

# BASICS OF NUTRITION



## STUDENT GUIDE

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# INTRODUCTION

## LEARNING OUTCOMES

Welcome to the Basics of Nutrition Module. By the end of this section of the course, you will be able to:

- ▶ Identify and describe the Nutritional Therapy Association’s “Foundations.”
- ▶ Explain the importance of eating a properly prepared, nutrient-dense, whole foods diet, and give specific examples of foods and preparation methods with consideration for bio-individuality.
- ▶ Describe the roles, functions, and synergistic relationships of macronutrients and micronutrients.
- ▶ Evaluate a *Food & Mood Journal* for nutrient density, food variety, and macronutrients optimally balanced for bio-individuality.

## THE NUTRITIONAL FOUNDATIONS

As mentioned in the Welcome Module, the NTA believes that there are six “Nutritional Foundations” that must be in balance for us to experience optimal health.

### Properly Prepared, Nutrient-Dense, Whole Food Diet

Eating a properly prepared, nutrient-dense, whole food diet provides the fuel and essential building blocks the body needs to maintain health and balance.



**THERE IS NO ONE-SIZE-FITS ALL DIET THAT IS PERFECT FOR EVERYONE, AND IT'S ESSENTIAL TO TAILOR NUTRITION TO THE UNIQUE BIO-INDIVIDUAL NEEDS OF EVERY CLIENT.**

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However, there *are* some general nutritional guidelines we recommend for everyone:

- ▶ Consuming minimally processed, unrefined, whole foods that are close to how they appear in nature.
- ▶ Eating a diverse range of local, seasonal, organic fruits and vegetables.
- ▶ Soaking and sprouting nuts, seeds, grains, and legumes, when appropriate, to maximize the bioavailability of nutrients.
- ▶ Choosing grass-finished meats, pasture-raised poultry and eggs, and wild caught seafood.

## Digestion & Elimination

Healthy digestion is fundamental to nutrition. Eating a properly prepared, nutrient-dense, whole food diet is an essential first step, but we must also be able to mechanically and chemically breakdown this food and absorb the nutrients it contains. The digestion process is dependent on a vast number of cascading events that begin in the brain and continue all the way through elimination. Proper digestion provides the nutrients that fuel and build every single cell in the body. These cells in turn make up every tissue and organ in the human body. So, we quite literally are what we eat; or rather, we are what we absorb.

## Blood Sugar Regulation

Glucose is the form of fuel that circulates in the blood as “blood sugar.” We obtain glucose from various food sources. Our brain, central nervous system, and

peripheral organs work hard to keep this quantity of glucose within a tightly controlled range. Too little and we feel lethargic, cranky, and ravenously hungry. Too much and we risk damage to our cells and tissues. Either case is seen as an emergency by the brain, and measures are taken immediately to bring blood sugar back into balance. We can help ensure balanced energy levels and prevent sharp spikes or drops in blood sugar by adjusting the quantity and quality of macronutrients we consume, reducing stress levels, getting adequate sleep, and engaging in regular movement.

## Fatty Acid Balance

The healthy fats found in animal and plant foods are a critical part of eating a properly prepared, nutrient-dense, whole food diet. Fats play numerous roles in the body:

- ▶ They provide the building blocks for cellular membranes and hormones.
- ▶ They act as a calorie dense energy source.
- ▶ They help regulate our inflammatory response.
- ▶ They increase satiety.
- ▶ And, as an added bonus, they make food taste better.

## Mineral Balance

Minerals make up approximately 5% of the human body, by weight, and are critical for every system to function. We cannot make them on our own, so we must get them from the foods and beverages we consume. Minerals are required to transfer nutrients across cell membranes, build healthy bones, regulate nerve signaling, and contract and relax our muscles. Some of the common minerals we think of are calcium, magnesium, sodium, and potassium, but we need many other macro and microminerals for optimal health. The best way to incorporate more minerals into

your diet is consuming a properly prepared, nutrient-dense, whole food diet and drinking plenty of clean, mineral-rich water.

## Hydration

Water is the most important nutrient. It makes up about 60 % of the total human body mass and is required for numerous body processes. (Popkin, D'Anci, & Rosenberg, 2010) Unfortunately, dehydration happens to be one of the most common deficiencies. Consuming an adequate amount of water is critical for proper hydration and overall health, so drink up! But as with digestion, consuming enough water is only part of the story. We must actually *absorb* the water we drink, a process which requires a sufficient quantity of special minerals called electrolytes.

# NUTRITION TERMS

## NUTRITION WORDS & CATEGORIES

**Nutrition** is a science focused on the interactions between living organisms and their food and the biological processes used by the body to break down, absorb, and utilize nutrients.

