

## What does someone Certified in Functional Medicine study?

Functional Medicine is an exciting new medical model that is experiencing tremendous growth in medical communities. The most prestigious Functional Medicine Center is located in Cleveland, and partners directly with The Cleveland Clinic and The Learner School of Medicine. Functional Medicine is personalized medicine for the individual rather than medicine based on averages and lab values that are within normal limits. As awareness of The Practice of Functional Medicine increases, more individuals are seeking this specialized healthcare option.

The track to becoming fully certified in FM is an extremely vigorous and comprehensive medical education. In this very lengthy document (below), taken directly from The Institute for Functional Medicine handbook, the full educational curriculum is detailed. Increasingly, I see medical establishments and individual practitioner claiming they practice FM. It is important that patients seeking care understand the qualification of the provider they choose to work with. It is in your best interest to make sure that your “Functional Medicine Practitioner” is or has attended an accredited program. The gold standard is full certification, and is recognized by the certified functional medicine practitioner (CFMP) title.

IFMCP / Candidate Handbook

### Sample Questions

The following questions are examples of the type of item content and level of difficulty candidates will encounter on the certification exam.

#### Example 1:

A 38-year-old female (G2P1) returns to see you after a 4-year absence. She had a partial hysterectomy 2 years previously for enlarged uterine fibroids and menorrhagia. Both ovaries were left intact. She reports that since that time she has experienced fatigue, poor memory, dry skin, and weight gain. She is concerned that her thyroid is “not working well.” You note that she eats soy 3-5 times a week. She brings in a recent lab showing TSH at 2.5, Free T4 at the upper end of the normal reference range, and a mildly elevated thyroid peroxidase antibody (TPO). You draw blood and await further lab results. In the interim, you instruct the patient to:

- A. Remove soy products from her diet
- B. Include more iron-rich foods in her diet
- C. Remove gluten from her diet
- D. Include more green leafy vegetables in her diet and supplement with 5mg 5-MTHF

**Best** correct answer is (C). **Example 2:**

A 25-year-old male presents with a chief complaint of depression for the past 2 years. He was born full term by Cesarean section. He was breast-fed for 4 months, but his mother’s milk ran out and so he was weaned to solid food. He reports a healthy childhood with some mild acne in his teens which has largely resolved. His parents divorced when he was 12. He moved from Phoenix to Seattle 3 years ago to marry and work with his father in the construction business. He has worked as a carpenter since 19 years of age. He has a family history of depression. Although he has increased accessibility living in the northwest, he chooses to not eat shellfish or seafood. He has not changed his diet significantly in the past 4 years. What is the most likely precipitating event or factor (i.e., trigger) in his illness?

- A. Workplace exposure to an environmental toxin
- B. Omega-3 fatty acid deficiency
- C. MTHFR single nucleotide polymorphism
- D. Vitamin D deficiency

**Best** correct answer is (D).

#### Example 3:

The following amino acid provides sulfur for sulfation:

- A. Cysteine
- B. Leucine
- C. Glycine
- D. Glutamine

**Best** correct answer is (A).

### Content Material for the Certification Exam

In order to be properly prepared for the Certification exam, candidates should know how to evaluate and apply the following information:

#### 1. Overview

- a. Recognize and apply the six principles of functional medicine in clinical practice:
  - i. Acknowledge the biochemical individuality of each human being, based on concepts of genetic and environmental uniqueness.
  - ii. Incorporate a patient-centered rather than a disease-centered approach to treatment.

