

2026 IAACN Symposium

“Clinical Nutrition as the Foundation for Oncology, Mental Health and Supporting Optimal Mitochondrial Function”

Dr. Lee Cowden, MD, MD(H)

The Role of Mitochondria in Amyotrophic Lateral Sclerosis & Other Neurodegenerative Diseases

Abstract

There is increasing evidence that mitochondrial dysfunction is a strong contributor to Amyotrophic Lateral Sclerosis (ALS) and other

neurodegenerative diseases. I will describe the various ways in which mitochondria become dysfunctional in ALS and how to correct those dysfunctions. HealingALS.org is conducting a 1000 ALS patient online observational study. If we have nearly as much success in 1000 patients as we did in our 2024 pilot study on 45 ALS patients, then we will likely be able to help patients with not only ALS, but also Parkinson’s disease, MS, Alzheimer’s dementia, autism, etc.

Educational Goals

- For participants to understand that ALS is a treatable condition with documented reversals.
- For all participants to understand the role of diet and supplements in reversing ALS.
- For some participants to choose to assist a few ALS patients in their attempt to reverse.

Learning Objectives

- Learn what are the various ways in which ALS patients develop mitochondrial dysfunction.
- Learn about mitochondrial tests that are available.
- Learn what steps can help reverse mitochondrial dysfunction in ALS & other neuro diseases.

Outline

1. Of the 44+ contributors to ALS, mitochondrial dysfunction is one of the most important
2. The micro-anatomy of the mitochondrion
3. The importance of the lipid bilayer membranes in mitochondria
4. Facts that many people don’t know about mitochondria
5. Macronutrient effects on the mitochondria
6. How Genova NutrEval test can guide one’s therapy for mitochondrial dysfunction
7. Published research showing mitochondrial role in neurodegeneration
8. How does electro-pollution adversely affect mitochondria & what can be done about it

9. Understanding how critical the correct forms of vitamins B2 & B3 are in the TCA & ETC
10. Understanding the TriCarboxylic Acid (TCA) cycle & how other supplements can improve it
11. Understanding the Electron Transport Chain (ETC) & how other supplements can improve it
12. Learn how mycotoxins adversely affect the TCA & ETC
13. Learn how the methylation cycle, folate cycle, BH4 cycle & urea cycle influence Mito & ALS
14. Learn importance of oral enzymes to reduce tissue hypoxia and mitochondrial dysfunction
15. Discuss mitochondrial tests in USA & Germany to assess mitochondrial function
16. Discuss impact of red-light & infrared on mitochondrial function

Dr. Jethro H. McFarland, DC, MS

PFAS, Environmental Toxicity, and Phase Angle as a Biomarker of Mitochondrial Function – A Chiropractic Perspective

Abstract

Toxicity (PFAS/environmental toxins) and nutritionally depleted diets has amplified the incidence of complex, multi-system illness

characterized by mitochondrial dysfunction and impaired detoxification. While biochemical and nutritional interventions are often emphasized, the role of spinal damage and the central nervous system—particularly in the regulation of nutritional adsorption, immunity, and overall organ function—remains underrecognized in both assessment and care.

This presentation will showcase real patient test results, imaging, and outcomes in the diagnosis & reversal of chronic toxicity, nutritional deficiency, and metabolic change. Many patients demonstrate a greater capacity to recognize, mobilize, and clear chronically stored toxicants, with improved tolerance of adjunctive detoxification and nutritional protocols.

Additionally, this presentation will describe and discuss Phase angle, measured via bioimpedance (InBody), is a clinically useful, non-invasive biomarker reflecting cell membrane integrity, body composition quality, and overall vitality. Low phase angle is frequently associated with chronic illness, inflammation, and poor outcomes, whereas higher phase angle corresponds to more robust cellular health and mitochondrial efficiency.

Educational Goals

- Present a nervous-system–first chiropractic framework that links structure to neurological function.
- Understanding how toxicity affects mitochondrial health.
- Description and application of phase angle as a measure of metabolic outcome.

