THE INSTITUTE FOR FUNCTIONAL MEDICINE®

Comprehensive Functional Medicine Glossary

ABCDs of Nutrition Evaluation: a system for developing a nutrition perspective during a Functional Nutrition Evaluation. Evaluating the A, B, and C includes looking at the Context and Company that the findings keep, while also looking at the Quality and Quantity when evaluating the D. These findings are often summarized by PFC-MVP to organize the nutrition-related findings.

- **Anthropometrics:** a measurement or description of physical dimensions and properties of the body. These can include: weight, height, body composition assessment, waist and hip circumference, vitals, etc.
- **Biomarkers:** laboratory tests that are utilized to assess an individual's condition, dietary, biological, or functional state
- **Clinical indicators:** physical examination findings within the Functional Nutrition Evaluation that point to areas of clinical imbalance
- **Diet, nutrition, and lifestyle:** an assessment of all of the factors contributing to an individual's current health status, including diet, nutrition, stress, sleep and relaxation, exercise and movement, and relationships

Absolute risk (risk difference): the absolute difference in outcomes between one group (usually the control group) and the group receiving treatment. The percentage shows how much the risk of something happening increases or decreases if a certain intervention is undertaken.

Adaptogen: any substance considered to help the body adapt to stress and to exert a normalizing effect upon bodily processes. Common sites of adaptogenic modulation include the endocrine, immune, and nervous systems. Botanical medicines are the most common adaptogens. Examples of adaptogens are ashwagandha and ginseng.

Allostasis: the process of achieving stability, or homeostasis, through physiological or behavioral change. This can be carried out by means of alteration in HPATG axis hormones, the autonomic nervous system, cytokines, or a number of other systems, and is generally adaptive in the short term. Allostasis is essential for maintaining internal viability amid changing conditions.

Allostatic load: the "wear and tear" on the body that accumulates as an individual is exposed to repeated or chronic stress. It represents the physiological consequences of chronic exposure to a fluctuating or heightened neural or neuroendocrine response that results from repeated or chronic stress.

Antecedents: factors that predispose a person to acute or chronic illness, including family history, genetics, circumstances of birth and delivery, etc. For a person who is ill, antecedents form the illness diathesis. From the perspective of prevention, antecedents are risk factors. Examples of genetic antecedents include the breast cancer genes BRCA1 and BRCA2.

Anti-Candida Food Plan: one of IFM's GI-Specific Food Plans (a subcategory of advanced therapeutic interventions) which focuses on the treatment of candidiasis, or an overgrowth of the fungus candida albicans. The plan eliminates caffeine, all added sugars and sweeteners, most starchy vegetables, most fruit, and other foods with a high glycemic load. This plan is an option for consideration when GI symptoms do not resolve following a standard elimination diet and reintroduction protocol.

Apoptosis: programmed cell death. As a normal part of growth and development, cells that are superfluous or that become damaged activate a cascade of intracellular processes leading to their own demise. In cancer cells, DNA damage may inactivate the apoptosis cascade, allowing mutated cells to survive and proliferate.

Biochemical individuality: the concept that the physiological and biochemical composition of each person is unique, and that composition is based upon the interactions of the individual's genetic makeup with lifestyle and environment. Genes are influenced by the continuous exposure to inputs from diet, nutrients, life experiences, beliefs, activity, toxins, medications, etc. It is this combination of factors that accounts for the endless variety of phenotypic responses seen every day by clinicians. The unique makeup of each individual requires personalized levels of nutrition, and a lifestyle adapted to that individual's needs in order to achieve optimal health. The consequences of not meeting the specific needs of the individual are expressed, over time, as degenerative disease.

Bioidentical hormone replacement therapy (BHRT): the use of exogenous hormones that are identical in molecular structure to endogenous hormones.

Bioimpedance analysis (BIA): a noninvasive tool for assessing body composition and fluid distribution. Body composition is the measurement of body fat in relation to lean body mass, while fluid distribution is a measure of both intra- and extracellular fluid levels.

Biomarker: a substance used as an indicator of a biological state. Such characteristics are objectively measured and evaluated as indicators of normal biological processes, pathogenic processes, or pharmacologic responses to a therapeutic intervention. Examples of cancer biomarkers include prostate specific antigen (PSA) and carcinoembryonic antigen (CEA).

Biotransformation: the chemical modification(s) of a compound made by an organism. Compounds modified in the body include, but are not limited to, nutrients, amino acids, toxins, heavy metals, and drugs. Biotransformation renders nonpolar (lipid soluble) compounds more polar (water soluble) so that they are excreted, not reabsorbed in renal tubules or gastrointestinal tract.

Body mass index (BMI): a calculated ratio of weight divided by height squared. This formula in the metric system is weight (kilograms)/height (meters)^2, or in the imperial system weight (pounds)/height (inches)^2 x 703. This is used to help assess risks by body type.

Cardiometabolic Food Plan: a first-step dietary intervention developed by IFM that aims to balance blood sugar, reduce simple sugars, increase intake of dietary fiber, and provide the body with phytonutrients that are beneficial for a range of cardiometabolic conditions. This plan emphasizes regular meal timing and therapeutic foods that help address blood sugar dysfunction, insulin resistance, central obesity, dyslipidemias, hypertension, metabolic syndrome, and associated inflammation.