- iii. Seek a dynamic balance among the internal and external factors in a patient's body, mind, and spirit.
  - iv. Address the web-like interconnections of internal physiological factors.
  - v. Identify health as a positive vitality—not merely the absence of disease—and emphasize those factors that encourage a vigorous physiology.
  - vi. Promote organ reserve as a means of enhancing the health span, not just the life span, of each patient.
2. Recognize the seven core clinical imbalances and use them to develop assessment and treatment plans for patients.
    - i. Assimilation: digestion, absorption, microbiota/GI.
    - ii. Defense & Repair: immune, inflammation, infection/microbiota.
    - iii. Energy: energy regulation, mitochondrial function.
    - iv. Biotransformation & Elimination: toxicity, detoxification.
    - v. Transport: cardiovascular and lymphatic systems, respiration.
    - vi. Communication: endocrine, neurotransmitters, immune messengers.
    - vii. Structural Integrity: subcellular membranes to musculoskeletal integrity.
  3. Be able to explain Functional Medicine succinctly and clearly to a patient.
  4. Evaluate and apply the mapping heuristic of functional medicine (GO-TO-IT— Gather, Organize, Tell, Order, Initiate, Track) in clinical practice.
  5. Be familiar with the Matrix and the Timeline in the patient workup. Reframe the patient's story in the context of the Functional Medicine Matrix Model and a patient-centered assessment, incorporating the timeline of the patient's story, the Functional Medicine Matrix, and the patient's antecedents, triggers, and mediators. Use this information to:
    - i. Elicit and articulate the patient's story to integrate experiences, perceptions, observations, and objective information into a coherent, culturally sensitive narrative
    - ii. Analyze the patient's story to identify the antecedents, triggers, and mediators that characterize that individual's health status
    - iii. Create rapport to engender common ground with the patient, establish trust and empathy, strengthen the therapeutic relationship, and help create permanent behavior changes in a primary care setting
    - iv. Use analogy and metaphor to explain the patient's laboratory and physical exam results, diseases and conditions, treatment options, and prevention strategies so that the patient understands his/her situation clearly
    - v. Develop the essential elements of the therapeutic encounter which facilitate an "environment of insight" in a primary care setting
  6. Identify obstacles to health (genetic, physical, emotional, mental, dietary, spiritual, cultural, or environmental) in the data-gathering process.
  7. Assess patients for their readiness to change, and utilize this assessment in creating patient-specific interventions to address clinical imbalances, reverse chronic disease, and otherwise optimize health and function.
  8. Recognize the strengths and limitations of laboratory tests used by both conventional and Functional Medicine practitioners. Understand how to evaluate both conventional (standard) and new or emerging laboratory tests by using the criteria of clinical utility, predictive value, accuracy, precision, sensitivity, and specificity of both existing and new tests.
  9. Recognize and apply key lifestyle recommendations that help to normalize multiple systems.

## 2. Assimilation

1. Evaluate the role that the gastrointestinal tract plays in chronic diseases and use this understanding to efficiently develop appropriate assessment and treatment protocols.
  2. Be familiar with the pathophysiology of underlying gastrointestinal diseases such as irritable bowel syndrome (IBS), inflammatory bowel disease (IBD), and gastroesophageal reflux disease (GERD).
- c. Assess the pathophysiology of impaired barrier integrity; identify diseases and dysfunctions associated with increased intestinal permeability; recognize the relationship between autoimmune disease and impaired barrier integrity; and explain the pathophysiology of gastrointestinal dysregulation not related to permeability issues.
4. Analyze how increased gastrointestinal permeability can be related to systemic dysfunction and how this may be addressed clinically.

5. Understand the importance of microbiota in the gastrointestinal tract, and know how to assess GI flora and when to utilize prebiotics and probiotics.
6. Recognize the pathophysiology and common ATMs of impaired barrier integrity, including:
  - i. Food allergy
  - ii. Food sensitivity/intolerance and other adverse food reactions
  - iii. Dysbiosis
  - iv. Nutritional insufficiency
  - v. Antibiotics, NSAIDs, PPIs
  - vi. Stress
7. Organize a framework for evaluation that takes into account issues with digestion/absorption, intestinal permeability, gut microbiota/dysbiosis, inflammation/immune dysfunction, and nervous system imbalance to improve quality of life for patients with GI dysfunction.
8. Understand the value and limitations of food allergy/sensitivity testing and be able to choose the most useful evaluation methods for patients suspected of reactions to foods.
9. Identify celiac disease and gluten sensitivity, understand the appropriate lab tests to evaluate both conditions, and understand the clinical implications of the differences between the two.
10. Recognize the most important and reliable laboratory evaluations to assess GI dysfunction, including:
  - i. Food allergy and sensitivity.
  - ii. Protozoal infections.
  - iii. Bacterial and fungal cultures and PCR.
  - iv. Antibody testing for pathogens and total IgA production.
  - v. Small intestine bacterial overgrowth (SIBO) assessment.
  - vi. Stool microscopy analysis.
  - vii. Gastrointestinal barrier integrity.
  - viii. Gastrointestinal inflammation markers including calprotectin and lactoferrin.
  - ix. Digestive and assimilation markers.
11. Recognize and treat effectively the most important antecedents and triggers of gastrointestinal dysfunction, including:
  - i. Food allergy (IgE), food intolerance, and food sensitivity (IgG).
  - ii. Protozoal infection, bacterial dysbiosis, small intestinal bacterial overgrowth, and fungal dysbiosis.
  - iii. Pancreatic insufficiency, hydrochloric acid insufficiency, bile acid insufficiency.
  - iv. Nutritional deficiencies and nutritional excesses.
12. Develop and organize individual treatment protocols using lifestyle, diet, nutraceuticals, pharmaceuticals and botanicals to treat patients with GI-related dysfunction.
13. Understand and use the “5R Program” to maximize patient response to treatment:
14. i. Remove
15. ii. Replace
- iii. Reinoculate
16. iv. Repair
- v. Rebalance
17. Apply the elimination diet as a means to identify food reactions and foods that may trigger or mediate chronic GI and other health dysfunctions.
18. Understand and implement various therapeutic diets including: the oligo antigenic diet, a low-glycemic index diet, a gluten-free diet, a Paleolithic-type diet, and FODMAP (fermentable oligo-, di-, and monosaccharides, and polyols) diet.
19. Understand the various benefits and potential problems associated with vegetarian and vegan diets.

