drives IgG (Th1) allergy/asthma; drives IgE (Th2), autoimmunity, mucosal defense, (Th17), chronic infection (exhaustion); Tregs
- T-helper cells, CD4 (help cells function more effectively) and CD8 cytotoxic.
- Levers: vitamin D, omega-3s, microbiome, sleep, stress

IMMUNOSENESCENCE

Thymic involution → fewer naïve T cells; accumulation of exhausted memory T cells.

Countermeasures: Immune Glandular, NAD+, DMG

B CELL FUNCTION & ANTIBODY PRODUCTION

Somatic hypermutation & class switching yield high-affinity antibodies.

Dysregulation → autoantibodies, hypogammaglobulinemia, poor recall responses.

Support: adequate protein (Best Whey or Supershake, Super Zinc, Super K2 Plus (Vitamine A), microbiome diversity - SuperBiotics

IMMUNE MEMORY & LONGEVITY

- Long-lived plasma cells and tissue-resident memory T cells sustain protection
- Exposure history - Memory based on infections, injections
- Latent Infections challenge the immune system. Give off “help” distress signals at a chronic level.
- Senescent cells aka Zombi Cells
- Len’s Story

DRIVERS OF IMMUNE DYSFUNCTION

- Latent/chronic infections; toxicants (PFAS, heavy metals); microplastics.
- Metabolic dysregulation (insulin resistance), micronutrient gaps.
- Psychosocial stress, circadian misalignment, sedentary behavior

Latent Viral/Bacterial Infections (EBV, CMV, Lyme, etc.)

- **Chronic antigenic stimulation** → constant activation of T cells → immune exhaustion.
- **Molecular mimicry** → microbial antigens resemble host proteins, triggering autoimmunity.
- **Persistent inflammation** → elevated NF-κB and interferon signaling keep cytokines "on."

- **Environmental & Endogenous Toxins (heavy metals, mold, pesticides, LPS)**

- **Mitochondrial dysfunction** → toxins impair oxidative phosphorylation, weakening immune cell energy.
- **ROS/RNS overproduction** → oxidative stress damages DNA, proteins, and lipids.
- **Gut permeability** → toxins disrupt tight junction proteins, driving endotoxin (LPS) leakage → TLR4 activation → systemic inflammation.

NF Solutions for Infections & Toxicity

PRODUCTS

Berberine (as Berberine HCl) 400 mg
Caprylic Acid (as Caprylic Oil) 300 mg
Olive (Olea europaea) Leaf Extract 333 mg
Grapefruit (Citrus paradisi) Seed Extract 250 mg
Garlic (Allium sativum) Bulb 250 mg
Neem Leaf Powder 200 mg
Thyme (Thymus vulgaris) Aerial Extract 100 mg
Oregano (Origanum vulgare) Aerial Extract 100 mg

PRODUCTS

G-PUR® Purified Clinoptilolite 250 mg
Humic/Fulvic Acid Mineral Blend (52/28) 250 mg
Apple Pectin (Pyrus malus) 225 mg
SolnulTM (Solanum tuberosum) 225 mg
Activated Carbon Charcoal 200 mg
Bentonite Clay 120 mg
Okra Extract 10:1 120 mg

Metabolic Dysfunction

Hyperglycemia/Insulin Resistance

- **AGEs (advanced glycation end-products)** → bind RAGE receptors on immune cells → chronic NF-κB activation and inflammatory cytokine release.
- **Excess glucose** → fuels pathogenic microbes and candida in the gut.

Obesity & Adipose Inflammation

- **Adipokines (leptin, resistin)** skew immune responses toward Th1/Th17 → autoimmunity and low-grade inflammation.
- **Inflamed adipose tissue** recruits macrophages that secrete TNF-α and IL-6, impairing insulin sensitivity and promoting systemic inflammation.