Chronic care model: a care model developed by Wagner and colleagues, the primary focus of which is to include the essential elements of a healthcare system that encourage high-quality chronic disease care. Such elements include the community, the health system, self-management support, delivery system design, decision support, and clinical information

systems. It is a response to powerful evidence that patients with chronic conditions often do not obtain the care they need, and that the healthcare system is not currently structured to facilitate such care.

Complementary and alternative medicine (CAM): a group of diverse medical and healthcare systems, practices, and products that are not presently considered to be part of conventional, mainstream medicine. The list of what is considered to be CAM changes frequently, as therapies demonstrated to be safe and effective are adopted by conventional practitioners, and as new approaches to healthcare emerge. Complementary medicine is used with conventional medicine, not as a substitute for it. Alternative medicine is used in place of conventional medicine. Functional Medicine is neither complementary nor alternative medicine; it is an approach to medicine that focuses on identifying and ameliorating the underlying causes of disease; it can be used by all practitioners with a Western medical science background and is compatible with both conventional and CAM methods.

CORE: a mnemonic given to patients to help them take ownership and engage in their healing plan. The mnemonic is a framework to help patients do the following:

- **Commit** to making lifestyle changes that are compatible with their overall health goals (e.g., commit to engaging in physical activity three times per week).
- **Omit** from lifestyle any habits or behaviors that are making it difficult to meet health goals (e.g., omit smoking from the daily routine).
- **Reduce** habits or behaviors that do not align with the health goals identified in partnership with the physician. Some of these habits or behaviors may need to be omitted or eliminated slowly over time (e.g., reduce the intake of carbonated beverages with added sugar from three times per day to once per day; once the patient is comfortable with that level of reduction, reevaluate and asses the need for further reduction).
- **Eliminate** from the diet and environment any foods or substances that may be contributing to negative health symptoms (e.g., undergo an elimination diet to identify any foods that may be triggering GI upset).

Core clinical imbalances: a set of seven interrelated biological systems that underlie all physiology. This set of systems was organized and adapted by IFM to assist clinicians in understanding and applying the complexity of functional medicine. Imbalances in the following seven biological systems, or core clinical imbalances, are the primary underlying cause of disease and dysfunction:

- **Assimilation** (i.e., digestion, absorption, microbiota, GI function, respiration)
- **Defense and repair** (i.e., immune, inflammation, infection, microbiota)
- **Energy** (i.e., energy regulation, mitochondrial function)
- **Biotransformation and elimination** (i.e., toxicity, detoxification)
- **Transport** (i.e., circulation, lymphatic flow)
- **Communication** (i.e., endocrine, neurotransmitters, immune messengers)
- **Structural integrity** (i.e., from subcellular membranes to musculoskeletal structure)

Using this construct, it becomes much clearer that one disease/condition may have multiple causes (i.e., multiple clinical imbalances), just as one fundamental imbalance may be at the root of many seemingly disparate conditions.

Core Food Plan: IFM's foundational food plan that provides a healthy balance of quality protein, fats, and carbohydrates with a diverse array of nutritious, phytonutrient-rich fruits and vegetables. This food plan is a baseline healthy eating plan for anyone interested in improving their diet, and it can easily accommodate omnivorous, vegetarian, and vegan lifestyles.

Cross-reactivity: occurs in allergic reactions when the proteins in one substance (typically pollen) are similar to the proteins found in another substance (typically a food). For example, allergy to birch tree pollen may cause a cross-reaction to apples.

Cytochromes P450 (CYP 450): a large and diverse group of enzymes, most of which function to catalyze the oxidation of organic substances. They are located either in the inner membrane of mitochondria or in the endoplasmic reticulum of cells and play a critical role in the detoxification of endogenous and exogenous toxins. The substrates of CYP enzymes include metabolic intermediates such as lipids, steroidal hormones, and xenobiotic substances such as drugs.

Cytokines: immunoregulatory proteins (such as interleukin, tumor necrosis factor, and interferon). They may act locally or systemically and tend to have both immunomodulatory and other effects on cellular processes in the body. Cytokines have been used in the treatment of certain cancers.

Detox Food Plan: an advanced therapeutic dietary intervention developed by IFM that aims to reduce food triggers, support liver function, provide the body with a diverse array of phytonutrients, encourage healthy elimination of toxins, and balance hormone metabolism. The plan focuses on long-term nutritional support of the major body systems involved with detoxification, including the gut, liver, and kidneys. It places a strong emphasis on eating nutrient-dense foods for life, reducing food contact with contaminating elements, and eating organic foods when possible.

Diabesity: a term used to describe a spectrum of disease (including insulin resistance, elevated blood glucose, hypertension, hypercholesterolemia, and type 2 diabetes) that is largely attributable to diet, lifestyle, and environmental toxin exposures.

DIGIN: a heuristic mnemonic for the assessment of gastrointestinal dysfunction. Thorough assessment of the GI tract should include investigation of the following:

- **Digestion/absorption:** problems with the digestive process including ingestion, chemical digestion, mechanical digestion, absorption, and assimilation
- **Intestinal permeability:** dysfunctional permeability of the intestinal barrier. Has the intestinal barrier lost its ability to discriminately allow the passage of specific molecules across the endothelium, making the gut barrier "leaky"?
- **Gut microbiota/dysbiosis:** changes in composition of the gut flora including balance and interaction of commensal species (See: dysbiosis)
- **Inflammation/immune:** inflammation and immune activity in the GI tract
- **Nervous system:** enteric nervous system function, which controls motility, blood flow, uptake of nutrients, secretion, and immunological and inflammatory processes in the gut

Dysbiosis: a condition that occurs when the normal symbiosis between gut flora and the host is disturbed, and organisms of low intrinsic virulence, which normally coexist peacefully with the host, may promote illness. It is distinct from gastrointestinal infection, in which a highly virulent organism gains access to the gastrointestinal tract and infects the host.