Learning Objectives

- Describe how environmental toxins, including PFAS, can contribute to chronic inflammation and metabolic dysfunction.
- Outline common approaches to assessing toxicity and metabolic stress using objective clinical measures.
- Explain the role of spinal structure and biomechanics in influencing overall metabolic health and toxin handling.

Outline

1. Introduction & Clinical Context
2. PFAS & Environmental Toxicity – Clinical Big Picture
3. Mitochondrial Function, Detoxification & Metabolic Stress
4. Phase Angle as a Biomarker of Cellular & Mitochondrial Health
5. Spinal Structure, Autonomics, and Metabolic/Toxic Outcomes
6. Case-Based Application
7. Clinical Integration & Takeaways



Dr. Shaffana Cagasan B.Sc., DC, CBHC

The Neuro-Nutrition Blueprint: Personalized Strategies for Better Sleep, Mood, and Cognitive Performance

the role of nutrition in supporting nervous system function. *The Neuro-Nutrition Blueprint* introduces an evidence-informed, personalized approach to optimizing sleep, mood, cognition, and overall mental energy through targeted nutritional strategies.

This presentation explores how individualized neurotransmitter and stress hormone assessments—can guide tailored interventions that support neurotransmitter balance, circadian regulation, and neuroplasticity.

Abstract

The growing understanding of the gut–brain axis, nutrient-gene interactions, and neuroinflammation has reshaped

Key topics include the impact of omega-3 fatty acids, B-vitamins, amino acids, phytonutrients, and glycemic stability on anxiety, depression, and cognitive performance, as well as the role of personalized supplementation and lifestyle integration.

Through clinical insights, practical frameworks, and case-based examples, attendees will gain tools to build customized nutrition plans that enhance nervous system resilience and empower patients to achieve lasting improvements in mental well-being and daily functioning.

Educational Goals

- The goal of this lecture is to equip healthcare and wellness professionals with an evidence-informed, personalized nutrition framework to support nervous system function.
- Participants will gain practical knowledge on how targeted nutritional strategies influence sleep quality, mood regulation, cognitive performance, and overall mental resilience through modulation of neurotransmitter balances, stress hormone regulation and the gut brain axis.

Learning Objectives

- Explain the role of key nutritional factors in neurotransmitter synthesis, stress hormone regulation, and neuroinflammation.
- Describe the mechanisms by which the gut–brain axis influences sleep, mood, and cognitive function.
- Identify common nutritional imbalances that may contribute to impaired sleep quality, mood dysregulation, and reduced cognitive performance.
- Evaluate patient presentations using a personalized nutrition framework to support nervous system resilience.
- Develop evidence-informed nutrition strategies to support neurotransmitter balance, HPA-axis regulation, and gut–brain communication.
- Apply practical clinical tools (neurotransmitter testing and cortisol testing) in case-based scenarios.

Outline

1. The Neuro-Nutrition Blueprint: Personalized Strategies for Better Sleep, Mood, and Cognitive Performance I. Introduction & Clinical Context
2. Prevalence of sleep disorders, anxiety, depression, cognitive decline
3. Limitations of symptom-only approaches
4. The evolving science of neuro-nutrition
5. Overview of personalized, systems-based framework II. Foundations of Neuro-Nutrition
 - A. Neurotransmitter Synthesis & Nutrient Cofactors
6. Serotonin (tryptophan, B6, magnesium)
7. Dopamine & norepinephrine (tyrosine, iron, B vitamins)
8. GABA (glutamate balance, magnesium)
9. Acetylcholine (choline, B5) B. Stress Physiology & HPA-Axis Regulation