### 3. Defense & Repair

1. Understand the physiology and pathophysiology associated with inflammation, autoimmunity, and other immune-related disorders and their associations with systemic disease.
2. Be familiar with the physiology and pathophysiology associated with asthma, sinusitis, and autoimmune diseases such as rheumatoid arthritis.
3. Recognize physical exam findings and important history associated with immune dysregulation and inflammation (e.g., heat, erythema, pain, edema, and fatigue) so as to decide appropriately on evaluation and treatment options for these disorders.
4. Recognize and evaluate the most important antecedents, triggers, and mediators involved in inflammation, autoimmunity, and other immune-related disorders (e.g., infection, inflammation, stress, dysbiosis, nutritional insufficiencies, allergens, gut permeability) in order to understand how the inflammatory process goes awry in immune dysfunction and chronic inflammatory disorders.
5. Recognize patterns that will help guide overall evaluation and treatment of patients with chronic inflammation or immune dysfunction.
6. Recognize and evaluate the most important and reliable laboratory tests associated with immune dysfunction and inflammation (beyond the standard lab evaluations such as CBC) and be able to interpret those tests to patients and make appropriate treatment decisions. To include:
  - i. Immune responses to dietary and environmental allergens
  - ii. Markers of intestinal inflammation in the assessment of gut immune dysfunction and differential diagnosis
  - iii. Stool testing (PCR vs. culture) for identifying infectious pathogens
  - iv. Natural Killer cell, T-reg cell, and cytokine testing for the assessment of chronic diseases involving immune dysfunction
7. Develop and organize individual treatment protocols for patients with immune dysfunction or chronic inflammatory conditions that include dietary changes, lifestyle modifications, nutraceutical, pharmaceutical, and botanical treatments.
8. Be familiar with current evidence regarding the role of fatty acids in the etiology and treatment of chronic immune-related diseases.
  - i. Know the polyunsaturated fatty acid (PUFA) prescription for different inflammatory conditions
  - ii. Evaluate PUFA sources in order to prescribe them most appropriately
  - iii. Be familiar with eicosanoid production and essential fatty acid (omega-3, -6) biochemical pathways
9. Analyze the evidence for the use of immunomodulators in the treatment of autoimmune and other immune related disorders, including:
  - i. plant-based immune modulators for their uses in treating immune related conditions
  - ii. phytonutrients and botanicals as anti-inflammatory and analgesic treatments in patients with chronic diseases