Elimination diet: a short-term therapeutic dietary intervention that eliminates the most common food allergens or trigger foods to which an individual may be allergic, intolerant, or sensitive. Such an approach seeks to uncover those foods or food substances to which an individual has a demonstrable reaction on repeat challenge. The IFM Elimination Diet is a first-step dietary intervention that seeks to identify trigger foods, reduce inflammation, support a healthy microbiome, reduce the toxic burden, and promote body awareness to food.

Endocrine disrupters: substances, generally human made chemicals, which may interfere with the body's endocrine system and produce adverse developmental, reproductive, neurological, and immune effects.

Epigenetics: the study of changes in organisms caused by modification of gene expression rather than alteration of the genetic code itself (i.e. a change in phenotype, not in genotype). Epigenetic modifications may occur in response to several factors, including aging, stress, lifestyle, environment, nutrition, and overall health status. Some of the most common mechanisms by which these factors can affect change to gene expression include histone modification and DNA methylation.

Exposome: combined exposure from all sources that reach the body's internal chemical environment. It is hypothesized that 90% of chronic disease is influenced by the way the environment (gut microbes, thoughts, food, social connectedness, environmental toxins, etc.) interacts with our genes.

Fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAPs): a collection of short-chain carbohydrates and sugar alcohols that are naturally occurring in certain foods, and sometimes added to processed foods. These compounds include fructose, lactose, fructans, galactans, and polyols (e.g., sorbitol and mannitol). FODMAPs are linked to irritable bowel disease and other gastrointestinal orders. When consumed, FODMAPs may be poorly absorbed in the small intestine and pass through the large intestine, where they can produce uncomfortable gas and bloating, abdominal pain, constipation, or diarrhea. A low-FODMAP diet may help reduce these symptoms (see: Low-FODMAP Food Plan).

Functional Medicine: an approach to medicine that addresses the underlying causes of disease using a systems-oriented, individualized approach, which engages both patient and practitioner in a therapeutic partnership. It reflects a personalized lifestyle medicine approach, and utilizes the Functional Medicine Timeline and Functional Medicine Matrix to help organize the patient's story and determine appropriate interventions for the prevention and treatment of chronic diseases.

Functional Medicine Matrix: the graphic representation of the functional medicine approach, which displays the seven nodes of clinical imbalance, as well as antecedents, triggers, mediators, modifiable lifestyle factors, and mental, emotional, and spiritual considerations. Practitioners can use the matrix to help organize their thoughts and observations about the patient's health and decide how to focus therapeutic and preventive strategies.

Functional Medicine Timeline: a tool that allows clinicians to visualize a patient's story chronologically by organizing important life events and health issues from pre-conception to the present.

Functional Nutrition: the advanced practice of personalized nutrition assessment, diagnosis, intervention, and monitoring, with the goal of promoting optimal health and preventing diet- and lifestyle-related illness.

Functional Nutrition Fundamentals: the key foundational aspects related to eating a healthy diet and making positive choices. Our relationship to food is multidimensional, and our choices are impacted by many conscious and unconscious desires. The Functional Nutrition Fundamentals consist of four main ideas about food and nutrition:

- **Food is energy.** At the most basic level, food is a fuel source necessary for the body to function.
- **Food is information.** Byproducts of food convey messages and assist with various processes within the body (e.g., metabolism, cell signaling, detoxification, etc.).
- **Food is connection.** Food brings people together, often serving as a central focus of social gatherings and celebratory events. Additionally, both pleasant and unpleasant memories often incorporate the smell, taste, and texture of foods. The reasons behind food choices, cravings, and aversions aren't always logical or rational, and these reasons can often be tied back to the connections we have to food.
- **Food is medicine.** We are what we eat. Choosing nutrient-dense foods that send signals to the body for positive gene expression is a key component of optimal health. Foods and food behaviors influence the body and can contribute to underlying causes of disease, and these factors can be adjusted to move an individual toward their greatest state of health and healing.

Functional Nutrition points of connection: clinical findings from one of the areas of the ABCDs of Functional Nutrition Evaluation that point to additional exploration of associated nutrition-related findings. For example, an elevated waist circumference can indicate that a physician needs to assess blood sugar regulation, examine the blood pressure, and review the lipids to determine the presence of additional metabolic abnormalities associated with insulin resistance.

Genomics: the study of the whole genome of organisms, including interactions between loci and alleles within the genome. Research on single genes does not fall into the definition of genomics, unless the aim of this functional information analysis is to explain the gene's effect on the entire genome network. Genomics may also be defined as the study of all of a cell or tissue's genes at the DNA (genotype), mRNA (transcriptome), or protein (proteome) levels.