10. Cortisol rhythm and sleep-wake cycles
11. Blood sugar instability and sympathetic activation
12. Nutritional modulation of stress response C. Neuroinflammation & Oxidative Stress
13. Role of omega-3 fatty acids
14. Polyphenols and mitochondrial function
15. Micronutrient deficiencies and inflammation IV. Personalized Nutrition Framework
Clinical Assessment
16. Dietary patterns
17. Symptom clusters
18. Lifestyle factors (sleep, stress, movement) Identify Priority Pathways
19. Sleep dysregulation pattern
20. Anxiety/stress dominance
21. Cognitive fatigue/brain fog
22. Mood instability V. Case Studies & Application Case 1: Insomnia + High Stress
Professional
23. Cortisol dysregulation
24. Magnesium + glycemic stabilization Case 2: Brain Fog + Low Mood
25. Iron deficiency
26. Omega-3 insufficiency
27. Gut dysbiosis Case 3: Perimenopausal Sleep Disruption
28. Blood sugar variability
29. Estrogen shifts & serotonin Participants practice identifying:
30. Mechanisms
31. Nutritional priorities
32. Practical intervention plan VII. Summary & Key Takeaways
33. Nutrition modulates neurotransmitters, stress hormones, and inflammation
34. Gut health is central to mood and cognition
35. Personalized strategies outperform generic recommendations
36. Small, targeted interventions can yield meaningful clinical outcomes



Gail Clayton, DCN, MS, CNS, RPh, LDN

**Assessing Mitochondria Function using Conventional
& Functional Labs**

Abstract

Understanding mitochondrial function is key to assessing energy production, metabolic health, and immune balance in

today's complex nutrition cases. This lecture will help nutrition professionals strengthen their ability to use organic acid testing as a practical tool for evaluating how well the mitochondria are functioning under stress. Participants will learn how to recognize patterns that reflect slowed metabolism, impaired energy flow, oxidative stress, and disruptions in cellular balance, and how these patterns influence overall health. The session will focus on connecting organic acid findings to real-world nutrition strategies, while also highlighting supportive conventional laboratory markers that add clarity and confidence to clinical assessment. By the end of this presentation, attendees will have a clearer, more integrated approach to assessing mitochondrial health and translating biochemical data into meaningful nutrition-based support.

Educational Goals

- Upon completion of this lecture, the participant will be able to:
- Confidently interpret organic acid patterns of the mitochondria
- Understand the nutrient needs of the mitochondria
- Explore conventional lab work complementary to organic acids assessment for optimal mitochondrial function

Outline

1. Identify hypometabolic states in the organic acids
2. Recognize and evaluate cell regulator markers
3. Determine the energetic flux of the TCA
4. Recognize mitochondria oxidative stress patterns
5. Summarize the Cell Danger Response Cycle
6. Connect energy production to immune activation
7. Recognize anaplerosis patterns
8. Recognize and evaluate patterns that indicate hypoxia
9. Evaluate and develop a treatment plan for 3-Hydroxy-3-Methylglutarate (HMG) patterns
10. Summarize conditions that restrict the electron transport chain flux
11. Recognize markers for chronic pH renal balancing
12. Identify and evaluate patterns of the Tricarboxylic acids
13. Connect citric acid markers to immune function
14. Explain the negative feedback pathways of elevated citric acid
15. Recognize problems with Complex II as related to TCA
16. Explain how to use alpha-ketoglutarate as a surrogate marker for systemic pH
17. Recognize anaplerotic filling of the Citric Acid Cycle
18. Recognize a pattern of functional CoQ10 deficiency



Dr. Mason Bresett, ND

Integrative Synergy: Functional Mushrooms as Adjunctive Care for Oncology, Mood, and Mitochondrial Function