Mitochondrial Dysfunction

- Energy-starved immune cells shift to glycolysis → less efficient, pro-inflammatory phenotype (Warburg-like metabolism in T cells/macrophages)

NF Solutions For Metabolic Function

PRODUCTS

Selenium 50 mcg (as Selenium Glycinate)(Albion®)
Chromium 200 mcg
(as Chromium Nicotinate Glycinate Chelate)(Albion®)
Dahlia4™ 150 mcg
(Dahlia pinnata Flower & Petal Extract)
Vanadium 100 mcg
(as Vanadium Nicotinate Glycinate Chelate)(Albion®)

PRODUCTS

L-Glutamine 5,000 mg
Galactoarabinan (Arabinogalactans) 1,000 mg
DMG HCL 500 mg
DGL (Deglyrrhizinated Licorice) 500 mg
Aloe Vera Leaf Extract (200:1) 250 mg
Slippery Elm Bark (ulmus rubra) 200 mg
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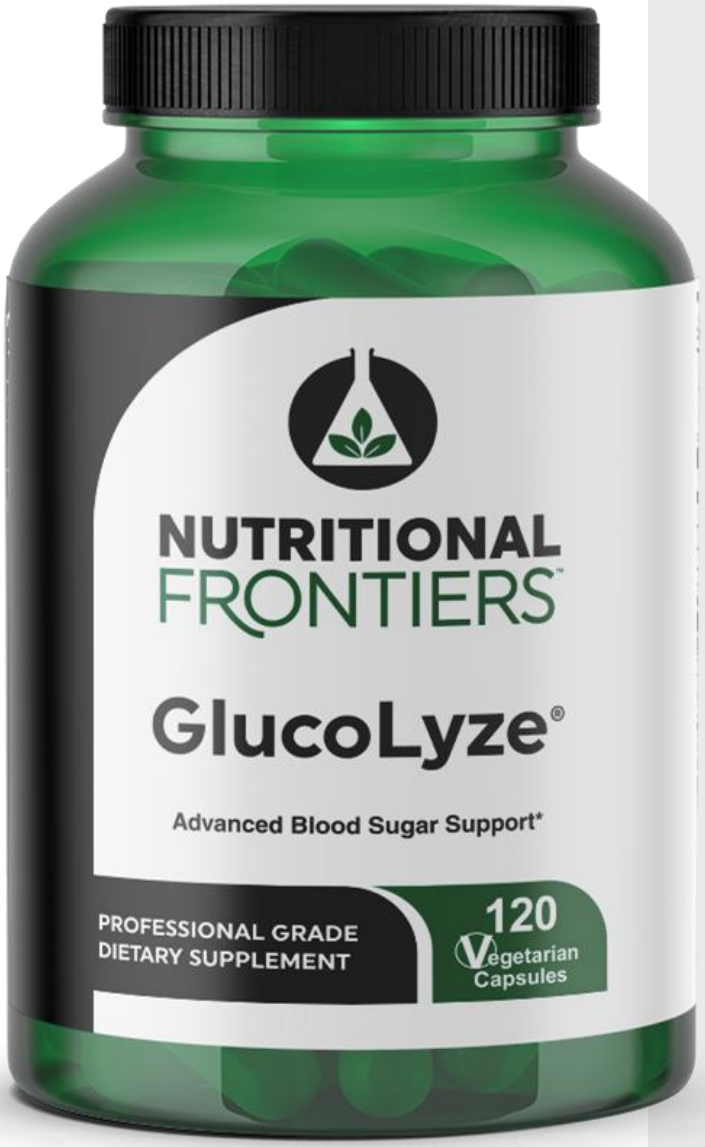
Stevia 60 mg