GI-Specific Food Plans: advanced therapeutic dietary interventions designed specifically for those with gastrointestinal (GI) complaints. Typically, a GI-specific food plan is prescribed when an elimination diet does not resolve negative symptoms. IFM's GI-Specific Food Plans include the Anti-Candida Food Plan, Low-FODMAP Food Plan, Specific Carbohydrate Diet (SCD) Food Plan, and the ReNew Food Plan.

Glucotoxicity: the structural and functional damage in the beta cells and target tissues of insulin, caused by chronic hyperglycemia. These alterations eventually cause a decreased hormonal action of insulin (i.e., insulin resistance).

Glycemic Index (GI): a numerical index that ranks carbohydrate-containing foods based on how quickly or slowly those foods are converted to glucose, causing blood glucose levels to rise. Foods are ranked on a scale of 0 to 100, with pure glucose (GI of 100) serving as the reference point. The smaller a food's assigned GI value, the less impact that food has on blood glucose levels.

Glycemic load (GL): a value assigned to a carbohydrate-containing food based on two factors—its quality (or, its glycemic index) and its quantity (grams per serving). This value is determined by multiplying a food's glycemic index by the number of grams of carbohydrates in the food, and dividing that result by 100. For optimal health, an individual's daily glycemic load should be kept under 100.

GO TO IT: a heuristic mnemonic for the processes involved in the clinical practice of functional medicine:

- **Gather** oneself and be mindful in preparing to see each patient; gather information through intake forms and questionnaires, as well as the initial consultation, physical exam, and objective data. Take a detailed functional medicine history that is appropriate to age, gender, and nature of presenting problems.
- **Organize** the subjective and objective details from the patient's story within the functional medicine paradigm. Position the patient's presenting signs and symptoms, along with the details of the case history, on the Functional Medicine Timeline and Functional Medicine Matrix.
- **Tell** the story back to the patient in your own words to ensure accuracy and understanding. The retelling of the patient's story is a dialogue about the case highlights—including the antecedents, triggers, and mediators identified in the history, as they correlate to the Functional Medicine Timeline and Matrix. The patient is asked to correct and amplify the story, setting up a framework of true partnership.
- **Order** and prioritize the patient's information:
  1. Acknowledge the patient's goals
  2. Address modifiable lifestyle factors
  3. Use Sidney Baker's too much/not enough model and ask, "What are the insufficiencies or excesses?"
  4. Identify clinical imbalances or disruptions in the organizing physiological systems of the Functional Medicine Matrix
- **Initiate** further functional assessment and intervention based upon the above work:
  1. Perform further assessment
  2. Refer out for adjunctive care to nutrition professionals, health coaches, lifestyle educators, specialists, and other healthcare providers.
  3. Initiate therapy
- **Track** assessments, note the effectiveness of the therapeutic approach, and identify clinical outcomes at each visit—all in partnership with the patient.

Heuristic: a strategy used for problem solving, learning, and discovery that is experience-based, not algorithmic. When an exhaustive search is impractical, heuristic methods may be used to speed up the process of finding a satisfactory solution. A type of hueristic is a rule of thumb.

Homeodynamics: the tendency of homeostatic set points to change throughout an organism's lifespan. Homeodynamics describes how a departure from a homeostatic norm can be adaptive (e.g., fever) or pathological, depending on the context.

Homeostasis: the tendency among living things to maintain physiological parameters within a narrow range usually considered normal in order to maintain optimal function. Under this definition, disease can be defined as a departure from the homeostatic state.

Hormesis: a biphasic dose response to an environmental agent characterized by a low-dose stimulation or beneficial effect, and a high-dose inhibitory or toxic effect.

Integrative medicine: medicine that combines treatments from conventional medicine and those from CAM, for which there is high-quality evidence of safety and effectiveness. In a broader sense, integrative medicine is healing-oriented medicine that takes into account the whole person (body, mind, and spirit), including all aspects of lifestyle, and makes use of all appropriate therapies, both conventional and alternative. The field is the only one of the emerging models to explicitly encompass the integration of therapeutics that, until recently, were the sole purview of CAM. Note that Functional Medicine is different from integrative medicine because Functional Medicine emphasizes the evaluation of underlying causes of health and dysfunction, and organizes assessment and treatment using the Functional Medicine Matrix, the Functional Medicine Timeline, and the GO TO IT heuristic.

Lifestyle medicine: the use of lifestyle interventions to lower the risk for the approximately 70% of modern health problems that are lifestyle-related chronic conditions (e.g., type 2 diabetes, metabolic syndrome, etc.), or for the treatment and management of disease if such conditions are already present. This includes lifestyle interventions such as nutrition counseling, physical activity, stress reduction, and rest. Lifestyle medicine is an essential component of the treatment of most chronic diseases and has been incorporated in many national disease management guidelines.

Lipotoxicity: the damage caused by persistently high free fatty acid levels, as a consequence of triacylglycerol catabolism.

Long latency disease: a disease that manifests at some time after the initial exposure to disease triggers, or that requires continued exposure to triggers and mediators over an extended period of time to manifest frank pathology. Examples include heart disease, cancer, and osteoporosis.

Low-FODMAP Food Plan: one of IFM's GI-Specific Food Plans (a subcategory of advanced therapeutic interventions) which focuses on the reduction or restriction of fermentable, oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAP)s—a class of carbohydrates that have been shown to contribute to symptoms of gastrointestinal (GI) conditions like irritable bowel syndrome (IBS) and small intestine bacterial overgrowth (SIBO). This plan is an option for consideration when GI symptoms do not resolve following a standard elimination diet and reintroduction protocol.