Abstract

As the complexity of chronic disease rises, functional mushrooms have emerged as a cornerstone of adjunctive clinical

nutrition. This presentation bridges traditional wisdom with modern biochemistry to explore how specific fungal compounds serve as critical tools for adjunctive oncology support, mental wellness, and mitochondrial longevity. A key focus will be placed on Ergothioneine, the "longevity vitamin," and its capacity to support mitochondrial integrity through persulfidation and cytoprotection—offering a novel pathway for addressing cellular aging and metabolic fatigue. We will further examine the Gut-Brain Axis, detailing how active compounds influence the microbiome to support mood regulation and neuro-resilience. Crucially, this talk addresses the importance of tradition and quality, teaching practitioners to identify therapeutically active products to ensure reproducible results, with a special focus on the Reishi mushroom. Finally, we will translate these mechanisms into practice by reviewing specific protocols and laboratory markers for monitoring efficacy. The session concludes with a transparent review of clinical case notes—highlighting successful outcomes alongside complex, challenging cases to provide realistic strategies for patient management.

Educational Goals

- To elucidate the novel biochemical pathways of Ergothioneine, specifically its role in persulfidation and cytoprotection, for supporting mitochondrial integrity and longevity.
- To equip practitioners with the discernment to evaluate fungal product quality (tradition vs. modern manufacturing) and identify therapeutically active compounds, with a special focus on Reishi (*Ganoderma lingzhi*).
- To demonstrate realistic patient management strategies by reviewing biochemical lab markers and contrasting successful clinical outcomes with complex cases in oncology and chronic disease.
- To impart knowledge on the basic physiological mechanisms and strengths of mushrooms so practitioners can effectively navigate challenging clinical presentations.
- To review the epidemiology of mushroom consumption, highlighting systematic review data that demonstrates a significant inverse relationship between mushroom intake and cancer risk.
- To examine the safety and synergy of medicinal mushrooms as adjuvants, presenting evidence of their ability to mitigate chemotherapy side effects (e.g., leukopenia, nausea) and improve Quality of Life (QoL) without interfering with therapeutic efficacy.

Learning Objectives

- Analyze Immunological Mechanisms of Action: Detail how fungal beta-glucans interact with innate immune receptors (Dectin-1, TLR2, etc.) to activate macrophages and subsequently enhance Natural Killer (NK) cell cytotoxicity against tumor cells.
- Evaluate Epidemiological & Clinical Evidence: Interpret the dose-response relationship between mushroom consumption and cancer risk reduction, and critique clinical data supporting the use of specific extracts for improving survival outcomes in breast, lung, and GI cancers.
- Construct Adjunct Oncology and Mitochondrial Protocols: Design evidence-based adjunctive treatment plans that safely combine functional mushrooms with standard-of care therapies and longevity protocols.
- Differentiate Mushroom Specificity: Distinguish the unique clinical applications of key medicinal mushrooms to tailor interventions to specific patient presentations.

Outline

This presentation explores the therapeutic potential of functional mushrooms as foundational tools for adjunctive oncology, mental health, and mitochondrial support. We will begin by examining the epidemiology of mushroom consumption and its inverse relationship with cancer risk, establishing the safety and efficacy of mycotherapy in mitigating chemotherapy side effects and improving quality of life. The lecture will then detail the biochemical mechanisms of key fungal compounds, with a specific focus on Ergothioneine—the "longevity vitamin"—and its role in cytoprotection and mitochondrial integrity via persulfidation. We will differentiate the clinical strengths of major medicinal mushrooms, particularly Reishi (*Ganoderma lingzhi*), while teaching practitioners how to critically evaluate product quality to ensure therapeutic activity. Finally, the session will translate theory into practice through a review of specific protocols, relevant laboratory markers, and a transparent analysis of real-world case studies, ranging from successful outcomes to complex management challenges.



Aron McNicholas, MS

A Reframing of Disease as the Body's Self-Directed Healing Process

Holistic Cancer Support

Lecture 1: A Reframing of Disease as the Body's Self-Directed Healing Process

Abstract

Throughout the history of medicine, there has been continual debate between Reductionistic and holistic ideology. In the 1800s and early 1900s, this played out amongst the great debate of germ and terrain theory. Modern allopathic medicine, science, and chemistry has adopted this reductionistic approach, as many professionals have turned in their alembics, spiritual communion, and apothecaries for

more "progressive approaches." But have these approaches truthfully described the origin of health and disease?