#### **4. Biotransformation & Elimination**

1. Recognize the prevalence of environmental toxic exposures, clarify their role in impaired health, and suggest steps that can be taken to decrease the risk and consequences of toxic exposure and accumulation.
2. Be familiar with the Phase I (CYP450) and Phase II conjugating enzyme systems including substrates, cofactors, nutritional requirements and inducibility and apply that information to better understand individual function, dysfunction, and susceptibility in detoxification.
3. Understand the phenomenon of imbalanced phase I and phase II biotransformation in the development of clinical disease.
4. Recognize relationships between systemic disease and chronic toxic exposures through a clear understanding of the pathophysiology of low-dose toxicity, endocrine disrupting chemicals, body-burden accumulation, and the concepts of toxin synergy and toxicant-induced loss of tolerance (TILT).
5. Identify diseases and dysfunctions potentially associated with chronic toxicity (e.g., autoimmune thyroiditis, multiple chemical sensitivities, fibromyalgia, ADD/ADHD, chronic fatigue, Parkinson Disease) and specifically recognize the systemic relationships between chronic toxic insults and neurotoxicity, immunotoxicity, mitochondrial dysfunction, endocrine disruption, and carcinogenesis.
6. Recognize and address the most important antecedents and triggers of the total toxic load, including impaired biotransformation, dysbiosis, impaired excretion, enterohepatic recirculation and nutritional deficiencies.

7. Develop and organize individual interventions using the Detox heuristic, PURE, to minimize the negative effects of chronic toxicant exposure:
  - i. Recognize Patterns
  - ii. Identify Undernourishment
  - iii. Reduce exposures
  - iv. Ensure a safe detox
8. Design programs to improve biotransformation by reducing toxic load (minimizing exposure), supporting balanced and effective phase I and phase II pathways, mobilizing and increasing the excretion of stored toxins, and decreasing redistribution by improving bowel health and implementing the 5R program (described above):
  - i. Develop and organize individual treatment protocols that incorporate dietary and food plans, nutraceuticals, botanicals, hydrotherapy, pharmaceuticals, and overall lifestyle factors to improve biotransformation, increase mobilization and excretion, and decrease redistribution of toxic compounds in the body.
  - ii. Design a safe and effective program to reduce toxic metal accumulation utilizing oral chelation compounds DMSA, DMPS, Ca/Na, and EDTA, done in conjunction with nutritional and phytonutrient cofactor support.
9. Utilize the strengths and limitations of the common laboratory evaluations associated with toxicity and biotransformation and be able to interpret those tests:
  - i. Urinary toxic metals: provocative/post-chelation challenge
  - ii. Blood toxic metals (Pb, Hg, As, Cd, etc.)
  - iii. Blood sulfate, cysteine/cystine, lipid peroxides, glutathione
  - iv. Hair analysis for toxic metals
  - v. Urine lipid peroxides, 8-OH dG, porphyrins, urinary organic acids
  - vi. Serum xenobiotic levels
  - vii. Single nucleotide polymorphisms (SNPs) in phase I and phase II enzyme systems
10. Recognize the effects that dental issues can have on systemic health.
11. Recognize health implications of electromagnetic radiation (EMR) in the forms of high-frequency ionizing and low-frequency non-ionizing radiation.

I. Recognize the emerging evidence that ongoing exposure to non-ionizing radiation (radio and telecommunication transmissions and related devices, other electronic devices, microwaves, etc.) may be associated with a number of disease states.

### 5. Structural Integrity

1. Examine the basic concepts of and approaches to assessing and treating structural integrity issues.
2. Utilize key structural integrity questions and a clinical framework to screen for structural issues.
3. Utilize a Functional Medicine approach to structural integrity and pain management to evaluate and treat patients with degenerative joint disease and chronic pain.
4. Identify frequently overlooked causes of musculoskeletal pain and/or overt or subclinical inflammation such as vitamin D deficiency, pro-inflammatory diets, lack of exercise, excess adipose tissue and adipokines, proprioceptive deficits, and joint dysfunction.
5. Recognize the signs of balance dysfunction and be able to test for balance problems in individuals with musculoskeletal and neurodegenerative disorders.
6. Prescribe appropriate aerobic, strength, and balance exercises to patients to improve or prevent various medical conditions and to reduce age-related musculoskeletal decline and sarcopenia. Understand the risks and benefits of each kind of exercise.
7. Assess and manage matrix and lifestyle factors that affect bone density (e.g., osteoporosis or osteopenia) in patients at risk for these disorders.

### 6. Communication & Transport

1. Differentiate normal from abnormal physiology of the hypothalamic-pituitary-adrenal-thyroid axis (HPAT) in primary care patients, and recognize how this axis relates to the function of gonadal/sex hormone and insulin physiology.