Macronutrient distribution: the average recommended range of intake for specific macronutrients (protein, fats, and carbohydrates) in the diet. Most of IFM's foundational, first-step, and advanced therapeutic food plans are usually prescribed in conjunction with one of the following five macronutrient distributions (also developed by IFM):

- **20P/30F/50C:** appropriate for patients who adhere to a vegan lifestyle and do not consume soy products
- **25P/30F/45C:** the suggested macronutrient distribution for individuals who want to consume a baseline healthy diet. This distribution is most often used in conjunction with the Core Food Plan, and is appropriate for individuals who are not yet ready to make more demanding nutrition modifications. It is also appropriate for omnivores, vegetarians, and vegans who consume soy products.
- **30P/30F/40C:** supports blood sugar control, lowers postprandial insulin levels, and targets metabolic concerns. This macronutrient distribution is most often used in conjunction with the Cardiometabolic Food Plan, but may also be used to support the IFM Elimination Diet or Detox Food Plan, if there are underlying cardiometabolic risks or concerns about blood sugar regulation.

- **30P/45F/25C:** appropriate for patients seeking a low-carbohydrate food plan without the added goal of nutritional or therapeutic ketosis. This macronutrient distribution was developed for use with the ReNew Food Plan, but may be applied to other plans if desired, especially if detoxification from refined carbohydrates is a health goal.
- **20P/60F/20C:** offers a low-carb, mildly ketogenic approach that is more sustainable and more palatable than therapeutic-grade ketogenic diets. With a macronutrient ratio (F:P+C) of 1.5:1, this macronutrient distribution provides 1.5 times as many calories from fat as calories from protein and carbohydrates combined. While this mild approach to a ketogenic diet does not require extensive practitioner-patient contact, it is strongly recommended that patients work with an experienced nutritionist and regularly monitor their ketone levels with urine strips. The 20P/60F/20C macronutrient distribution is commonly used in conjunction with the Mito Food Plan, but may be applied to other IFM food plans if desired. l.

Macronutrients: see PFC-MVP.

Matrix: see Functional Medicine Matrix.

Mediators (perpetuators): intermediaries that contribute to the continued manifestations of disease. Mediators do not cause disease; instead, they underlie the host response to triggers. Examples include biochemical factors (e.g., cytokines and leukotrienes) and psychosocial factors (e.g., reinforcement for staying ill).

Medical Symptom Questionnaire (MSQ): a tool used by functional medicine practitioners to assess the frequency and severity of a patient's problem and to track progress of treatment over time.

Metabolomics (metabonomics): the study of metabolic responses to drugs, environmental changes, and diseases. An extension of genomics and proteomics, metabolomics may lead to more efficient drug discovery and individualized patient treatment with pharmaceutical drugs and other interventions and therapies.

Methylation: the biochemical process of that involves the attachment of a single carbon methyl group to a substrate. Methylation occurs in many biochemical pathways, including phase II detoxification, immune function, and maintaining DNA. Methylation works as an epigenetic control mechanism, as methylation of DNA often acts to repress gene transcription.

Micronutrients: see PFC-MVP.

Mito Food Plan: an advanced therapeutic dietary intervention from IFM that emphasizes therapeutic foods for energy, anti-inflammatory nutrients, and high-quality dietary fats. The Mito Food Plan is low-glycemic, low-grain, and gluten-free. The plan focuses on supporting healthy mitochondria and is often used in conjunction with IFM's mildly ketogenic macronutrient distribution (20P/60F/20C). Intermittent fasting and therapeutic calorie restriction are optional strategies sometimes used with the Mito Food Plan.

Mnemonic: a word, phrase, or sentence that is used as a way to memorize and remember a number of separate objects, elements, ideas, etc., that make up a group.

Modifiable lifestyle factors: health-promoting lifestyle factors that include:

- **Sleep and relaxation:** getting adequate sleep and making time for meaningful relaxation
- **Exercise and movement:** participating in physical activity that is age-appropriate and that can be performed within the parameters of an individual's health status
- **Nutrition:** maintaining adequate hydration, and eating a diet that is age-appropriate and complementary to genetic background, health conditions, and environment
- **Stress:** reducing overall stress levels and effectively managing existing stress
- **Relationships:** developing and maintaining healthy relationships and social networks, while reducing the impact of noxious relationships

These appear along the bottom of the Functional Medicine Matrix. Clinicians and their patients can co-develop an individualized plan for addressing these issues.

Molecular mimicry: a condition that happens when a foreign antigen shares sequence or structural similarities with human tissue. Molecular mimicry has been proposed as a pathogenic mechanism for autoimmune disease, as well as a probe useful in uncovering its etiologic agents.

Neurotrophins: a family of small proteins acting as growth factors that help support cells within the central nervous system. Neurotrophins serve several important roles in the maintenance of nervous system function, including stimulation of neurogenesis, induction of differentiation from progenitor cells into neurons, and prevention of apoptosis in functioning nerve cells.

Nutrient deficiency: occurs when nutrients are not obtained in adequate amounts to meet the requirements for normal cellular function. Nutrient deficiencies result in various signs and symptoms and, if not corrected, overt disease states

Nutrient insufficiency: occurs when the body does not get optimal levels of nutrients. Nutrient insufficiencies may result in signs and symptoms, but not necessarily overt disease presentation.