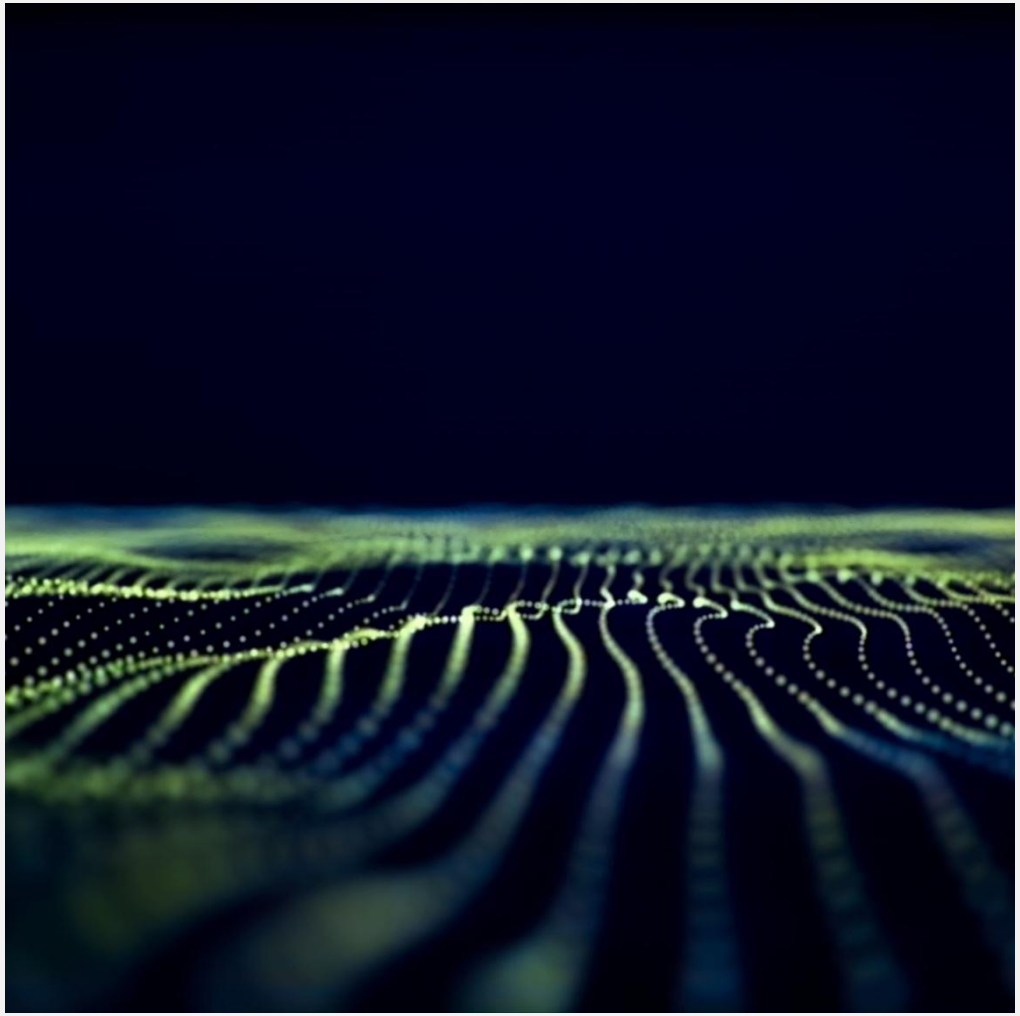


PRODUCTS

Vitamin B6 (as Pyridoxal-5-Phosphate) 4.5 mg
Vitamin B12 (as Methylcobalamin) 75 mcg
Biotin 1,000 mcg
Chromium (as Chromium 300 mcg
Nicotinate Glycinate Chelate)(TRAACS™) Cassia (Cinnamon) Bark Extract 500 mg
Gymnema Leaf Extract 200 mg
R-Alpha Lipoic Acid 150 mg
L-Taurine 150 mg
Green Tea Leaf Extract 72 mg
Vanadium (as Vanadyl Sulfate, 2 mg
Vanadium Nicotinate Glycinate Chelate) (TRAACS™)

Lifestyle Factors

Chronic Stress - CALM DAY	**HPA axis overdrive** → excess cortisol → thymic shrinkage, T-cell suppression, lowered sIgA.
	Catecholamines (epinephrine/norepinephrine) → skew balance toward Th2 → allergies and reduced viral defense.
Lack of Sleep - SLEEP TIME, MELATONIN	**Circadian rhythm disruption** → alters clock genes in immune cells.
	Reduced melatonin → less antioxidant protection, weaker mitochondrial and NK-cell activity.
	Sleep deprivation → increases IL-6, TNF-α, and CRP → systemic inflammation.
Lack of Movement	**Sedentary state** → reduced lymphatic circulation → impaired immune surveillance.
	Low muscle contraction → decreased release of myokines (IL-7, IL-15) that support NK and T cell development.