2. Understand the phenomenon of progression in endocrine dysfunction where adrenal stress commonly precedes thyroid dysfunction which commonly precedes gonadal dysfunction (A T G).
3. Assess the impact of stress on the hormonal milieu and the overall physiology of the patient.
4. Be familiar with the steroidogenic pathways and understand how hormones interact in a complex web whereby changes in one hormone can have profound effects on others.
5. Assess the physiology, pathophysiology, and nutritional influences associated with various hormones (e.g., CRH, ACTH, cortisol, DHEA, pregnenolone, growth hormone, melatonin) and their signaling, sensitivity, activity, metabolism, and elimination.
6. Assess thyroid physiology, pathophysiology, and nutritional influences associated with TSH, T3, T4, and RT3 and their signaling, sensitivity, activity, metabolism, and excretion.
7. Be conversant with the differential diagnosis of hypothyroid causation: primary (thyroid gland issue), secondary (pituitary TSH insufficiency), and tertiary (hypothalamic TRH) hypothyroidism.
8. Identify symptomology and be able to assess patients with autoimmune thyroid disease (Graves' disease, Hashimoto's thyroiditis) with appropriate clinical testing using thyroglobulin antibodies (TgAb), and thyroid peroxidase antibodies (TPOAb).
9. Assess the physiology, pathophysiology, and nutritional influences associated with sex hormones (especially: testosterone, progesterone, and the estrogens) and their signaling, sensitivity, activity, metabolism, and elimination.
10. Assess the physiology and pathophysiology associated with the HPATG axis and its interface with the autonomic nervous system.
11. Apply the functional medicine matrix to arrive at a more comprehensive evaluation and treatment of common female sex hormone issues including PMS, Poly Cystic Ovary Syndrome, menstrual irregularities, dysmenorrhea, and infertility.

I. Recognize the most common antecedents and triggers associated with dysregulation of the HPAT axis and, specifically, with adrenal and thyroid dysfunction (stress, trauma, infection, inflammation, nutritional insufficiencies, toxins, and allergens).

13. Recognize the most common antecedents and triggers associated with dysregulation of testosterone, progesterone, and the estrogens:
  - i. Obstructive sleep apnea
  - ii. Age
  - iii. Pregnancy
  - iv. Adrenal fatigue
  - v. Thyroid dysfunction
  - vi. Stress
  - vii. Trauma
  - viii. Infection
  - ix. Inflammation
  - x. Nutritional insufficiencies
  - xi. Toxins
  - xii. Allergens
14. Appropriately prescribe treatment using bioidentical sex hormones; understand important differences in routes of delivery and issues regarding safety, effectiveness, and risks of hormone replacement therapy.
15. Evaluate the most important laboratory tests to use in assessing hormone-related dysfunction and recognize common pitfalls of lab testing in this area, including problems with sensitivity or specificity.
16. Assess the role of sleep and the effects of circadian rhythms on hormonal and neurotransmitter function.
17. Utilize knowledge of the broad continuum of metabolic dysfunction from pre-disease pattern recognition to fully expressed, end-organ manifestations to improve prevention and treatment planning.
18. Develop and organize individual treatment protocols for hormone dysregulation using diet, exercise, nutraceuticals, botanicals, and mind-body/behavioral interventions.
19. Design treatment protocols that balance hormonal function in patients with chronic disease, utilizing the concepts of hormonal cellular sensitivity, secretion, precursors, metabolism, and excretion; for example:

- ix. Apply knowledge of insulin resistance to develop an expanded management strategy for PCOS.
  - x. Recognize the links between diet and obesity with the increasing rates of non-alcoholic fatty liver disease.
20. Understand the connections between insulin resistance, variable estrogen metabolites and breast cancer risk.
  21. Understand the controversies around cancer prevention and be able to appropriately prescribe preventive interventions to patients at risk of prostate, breast, and ovarian cancers.
  22. Appropriately prescribe adjunctive treatment to breast and prostate cancer patients.
  23. Utilize knowledge of the mind-body connection as antecedent, trigger, and mediator in the feed-forward cycle of chronic disease to intervene appropriately in stress-related and mental-emotional disorders.
  24. Assess patient status on the most important risk factors for cardiovascular disease:
    - i. Obesity
      - ii. Dyslipidemia
      - iii. Chronic inflammation
      - iv. Insulin resistance/metabolic syndrome/diabetes
    - v. Stress
    - vi. Hypertension
    - vii. Heavy metal body burden
25. Identify patients at risk of developing cardiovascular disease (CVD) through important conventional biomarkers including:
    - i. HDL and LDL cholesterol
    - ii. Non-HDL cholesterol
    - iii. Homocysteine
    - iv. hs-CRP
    - v. Fasting and postprandial insulin levels
    - vi. Glucose tolerance testing (GTT)
    - vii. Waist circumference (WC), waist-hip ratio (WHR); body-mass index (BMI) Salivary cortisol, DHEA
  26. Recognize the value and limitations of emerging risk factors and biomarkers for CVD including: antibody triggers, long- latency nutritional deficiencies, lipoprotein-associated phospholipase A2 (Lp-PLA2), Apo B, LDL particle size and number, lipoprotein (a), LDL and HDL sub-fractions.
  27. Design interventions that can reduce the impact of risk factors, and help prevent the development or progression of CVD, including:
    - i. Patient-centered therapeutic relationship
    - ii. Diet
    - iii. Nutraceuticals
    - iv. Stress management/reduction
    - v. Sleep hygiene
    - vi. Exercise
    - vii. Smoking cessation
    - viii. Weight management
    - ix. Statins and other pharmaceuticals
- bb. Understand emerging concepts in the measurement and diagnosis of hypertension including noninvasive testing such as carotid IMT and duplex, pulse wave analysis, and endothelial dysfunction testing.
- cc. Utilize a range of therapeutics for the treatment of hypertension, including weight loss, exercise, mineral repletion, ber, antioxidants, vitamins, and healthy fats.
- dd. Prescribe effective nutraceuticals for promoting vascular repair and decreasing lipid-based risk factors, including niacin, red yeast rice, plant sterols, EGCG, omega-3s, glutathione, etc.
- ee. Select and integrate therapies that are appropriate to an individual's total risk, health status, genetic vulnerabilities, age, and capacity for change.

## 7. Energy

1. Define energy regulation as it relates to human biology and apply those concepts in biomedical models (from the subcellular level to the organ system) to improve health and vitality.
2. Be familiar with the primary macronutrient metabolic pathways (glycolysis, Krebs cycle, beta-oxidation, electron transport chain) and be able to assess their function and dysfunction through lab tests and symptomology.
3. Understand and be able to explain the key role of mitochondria in energy production, and mitochondrial vulnerability to oxidative stress (OS), toxic metal accumulation and other related inhibitors of energy metabolism.
4. Recognize the factors that control or reduce the risk of OS and optimize energy metabolism.
5. Understand the difference between primary and secondary mitochondrial pathologies and how to differentiate the two.
6. Know which organ systems use the majority metabolic energy, and how energy dysregulation can lead to organ-specific manifestations.
7. Identify antecedents, triggers, and mediators that suggest oxidative stress as a consideration in a patient's state of health or disease.
8. Identify the unique attributes of the brain that are affected by energy dynamics and OS risk and be able to apply methods to evaluate and modify those risks.
9. Evaluate the possible effects of electromagnetic fields (EMFs) on human health and assist patients to function optimally in an environment increasingly affected by EMFs.
10. Improve detection of the most common antecedents and triggers associated with mitochondrial dysfunction in clinical syndromes characterized by chronic pain, fibromyalgia, chronic fatigue, and cognitive decline through advanced history taking skills and pattern recognition.
11. Review the impact of OS, inflammation, and structural changes on mitochondrial function and human health, focusing on tissues that rely heavily on mitochondrial energy production—brain, nerve, cardiac and skeletal muscle, and organs of detoxification.
12. Identify key physical exam findings and prioritize laboratory assessments useful in the assessment of fatigue, pain syndromes and neurologic disorders, including best assessment of mitochondrial function, OS, and inflammation.
13. Utilize emerging and evidence-based approaches to improve mitochondrial function and optimize energy utilization in the management of fatigue, pain syndromes, and neurologic disorders.
14. Develop personalized treatment protocols using exercise, nutrition, nutraceuticals, pharmaceuticals, electrical modalities, kinetic therapies, to address individual presentations of depression, headaches/migraine pain, fatigue, neuropathy, cognitive impairment, and other chronic neurodegenerative disorders.