Nutrient toxicity: occurs when too much of a specific nutrient causes illness or dysfunction.

Nutrigenomics (nutritional genomics): the study of how different foods may interact with specific genes to increase the risk of common chronic conditions, such as obesity, type 2 diabetes, heart disease, stroke, and certain cancers. It can also be described as the study of the influence of genetic variation on nutrition by correlating gene expression or single-nucleotide polymorphisms with a nutrient's absorption, metabolism, elimination, or biological effects. Nutrigenomics also seeks to provide a molecular understanding of how common chemicals in the diet affect health by altering the expression of genes and the structure of an individual's genome. The ultimate aim of nutrigenomics is to develop rational means to optimize nutrition for the patient's genotype.

Nutritional status: the current condition of an individual based on the interaction of diet, nutrient levels, demands on the body, and both internal and external factors impacting health.

Organ reserve: the difference between the optimal function of a vital organ and the level of function required to maintain an individual's daily life. In other words, it is the "reserve power" of a particular organ, above and beyond what is required in a healthy individual. It can also be thought of as the degree of freedom available for the organ to perform its functions and maintain health. Decline in the organ reserve occurs in times of stress, sickness, and as we age.

Organ system diagnosis: the practice of giving a collection of symptoms a name based on dysfunction in an organ system, then citing the named disease as the cause of the symptoms the patient is experiencing. Organ system diagnosis is common in the allopathic medical model. However, this bit of circular logic avoids any discussion of the systemic or underlying causes of dysfunction, and treats all people with a disease the same, despite the fact that two people with the same collection of symptoms may have completely different underlying physiological causes for the symptoms they display.

Oxidation-reduction (redox): paired chemical reactions that occur in balance with each other within the body of a healthy individual. These reactions involve the transfer of electrons (or the distribution of electron sharing), and thus require both a donor and acceptor. When this physiological parameter is out of balance, a net accumulation of donors or acceptors can lead to deleterious cellular oxidation phenomena (e.g., lipid peroxidation, free radical formation).

Oxidative stress: occurs when there is an imbalance between the production of damaging reactive oxygen species and an individual's antioxidant capacity to detoxify the reactive intermediates or to repair the resulting damage. Disturbances in the normal redox state of tissues can cause toxic effects through the production of peroxides and free radicals that damage all components of the cell, including proteins, lipids, and DNA. Oxidative stress is implicated in the etiology of several chronic diseases, including atherosclerosis, Parkinson's disease, Alzheimer's disease, and chronic fatigue syndrome.

Patient-centered care: care that is centered on the goals of the patient. This type of care requires the involvement and collaboration of both patient and doctor in working towards health goals. The patient plays an active role in their healthcare, with the underlying goal of promoting optimal health and vitality, rather than simply working toward the absence of disease.

Personalized medicine (individualized medicine): medicine that treats each patient as a unique individual and takes into account the totality of personal history, family history, environment and lifestyle, physical presentation, genetic background, and components of mind, body, and spirit. Interventions are tailored to each patient and adjusted based on the patient's individualized response. This term can also describe the effort to define and strengthen the art of individualizing healthcare by integrating the interpretation of patient data (medical history, family history, signs, and symptoms) with emerging "–omic" technologies like nutrigenomics, pharmacogenomics, proteomics, and metabolomics.

Personalized nutrition plan: a customized nutrition plan that addresses and takes into account the findings from the Functional Nutrition Evaluation in order to reestablish health in an individual.

PFC-MVP: a mnemonic for organizing the clinical findings revealed in a functional nutrition evaluation to guide a nutrition intervention. PFC-MVP provides a way to capture nutrition-oriented clinical exam findings, laboratory results, and dietary concerns identified by diet, nutrition, and lifestyle review in a systematic way. The nutrition evaluation

process identifies concerns with the macronutrients—protein, fats, and carbohydrates—and the micronutrients—minerals, vitamins and phytonutrients.

- **Protein:** macromolecules made up of chains of amino acids that constitute the majority of structural tissue and are involved in almost every function of the body. High-quality proteins of any kind are the best choice. This includes lean, grass-fed, organic, non-GMO animal products; and organic, non-GMO plant sources.
- **Fats:** macromolecules that are insoluble in water. They are chemically described as saturated, unsaturated, monounsaturated, or polyunsaturated. Good quality fats are essential for maintaining healthy cell membranes, providing energy, and modulating inflammation.
- **Carbohydrates:** macromolecules that make up four groups: monosaccharaides, disaccharides, oligosaccharides, and polysaccharides. Carbohydrates serve as a primary energy source, promote proper gastrointestinal functioning, and aid in the elimination of toxins and waste products.
- **Minerals:** inorganic nutrients found in foods that are essential for growth and health. There are two categories of minerals—macrominerals and microminerals (also known as trace minerals). Macrominerals are required by the body in large amounts. These minerals include calcium, chloride, magnesium, phosphorus, potassium, sodium, and sulfur. The body requires only small amounts of microminerals. These include cobalt, copper, fluoride, iodine, iron, manganese, selenium, and zinc.
- **Vitamins:** compounds found in food that are needed for growth and health maintenance. Some vitamins are classified as fat-soluble at soluble vitamins; these are Vitamins A, D, E, and K. Other vitamins are water-soluble; these include Vitamin C and the vitamin B complex: thiamine (B1), riboflavin (B2), niacin (B3), pantothenate (B5), pyridoxine (B6), biotin (B7), folate (B9), and cobalamin (B12).
- **Phytonutrients:** natural compounds and components of plants that lend color and taste, and help promote health by multiple mechanisms. These mechanisms include stimulating enzymes that help the body get rid of toxins, boosting the immune system, promoting healthy hormone levels, etc. Fruits, vegetables, grains, legumes, spices, herbs, nuts, seeds, and teas all provide powerful phytonutrients. These phytonutrients come in all colors—green, yellow, orange, red, blue-purple, white, brown, and black.