**Nutrients** are the chemical substances contained in food that are necessary to sustain life. They play many key roles in the body, which can be broken down into three main categories: energy, structure, and function. For example, nutrients provide us the energy we need to move, think, digest, rebuild, and heal. They provide the basic building blocks we need to build our cells, tissues, organs, and systems. And they help create the enzymes and hormones we need to function properly.

Nutrients can be broken down into 3 basic categories: water, macronutrients, and micronutrients. Macronutrients serve primarily as building blocks of the body and as fuel for energy production. Micronutrients serve primarily as **co-factors** for proper physiological function and also as structural building blocks.

Let's go over each of these in detail now.



**A CO-FACTOR IS A SUBSTANCE WHOSE PRESENCE IS ESSENTIAL FOR THE ACTIVITY OF AN ENZYME. ENZYMES SPEED UP, OR ACCELERATE, ALMOST ALL CHEMICAL REACTIONS IN THE BODY AND ARE NECESSARY FOR LIFE AS WE KNOW IT.**

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# WATER

## The Most Important Nutrient

You might not think of water as a “nutrient,” but given all its functions in the body, it definitely makes sense to think of it as such.



Here are few interesting facts about water:

- ▶ You can go about 8 weeks without food, but only days without water.
- ▶ Water is found in every single tissue in the body.
- ▶ Water makes up the bulk of all body fluids, including saliva, blood, lymph, intracellular fluid (the fluid within cells), and extracellular fluid (the body of fluid outside cells).
- ▶ Water is often called the “universal solvent” since it can dissolve a wide variety of substances (more than any other liquid in fact).

And here are but some of the many roles of water in the human body:

- ▶ Water helps deliver nutrients and oxygen to cells and transport waste away from cells and out of the body.
- ▶ Water helps cushion and lubricate our joints, absorb shocks to the body, and prevent tissues from sticking.
- ▶ Water moistens oxygen for easier breathing.
- ▶ Water helps regulate optimal body temperature.



- ▶ Water helps improve the communications between cells and maintain their electrical properties.

## Water Consumption & Loss

The body can produce a very small amount of its daily water needs through metabolic processes, but the vast majority comes from the beverages and foods we consume. On average, ingested liquids account for 64% of our water intake, ingested food accounts for 28%, and metabolic processes make up the remaining 8%.

Optimal health requires daily consumption of sufficient water since the human body does not store water long-term. We're not camels after all! Water is lost from the body in four main ways: about 60% is excreted by the kidneys and out of the body through urine, about 24% is released through the skin via perspiration, about 12% is exhaled out through the lungs, and about 4% is excreted through the GI Tract via stool. Also, water loss ranges with exercise.

## Water Consumption Guidelines

Like with nutrition, water needs are always bio-individual. Some individuals will need more water than others in hotter temperatures, during intense physical activity, or when experiencing intense stress, blood sugar dysregulation, and so on. While the quantity of water intake should be tailored to each client, NTCs and NTPs should also ensure that their clients practice the following water consumption habits:

- ▶ **Add a pinch of sea salt to your water:** Sea salt contains dozens of minerals, including the electrolytes calcium, magnesium, potassium, and sodium that help you better absorb and utilize the water you drink.

- ▶ **Sip, don't chug:** The body can only process a limited amount of water at a time. You will be able to absorb and utilize the water you drink more efficiently if you take small sips over a longer period of time.
- ▶ **Drink most water away from meals:** Sipping a little water with meals is fine but try to consume most of your water between meals to avoid diluting stomach acid and negatively impacting digestion. Thoroughly chewing each bite will help provide most of the lubrication needed throughout the meal.
- ▶ **Don't drink too much water:** Consuming too much water can be just as problematic as not getting enough. As a general rule, try to follow your thirst but avoid drinking more than 1 gallon (3.8 liters) per day.
- ▶ **Drink clean water:** Get your water from clean, reliable sources and use a good water filter system for water that you drink or bathe in.

Water consumption guidelines and sourcing tips will be discussed in more detail in the Hydration Module.

## MACRONUTRIENTS

There are three macronutrients: carbohydrates, fat, and protein. Each of these plays a number of important roles in fueling and constructing the human body.