Join Functional Medicine Practitioner & Clinical Herbalist Aron McNicholas for a reframing of our modern disease paradigm. Aron will explain the root cause of most modern illnesses through simple, direct, sensory experiences. He will cover the pros and cons of most modern assessments and provide alternative strategies, like live blood analysis, to assess the terrain of patients. Finally, class will conclude with a materia medica of resources to stock in your medicine cabinet.

Lecture 2: Holistic Cancer Support

Abstract

In 1971, President Nixon famously declared the war on cancer, signing in the National Cancer Act and allocating \$1.6 billion in research funds. Researchers celebrated the discovery of oncogenes and bet the farm on the somatic theory of cancer. At that time, the rate of cancer was one in eight. Half a century later, what are the results? Current estimates project one in three individuals will be diagnosed with cancer in their lifetime. With a multi-billion-dollar failure in plain sight, many would agree that an alternative approach to cancer treatment is necessary.

This lecture will cover the history of cancer, beginning in ancient Egypt and moving up to modern oncology treatments. Class will cover a reframing of the disease process, incorporating a new health paradigm, and holistic options to help support patients. Supportive topics will include dietary, herbal, homeopathic, and detoxification strategies. Finally, the class will include a special emphasis on mistletoe (*Viscum album*) and the many benefits it has demonstrated in European hospitals.

Educational Goals (Overall Course)

By the end of this two-part class, participants will:

- Develop a critical understanding of dominant medical paradigms and how historical, philosophical, and scientific frameworks shape modern approaches to disease.
 - Explore a holistic, terrain-based model of health that reframes disease as a self-directed healing response rather than a purely pathological failure.
 - Gain foundational knowledge of supportive and holistic strategies for supporting chronic illness and cancer, with an emphasis on patient-centered care.
 - Build practical literacy in holistic assessment tools, materia medica, and supportive therapies that complement conventional medical approaches.
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Learning Objectives

Part 1: A Reframing of Disease as the Body's Self-Directed Healing Process

By the end of Part 1, students will be able to:

- Compare and contrast reductionistic and holistic models of health and disease, including germ theory and terrain theory.
 - Explain how historical shifts in medicine influenced the development of modern allopathic practices.
 - Describe disease as a potential adaptive or self-regulatory response of the body rather than solely as a malfunction.
 - Evaluate the strengths and limitations of common modern diagnostic assessments.
 - Identify alternative assessment strategies used in functional and holistic medicine, including terrain-based approaches.
 - Recognize key herbs, nutrients, and tools appropriate for a foundational home or clinical medicine cabinet.
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Learning Objectives

Part 2: Holistic Cancer Support

By the end of Part 2, students will be able to:

- Summarize the historical understanding of cancer from ancient civilizations to modern oncology.
- Explain the somatic theory of cancer and assess its limitations in light of current epidemiological trends.
- Describe cancer through a holistic and systems-based health paradigm.
- Identify integrative strategies that support patients with cancer, including dietary, herbal, homeopathic, and detoxification approaches.
- Explain the therapeutic use, mechanisms, and clinical context of mistletoe (*Viscum album*) in European integrative oncology settings.

Outline

Part 1: A Reframing of Disease as the Body's Self-Directed Healing Process

I. Introduction

- a. Course overview and intentions
- b. Defining health, disease, and healing
- c. Why paradigms matter in medicine

II. Historical Foundations

- a. Reductionism vs. holism in medical history
- b. Germ theory vs. terrain theory
- c. The shift from traditional healing systems to modern allopathic medicine

III. Disease as a Healing Process

- a. Reframing symptoms as biological intelligence
- b. Acute vs. chronic illness
- c. The role of inflammation, adaptation, and compensation

IV. Modern Diagnostic Approaches

- a. Overview of conventional testing and diagnostics
- b. Benefits and limitations of lab-based and symptom-based assessments

V. Terrain-Based Assessment

- a. Concept of “terrain” in functional and holistic medicine
- b. Sensory-based and observational assessment
- c. Benefits of live blood, the patient story, and manual palpation skills in the assessment process.