Phenotype: observable traits of an organism resulting from the expression of genes influenced by environmental factors.

Phytonutrients: see PFC-MVP.

Post-traumatic stress disorder (PTSD): a disorder that develops in some people who have experienced a shocking, scary, or dangerous event.

Precipitating event: an event that initiates a change in health status that persists long after exposure to the event ends. This is similar to a trigger, however, a trigger only provokes illness as long as the person is exposed to the trigger, or for a short time afterward.

Prospective medicine (P4 medicine): a descriptive term used to describe personalized, predictive, preventive, and participatory medicine. This concept was developed and introduced in 2003 as a convergence of systems medicine, the digital revolution, and consumer-driven healthcare. Prospective medicine focuses on creating an innovative synthesis of technologies and models—particularly personalized medicine (the "-omics") and systems biology—in order to determine the risk for individuals to develop specific diseases, detect the disease's earliest onset, and prevent or intervene early enough to provide maximum benefit.

Proteomics: the large-scale study of proteins, particularly their structures and functions, how they are modified, when and where they are expressed, how they are involved in metabolic pathways, and how they interact with one another. The proteome is the entire complement of proteins, including the modifications made to a particular set of proteins, produced by an organism or system. This will vary with time and distinct requirements, or stresses, that a cell or organism undergoes. As a result, proteomics is much more complicated than genomics. An organism's genome is more or less constant, while the proteome differs from cell to cell and from time to time.

PURE: a heuristic mnemonic used for the assessment and treatment of toxicity-related disorders. Steps to consider when assessing and treating patients with toxic exposures include:

- **Pattern recognition:** recognize common patterns of toxicity signs and symptoms, including those associated with neurodevelopmental toxicity, immunotoxicity, mitochondrial toxicity, and endocrine toxicity.
- **Under-supported/overexposed:** examine the patient's environment and lifestyle to determine what might be lacking and what might be excessive.
- **Reduce toxin exposure:** design a strategy for the patient to avoid continued toxin exposure.
- **Ensure a safe detox:** support the patient during detoxification by ensuring adequate nutrients to aid in the detoxification and biotransformation process, and by recommending lifestyle changes that increase the safety and efficacy of detox programs.

PTSD: a heuristic mnemonic for general treatment of hormone-related disorders. Factors to be considered include:

- **Production:** production (or synthesis) and secretion of the hormone
  - *What are the building blocks of thyroid hormone and cortisol?*
  - *What affects the secretion of insulin?*
  - *What are the building blocks of serotonin?*
  - *What affects synthesis-inflammation of the gland (as in autoimmune thyroiditis)?*
- **Transport:** transport, conversion, distribution, or interaction with other hormones
  - *Do the levels of insulin impact the levels of E or T?*
  - *Does a hormone's transport from its gland of origin to the target gland impact its effectiveness or toxicity?*
  - *Can we influence the level of free hormone?*
  - *Is the hormone transformed (T4 to T3 or RT3), and can we modulate that?*
- **Sensitivity:** cellular sensitivity to the hormone signal
  - *Are there nutritional or dietary factors that influence the cellular response to insulin, thyroid hormones, estrogens, etc.?*
- **Detoxification:** detoxification or excretion of the hormone
  - *How is estradiol metabolized in the process of biotransformation?*
  - *Can we alter it?*
  - *What can we do to affect the binding to and excretion of estrogens?*

Relative risk: a measure of the strength of the relationship between risk factors and a condition. For example, one could compare the risk of developing cancer in persons with a certain exposure or trait to the risk in persons who do not have this characteristic. Male smokers are about 23 times more likely to develop lung cancer than male nonsmokers, so their

relative risk is 23. Most relative risks are not this large. For example, women who have a first-degree relative (mother, sister, or daughter) with a history of breast cancer have about twice the risk of developing breast cancer, compared to women who do not have a family history.

ReNew Food Plan: an advanced therapeutic dietary intervention developed by IFM. This plan serves as a "whole systems reboot" to set an individual on a renewed path to wellness. On this plan, all sweeteners (natural and artificial), dairy, grains, alcohol, caffeine, genetically modified organisms (GMOs) and processed foods are removed from the diet. The plan also excludes foods that are high in pro-inflammatory saturated animal fats and foods that may contain heavy metals. The ReNew Food Plan's goals are to reduce chronic inflammation, support sugar detoxification, identify and reduce food triggers, reduce food cravings, and encourage the healthy elimination of toxins. This plan is an option for consideration when GI symptoms do not resolve following a standard elimination diet and reintroduction protocol.