### Carbohydrates

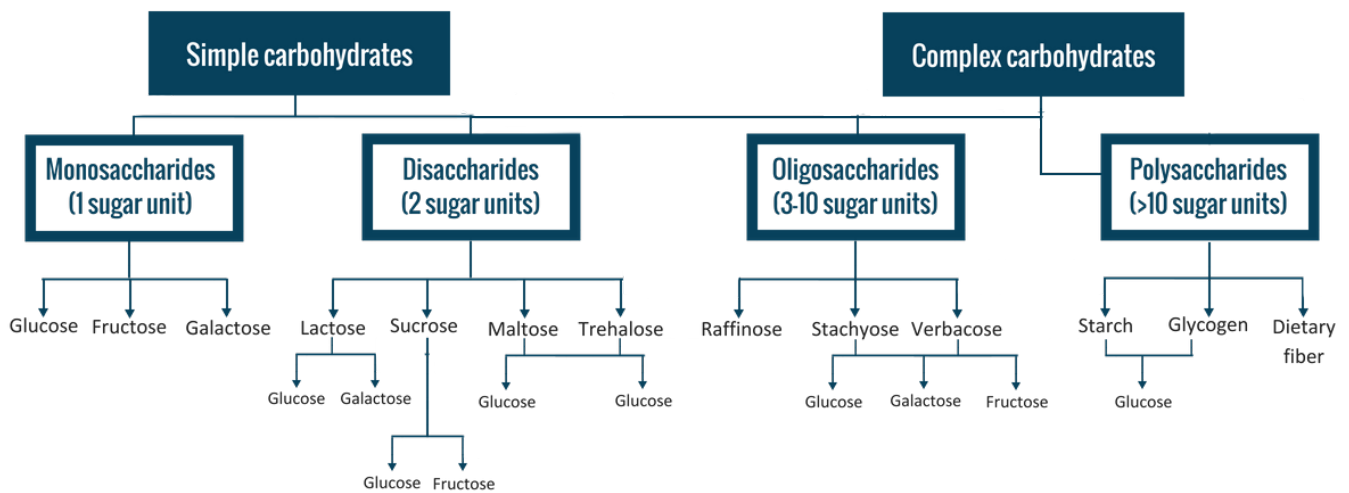
Carbohydrates are made of carbon and water, hence the two parts of the word: *carbo-* and *-hydrate*. They are found predominately in vegetables, fruits, tubers, legumes, grains, and sweeteners. (Cummings & Stephen, 2008)



## ROLES OF CARBOHYDRATES IN THE BODY

Carbohydrates, in the form of glucose, provide a quick source of fuel for the brain and muscles. In the form of fiber, carbohydrates help provide fuel for our microbiome and ensure regular elimination of waste. And when combined with fat and protein, carbs help us fight infections, grow new body tissue such as bones and skin, and lubricate our joints.

## CARBOHYDRATES



## CARBOHYDRATES CLASSES

Carbohydrates can be divided into 2 basic categories: simple and complex.

Simple carbohydrates include monosaccharides and disaccharides, sometimes called ‘sugars,’ and polyols, called ‘sugar alcohols.’ These include both natural and refined substances. See figure of carbohydrates classes above.

They tend to have sweet flavors and while mono and disaccharides are easily absorbed within the digestive tract, polyols are notoriously difficult to absorb.

Complex carbohydrates, also known as polysaccharides, include both starchy polysaccharides (starches) and non-starchy polysaccharides (insoluble and soluble fiber). These are found in plants, while glycogen, another form of polysaccharides, is found in most animal tissues.

In plants, starch is the storage form of glucose created during photosynthesis. Foods such as potatoes, wheat, corn, rice, and cassava contain a large percentage of starch.

In humans, glucose is stored in the liver and muscles as **glycogen**.

Fiber is classified into two main groups: **soluble fiber** and **insoluble fiber**. Fiber is either soluble or insoluble based on its ability to dissolve in hot water. Fibers that dissolve in hot water are soluble, those that don't are insoluble. Food containing soluble fibers are: legumes, oats, barley, some fruits such as berries, bananas, apples, and pears, and some veggies such as carrots, broccoli, artichokes and onions. Foods rich in insoluble fibers are whole grain products, wheat and corn bran, nuts, seeds, some veggies, and some fruits. Generally, veggies and most grain products contain more insoluble than soluble fibers.

Soluble fibers generally DELAY (slow down) gastric emptying, increase transit time (through slower movement), and decrease nutrient absorption (like glucose). Insoluble fibers DECREASE (speed up) transit time and increase fecal bulk. Resistant starch cannot be classified as soluble or insoluble - it depends on the resistant starch as it can be both. Neither type of fiber can be broken down by our own human enzymes. Instead, they feed the microbes in our guts. When these microorganisms eat the fiber we consume, they produce a number of important byproducts that are important to human health, including vitamins like K2 and B12, short chain fatty acids, and organic acids.

Fiber, however, is not the only source of food for our gut flora. A special kind of starchy polysaccharide known as **resistant starch** can also feed our microorganisms, as well as two oligosaccharides: *fructooligosaccharides* (also called FOS) and *galactooligosaccharides* (also called GOS). Oligosaccharides are a

category of carbohydrates that fall in-between simple and complex. We will discuss the intricacies of these carbohydrates more in the Digestion module.