VI. Practical Applications

- a. Foundational materia medica
- b. Herbs, nutrients, and tools for resilience and terrain support
- c. Building a personal or clinical medicine cabinet

VII. Conclusion and Integration

- a. Key takeaways
 - b. Applying a reframed disease paradigm in practice
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Part 2: Holistic Cancer Support

I. Introduction

- a. Revisiting medical paradigms in the context of cancer
- b. Overview of cancer statistics and modern challenges

II. History of Cancer

- a. Cancer in ancient Egypt and early medical texts
- b. Evolution of cancer theories
- c. The War on Cancer and the rise of the somatic mutation theory

III. Limits of the Conventional Model

- a. Outcomes and unintended consequences
- b. Epidemiological trends and unresolved questions
- c. Why alternative perspectives are gaining traction

IV. A Holistic Reframing of Cancer

- a. Cancer as a systems-level process
- b. Immune function, metabolism, toxicity, and terrain
- c. Cancer as an adaptive or protective response

V. Holistic Supportive Strategies

- a. Dietary approaches for metabolic and immune support
- b. Herbal medicine and botanical allies
- c. Homeopathy and energetic considerations
- d. Detoxification and drainage pathways

VI. Focus on Mistletoe (*Viscum album*)

- a. Historical and modern use
- b. Mechanisms of action
- c. Clinical outcomes and safety considerations
- d. Integration within holistic cancer care models

VII. Conclusion

- a. Integrative perspectives on cancer support
- b. Ethical considerations and patient empowerment
- c. Future directions in holistic oncology

Morley M. Robbins, MBA, CHC

The Dysregulation Copper <> Iron Metabolism: Could this Dynamic be the Epicenter of ALL Chronic Disease?

Abstract

A central player in the process of mitochondrial function are the minerals, but especially one mineral that is often overlooked: Copper.

We live in a world that has been programmed to believe in both Anemia (Iron deficiency) and Copper toxicity. The truth of the matter is that the reality of these two redox-active minerals is just the opposite: Our food environment, and thus our bodies, have become Copper deserts, which causes Iron accumulation at a tissue level, that is NOT revealed in standard blood testing. This presentation will delve deeply into these dynamics, and explain the metabolic origins of all chronic disease. Most importantly, this presentation will outline tangible, proven steps to restore metabolic homeostasis and subsequently, healthy immune function.

Educational Goals

- Clarity about the true dynamics of Copper <> Iron Metabolism: Copper is the GENERAL, Iron is the FOOT SOLDIER
- Certainty that healthy, optimal Mitochondrial function is dependent upon Bioavailable Copper
- Confidence that Mammalian Energy Dysregulation is KEY to understanding the process and origin of Chronic Disease

Learning Objectives

- Awareness that Copper has been MIA on the farm and our food for ~80+ years, despite the Narrative about “Copper Toxicity.”
- A deep understanding about how easily Iron Accumulates in the Cell, the Mitochondria and the Nucleus, aka the LIP (Labile Iron Pool)
- A working knowledge about how energy is made, supported by Mineral Status, and how easily Energy is lost to a wide spectrum of STRESSORS!