Single nucleotide polymorphism (SNP): a DNA sequence variation occurring when a single nucleotide—A, T, C, or G—in the genome differs between members of a species or between paired chromosomes in an individual. Almost all common SNPs (pronounced "snips") have only two alleles. These genetic variations underlie differences in our susceptibility to, or protection from, several diseases. Variations in the DNA sequences of humans can affect how humans develop diseases. For example, a single base difference in the genes coding for apolipoprotein E is associated with a higher risk for Alzheimer's disease. SNPs are also manifestations of genetic variations in the severity of illness, the way our body responds to treatments, and the individual response to pathogens, chemicals, drugs, vaccines, and other agents. They are thought to be key factors in applying the concept of personalized medicine.

SMART goals: a mnemonic framework used for organizing and implementing health-related goals when coaching patients through behavior change. SMART goals are

- **Specific.** Desired outcomes are stated as explicitly as possible, and a specific area or topic is targeted for improvement. This is the "who, what, where, when, which, and why" of the stated goal.
- **Measurable.** The ways in which progress will be monitored and tracked are identified. This is the "how" of the stated goal.
- **Action-oriented.** The stated goals are small, achievable, and are easily outlined into specific steps that will enable the patient to complete the goal. As smaller goals are met, they are replaced with intermediate goals and goals that are more difficult to achieve.
- **Realistic.** The patient is both willing and able to accomplish this goal.
- **Timely.** In order to help the patient maintain motivation, the goal is set with a deadline or timeline in mind for achievement.

Sociogenomics: the field of study investigating the role of social networks, social connectedness, and a sense of community in the promotion of health or disease. Sociogenomics is an important consideration as a determinant of patient health.

Specific Carbohydrate Diet (SCD): a dietary intervention that focuses on the consumption of monosaccharides (simple carbohydrates) that are easily absorbed by the intestinal wall. Disaccharides and polysaccharides (complex carbohydrates) are omitted while following this approach, as these foods are not easily digested and can feed harmful bacteria in our intestines, resulting in small intestine bacterial overgrowth (SIBO), chronic inflammation, and other negative symptoms.

IFM's SCD Food Plan is one of three GI-specific food plans (a subcategory of advanced therapeutic interventions), which aims to restore the balance of bacteria in the gut. This plan is an option for consideration when GI symptoms do not resolve following a standard elimination diet and reintroduction protocol.

Systems biology: an interdisciplinary study of systems of biological components (e.g., molecules, cells, organisms, species, etc.) that focuses on complex interactions with biological systems, using a holistic approach to biological research. Put another way, a systems biology approach examines the relationships and interactions between various parts of a biological system and integrates this information to understand how biological systems function. To study biological components and their interactions, scientists in this field use quantitative measurements of the behavior of groups of interacting components; systematic measurement technologies such as genomics, bioinformatics and proteomics; and mathematical and computational models to describe and predict dynamical behavior.

The 5Rs: a heuristic mnemonic for the five-step process used to normalize gastrointestinal function, which is a core component of functional medicine. The 5R Framework for Gut Restoration is as follows:

- **Remove** the source of the imbalance (e.g., pathogens, allergic foods) as a first step
- **Replace** any factors that are missing (e.g., HCL, digestive enzymes)
- **Reinoculate** or repopulate the gut with symbiotic bacteria (e.g., lactobacilli, bifidobacteria)
- **Repair** damaged gut membranes using, for example, glutamine, fiber, and butyrate, etc.
- **Rebalance** or modify the attitude, diet, and lifestyle of the patient to promote a healthier way of living

Three legs of the stool: a framework for practicing functional medicine that includes three parts:

- **Retelling the patient's story:** collecting information from the patient through extensive interaction, then reflects the problem back to the patient in terms of antecedents, triggers, and mediators (ATMs)
- **Organizing the clinical imbalances:** organizing physiological systems and listing them on the Functional Medicine Matrix
- **Personalized lifestyle factors:** assessing each patient's environment and lifestyle, and partnering with patients to develop, adopt, and maintain appropriate personalized health-promoting behaviors

Timeline: see Functional Medicine Timeline.

Triage theory: theory that DNA damage and late onset disease are consequences of a triage allocation mechanism developed during evolution to cope with periods of micronutrient shortage. When micronutrients (i.e., vitamins and minerals) are scarce, they are consumed for short-term survival at the expense of long-term survival. Triage theory explains how diseases associated with aging like cancer, heart disease, and dementia may be unintended consequences of mechanisms developed during evolution to protect against episodic vitamin or mineral shortages.

Triggers: discrete entities or events that may provoke symptoms or disease (e.g., microbes). A single trigger may be insufficient in and of itself for disease formation, as the health, reserve capacity, and resilience of the host are important components of the response. Triggers are important markers of potential disease and dysfunction.

Waist-to-hip ratio (WHR): the waist circumference divided by the hip circumference, which is a useful metric for assessing risk of metabolic syndrome. Increased clinical concerns are identified with a WHR greater than 0.8 for women and 0.9 for men.

Xenobiotics: chemicals found in an organism that are not normally produced by or expected to be present in that organism. Xenobiotics may also include substances present in much higher concentrations than usual. This term is often applied to pollutants like dioxins, polychlorinated biphenyls, and other substances foreign to an entire biological system (i.e., artificial substances that did not exist in nature before their synthesis by humans). Exposure to several types of xenobiotics has been implicated in cancer risk.

