MODULE 1 — Understanding Cancer from a Functional Nutrition Perspective

Goal: Build a foundational understanding of *why* nutrition and lifestyle matter in cancer prevention and support.

Lesson 1. What Cancer Is

- Normal cell life cycle: growth, repair, apoptosis
- What goes wrong:
    - DNA damage
    - Loss of growth control
    - Impaired immune surveillance
- Tumor formation vs metastasis (high-level overview)

Lesson 2. Cancer as a "Terrain" Problem

- Why cancer is not just a genetic disease
- The role of the internal environment ("biological terrain")
- Why the same mutation can lead to different outcomes

Core Drivers of Cancer Risk (Introduced, Not Solved Yet)

- Chronic inflammation
- Oxidative stress
- Insulin resistance & metabolic dysfunction
- Hormonal imbalance
- Gut dysbiosis & impaired detoxification
- Environmental & lifestyle exposures

Lesson 3. Functional Nutrition vs Conventional Model

- Symptom management vs root-cause reduction
- Upstream vs downstream interventions
- Prevention, risk reduction, and support during treatment (clear distinctions)

What Functional Nutrition Can & Cannot Do

- What nutrition *can* influence:
    - Inflammatory load
    - Metabolic signaling
    - Immune resilience
    - Treatment tolerance

- What nutrition *cannot* replace:
    - Surgery, chemo, radiation, immunotherapy

MODULE 2 — Inflammation & Oxidative Stress: Foundational Targets

Goal: Understand inflammation as a primary intervention point.

Lesson 1:

- Acute vs chronic inflammation
- Sources of inflammation:
    - Diet (omega-6 excess, sugar, AGEs)
    - Gut permeability
    - Adipose tissue
    - Chronic stress
- Inflammatory markers:
    - hs-CRP
    - Ferritin
    - ESR
    - IL-6 (overview)
    - Homocysteine

Lesson 2: Nutrition + Supplement Strategies

Food

- Anti-inflammatory dietary pattern
- Fiber and phytonutrients

Supplements (mechanism-based)

- Omega-3 fatty acids (eicosanoid balance)
- Curcumin (NF-κB, COX-2 modulation)
- Ginger (PGE2 reduction)
- Magnesium (stress-inflammation axis)

Action

- Inflammatory Load Questionnaire
- Targeted anti-inflammatory protocol framework

MODULE 3 — Oxidative Stress, Antioxidant Defense & Redox Balance

Goal: Restore redox balance without suppressing necessary oxidative signaling.

Lesson 1:

- Oxidative stress vs oxidative signaling
- Endogenous antioxidant systems:
    - Glutathione
    - Superoxide dismutase
    - Catalase
- When oxidative stress promotes tumor growth
- Antioxidants during prevention vs during active treatment

Lesson 2: Nutrition + Supplement Strategies

Food

- Polyphenol-rich diet
- Sulfur-containing vegetables

Supplements

- NAC (glutathione precursor)
- Alpha-lipoic acid
- Vitamin C (context-dependent dosing)
- Selenium (caution & personalization)

Action

- Oxidative Stress Risk Assessment
- Redox balance decision tree

MODULE 4 — Metabolic Health, Insulin & Growth Signaling

Goal: Reduce growth-promoting signals that fuel cancer.

Lesson 1:

- Cancer as a metabolic disease (partial model)
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- Insulin, IGF-1, mTOR pathways

Lesson 2: Nutrition + Supplement Strategies

Food

- Blood sugar–stabilizing diets
- Ketogenic / low-glycemic strategies (criteria-based)

Supplements

- Berberine
- Chromium
- Alpha-lipoic acid
- L-carnitine (mitochondrial support)

Action

- Metabolic Risk Questionnaire
- Metabolic support protocol mapping

MODULE 5 — Hormones, Epigenetics & Signaling Modulators

Goal: Balance hormone signaling and gene expression.

Lesson 1:

- Estrogen metabolism (2-OH vs 16-OH pathways)
- Cortisol, insulin, thyroid cross-talk
- DNA methylation and histone modification

Lesson 2: Nutrition + Supplement Strategies

Food

- Cruciferous vegetables
- Lignans and phytoestrogens (context-specific)

Supplements

- DIM / I3C
- Calcium-D-glucarate
- Vitamin D
- Resveratrol
- B-complex (methylation support)

Action

- Hormone & epigenetic risk mapping
- Estrogen detox support plan

MODULE 6 — Gut Microbiome, Immunity & Detoxification

Goal: Restore gut-immune balance and detox capacity.

Lesson 1:

- Gut barrier integrity
- Estrobolome
- Immune training role of microbiome
- Endotoxin load (LPS)

Lesson 2: Nutrition + Supplement Strategies

Food

- Prebiotic & fermented foods
- Protein adequacy for repair

Supplements

- Targeted probiotics
- L-glutamine
- Zinc carnosine
- Digestive enzymes

Action

- Gut dysfunction questionnaire
- GI repair protocol builder

MODULE 7 — Immune Surveillance & Anti-Tumor Defense

Goal: Enhance immune recognition and response.

Lesson 1:

- NK cells, T-cells, macrophage polarization
- Immunosenescence
- Nutrient deficiencies and immune dysfunction

Lesson 2: Nutrition + Supplement Strategies

Supplements

- Vitamin D
- Zinc
- Selenium (context-dependent)
- Medicinal mushrooms (beta-glucans)

Action

- Immune resilience assessment
- Immune support plan

MODULE 8 — Environmental Toxins & Biotransformation

Goal: Reduce carcinogenic burden without aggressive detox.

Lesson 1:

- Endocrine disruptors
- Heavy metals and oxidative stress
- Phase I vs Phase II detox

Lesson 2: Nutrition + Supplement Strategies

Supplements

- Sulforaphane
- Glycine
- NAC
- Milk thistle

Action

- Environmental exposure mapping
- Detox support prioritization

MODULE 9 — Stress, Sleep & Nervous System Regulation

Goal: Normalize stress signaling that suppresses immunity.

Lesson 1

- HPA axis dysregulation
- Autonomic imbalance
- Sleep and melatonin

Nutrition + Supplement Strategies

Supplements

- Magnesium
- L-theanine
- Adaptogens
- Melatonin

Action

- Stress & sleep assessment
- Nervous system support plan

MODULE 10 Active Treatment: Supplement Efficacy and Safety

Goal: Teach *clinical discernment*, not fear.

Lesson 1:

- When antioxidants may interfere with treatment
- Timing and dosing principles
- Coordination with oncology care
- Red-flag supplements

Lesson 2: Proven supplements

Action

- Personal supplement safety checklist
- Oncology discussion guide

MODULE 11

Lessons by cancer type (your Excell tabs)

MODULE 12 — Building the Personalized Functional Cancer Protocol

Students create:

- Personalized nutrition plan
- Supplement protocol by pathway
- Monitoring & adjustment plan

Students integrate:

- Inflammatory load
- Metabolic health
- Hormonal balance
- Gut function
- Environmental exposure
- Lifestyle & stress resilience

Final Deliverables

- Personalized Functional Cancer Prevention Blueprint
- Top 5 modifiable priorities
- Long-term sustainability plan