Outline

The average practitioner is not taught how energy is made, how blood is made, how bone is made, nor how hormones are activated. This may appear to be a bold set of statements, but ALL 4 functions are dependent on Bioavailable Copper, a subject matter that never enters the clinical or nutritional classroom setting. This presentation will cover both the basics, and the more advanced components of Copper Metabolism, dynamics of Copper <> Iron interdependence, as well as the mechanisms of how mammalian physiology suffers from stress-induced mineral dysregulation, that causes metabolic dysfunction, that THEN causes symptoms

to appear. The Symptoms are REAL. The concept of Disease, however, is simply a narrative that is NOT supported in the Literature, once you understand mineral metabolism and its impact upon energy metabolism. This presentation will be dense with peer-reviewed citations that will challenge the conventional dogma, but leave the practitioner intrigued and excited to learn more about the many rolls that minerals play in human physiology that are not taught, nor stressed in conventional practitioner training. This presentation will pull back the Curtain to reveal an amazing set of enzymatic and signaling pathways that run and regulate optimal physiology, all courtesy of Bioavailable Copper.



Dr. Jared Roscoe, DC, IMD

**Enzymatic Substrates in Nutrition Practice:
Biochemical Foundations and Emerging Applications**

Abstract

This continuing education lecture introduces nutrition professionals to the emerging field of enzymatic substrate therapy and

its potential relevance in metabolic, digestive, and systemic health. Recent advances in nutritional biochemistry and enzymology have led to the development of novel enzymatic substrates that may influence nutrient utilization, cellular signaling, and regulatory pathways.

The course provides a scientific overview of enzymatic substrate mechanisms and explores how these substrates may interact with metabolic, inflammatory, and detoxification processes relevant to nutrition practice. Emphasis is placed on understanding underlying biochemical dysfunctions that may contribute to chronic or treatment-resistant presentations.

Grounded in peer-reviewed research and original scientific investigations, this lecture equips nutritionists with evidence-informed knowledge to critically evaluate this developing therapeutic category. Participants will gain insight into when enzymatic substrate concepts may be considered within nutrition-focused protocols, consistent with professional scope of practice and ethical standards.

Educational Goals

- To introduce nutrition professionals to the biochemical foundations of enzymatic substrate therapy within the context of contemporary nutritional science.
- To increase understanding of how enzymatic substrates may influence metabolic regulation, inflammatory signaling, digestive efficiency, and detoxification pathways.
- To support critical evaluation of emerging research in enzymology and its potential application within evidence-informed nutrition practice.

Learning Objectives

- Explain key principles of enzyme-substrate interactions and regulatory pathway dynamics in human metabolism.
- Distinguish enzymatic substrate therapy concepts from conventional digestive enzyme supplementation.
- Analyze how substrate availability may influence oxidative stress, inflammatory signaling, nutrient assimilation, and detoxification processes.
- Critically evaluate current scientific literature regarding enzymatic substrates for appropriate application within scope of practice.

Outline

- I. Foundations of Enzymology in Clinical Nutrition (25 minutes)
 - a. Enzyme kinetics and substrate concentration
 - b. Rate-limiting steps in metabolic pathways
 - c. Cofactor dependence and nutrient-enzyme relationships
 - d. Regulatory feedback mechanisms
- II. Metabolic & Systemic Dysfunction: Biochemical Considerations (30 minutes)
 - a. Redox balance and oxidative stress
 - b. Inflammatory pathway modulation
 - c. Digestive enzymatic capacity and nutrient utilization
 - d. Detoxification enzyme systems (Phase I and Phase II)
 - e. Substrate insufficiency vs. enzyme insufficiency
- III. Conceptual Framework of Enzymatic Substrate Therapy (30 minutes)
 - a. Definition and theoretical foundations
 - b. Proposed biochemical mechanisms of action
 - c. Distinction from enzyme replacement therapy
 - d. Review of emerging peer-reviewed literature
 - e. Mechanistic plausibility and scientific limitations
- IV. Clinical Application Framework (25 minutes)
 - a. Identifying metabolic patterns within nutrition scope
 - b. Documentation and ethical considerations
 - c. Interdisciplinary coordination
 - d. Contraindications and safety awareness
- V. Evidence Review & Future Directions (10 minutes)
 - a. Summary of key research findings
 - b. Limitations of current evidence
 - c. Areas for further investigation