Lifestyle Factors

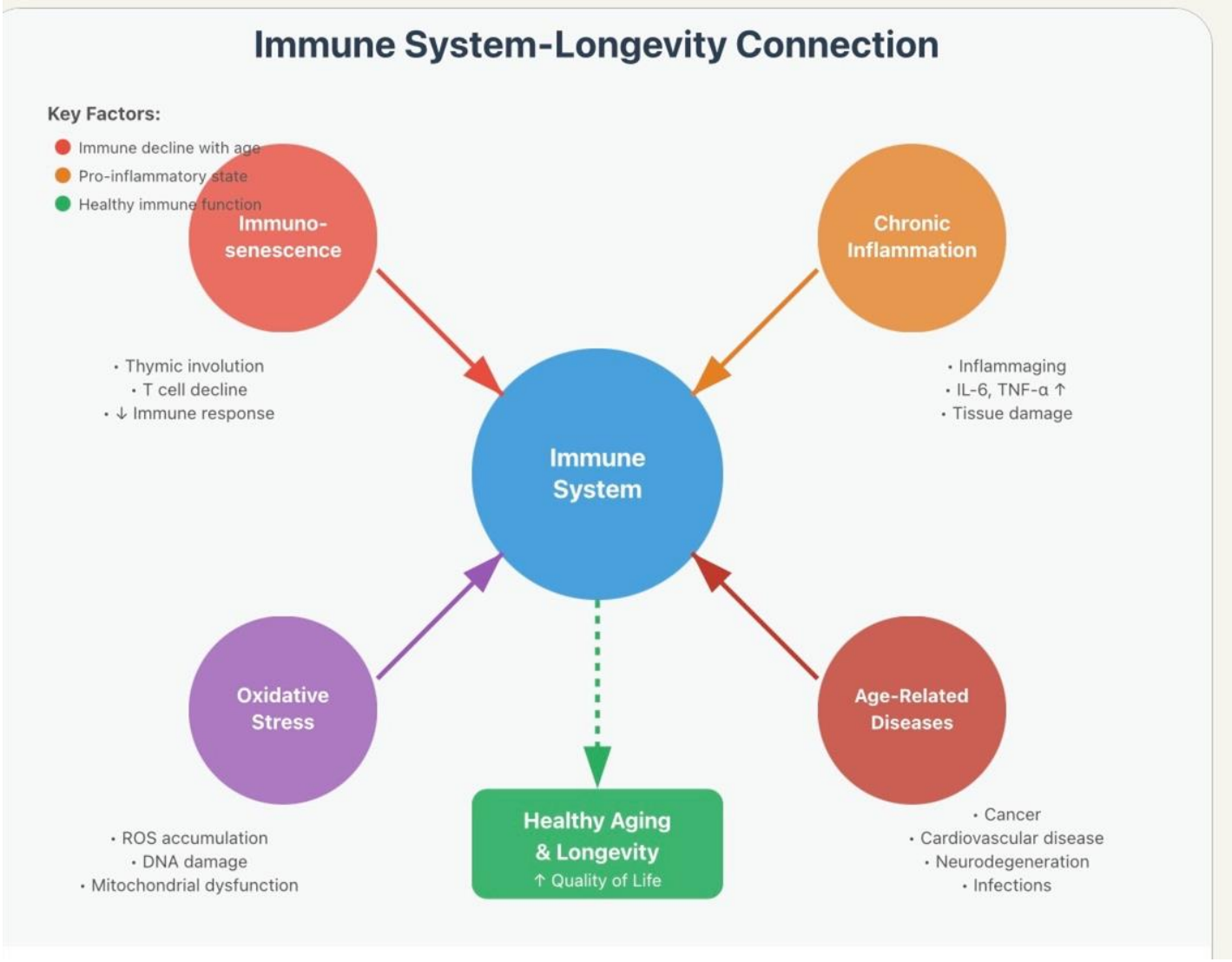
Dehydration

- **Viscosity of blood/lymph** increases → sluggish immune trafficking.
- **Reduced mucosal hydration** → thinner mucus barrier → pathogens cross more easily.
- **Electrolyte imbalance** → impaired cell signaling and energy metabolism.

Processed Foods - SUPERSHAKE, BEST WHEY PROTEIN, ULTIMATE SHAKE

- **High omega-6 oils** → excess arachidonic acid → pro-inflammatory eicosanoids.
- **Refined sugars** → spike insulin → worsen glycation and microbiota imbalance.
- **Food additives/emulsifiers** → disrupt gut microbiota and epithelial tight junctions.
- **Low phytonutrient content** → weak antioxidant defenses, poor detox pathways.

SUMMARY


Immune System-Longevity Connection
Key Factors:
Immune decline with age
Pro-inflammatory state
Healthy immune function
Immuno-senescence
• Thymic involution
• T cell decline
• ↓ Immune response
Chronic Inflammation
• Inflammaging
• IL-6, TNF-α ↑
• Tissue damage
Immune System
Oxidative Stress
• ROS accumulation
• DNA damage
• Mitochondrial dysfunction
Healthy Aging & Longevity
↑ Quality of Life
Age-Related Diseases
• Cancer
• Cardiovascular disease
• Neurodegeneration
• Infections

Questions