## ESSENTIAL VS. NON-ESSENTIAL

Technically speaking, there is no such thing as an “essential” carbohydrate since the body can produce glucose from protein. However, given the important roles they play in energy regulation, digestion, feeding our microbiome, and so on, we do believe that a bio-individual quantity of high-quality carbohydrates belongs in a well-balanced diet.

## Fat



Contrary to popular belief, dietary fat is not the villain it has been made out to be. A fairly high percentage of diverse, high-quality fats are required to fuel and build your body.

### ROLES OF FAT IN THE BODY

Fats are crucial for numerous body functions and structures. For example, the fat in our food helps us absorb the fat-soluble vitamins A, D, E, and K, helps improve the taste and enjoyment of food, increases satiety, and helps regulate the speed we digest food. It also provides an important source of high caloric energy that is ideal for long, low-intensity activity. Fat is also needed to build cell membranes and certain hormones and serves as a protective lining for the organs of the body.

### CLASSES OF FATS

There are three main classes of fats—technically called “fatty acids”—identified by their degree of “saturation”. Saturation refers to whether or not the carbon atoms

in each fat molecule are attached to hydrogen atoms or attached to other carbon atoms with double bonds.

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**WATCH THIS QUICK “SATURATED FATS, UNSATURATED FATS, AND TRANS FATS” VIDEO FOR MORE INFORMATION.**

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Saturated fatty acids are the most stable class since they lack double bonds between carbon atoms and have the maximum number of bonded hydrogen atoms. This class of fats, found in animal products and tropical oils, is usually solid at room temperature, does not go rancid easily, and is the safest choice for cooking.

Monounsaturated fatty acids are less stable than saturated fats since they have one (mono) double bond. This class of fats is found in olives, avocados, and various nuts, and tends to be liquid at room temperature. Monounsaturated fats are safe for low-temperature cooking but should not be used with higher heat and should be stored in dark containers to avoid going rancid.

Polyunsaturated fatty acids have two double (poly, or more than one) bonds. This makes these fats very unstable and highly reactive to light, heat, and oxygen, so they should not be used for cooking and always stored away from heat and light to help prevent rancidity. Polyunsaturates can be found in fish, flax, nuts, and seeds, and are best eaten raw. While these fats are not suitable for cooking, they are incredibly important for optimal physiology and should be eaten daily.

There are two special sub-classes of polyunsaturated fats worth mentioning here: Omega-3s and Omega-6s. Sufficient quantities of both are needed in our diet for optimal health, but the ratio between the two is just as important as the quantity of each. Ideally, the ratio between Omega-3s and 6s should be between 1 to 1 and 1 to 4. However, many people today eat a ratio between 1 to 10 and 1 to 25 thanks to overconsumption of refined vegetable oils and grain-fed animal products (grass-

fed animals have a slightly more favorable ratio). Getting the right ratio is critical for managing inflammation in the body, supporting healthy cells, and maintaining optimal cognitive function.

It's important to understand that none of these fat classes are "good" or "bad" per se. Each type serves an important purpose in the body and each has pros and cons depending on the context.

It's also key to understand that fat containing foods usually include a *combination* of saturated, monounsaturated, and polyunsaturated fats, not just one class. Lard, for example, a fat commonly thought of as saturated, actually contains *more* monounsaturated than saturated fat.

## ESSENTIAL VS NON-ESSENTIAL FATS

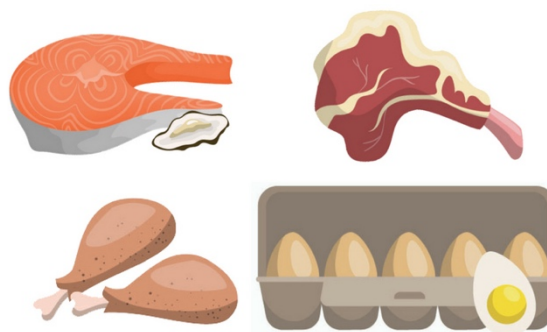
There are two "essential" fatty acids: **linoleic acid**, a polyunsaturated omega-6 fatty acid, and **alpha-linolenic acid**, a polyunsaturated omega-3 fatty acid. These two fats cannot be produced in the body and must be obtained from food. All other types of fat needed in the human body can be made from these two. However, in some situations certain fatty acids become conditionally essential, meaning that there is a greater need to directly consume specific fatty acids. We'll discuss this more in the Fatty Acid module.

## FAT SOURCING & QUALITY

Food quality is important with *all* macronutrients, but it's especially key when it comes to fats. Toxins can "bio-accumulate" (or build up) in fat tissue, so it's best to get fats from clean sources like 100% grass-fed animals, pasture-raised eggs, and organic coconut oil, cold-pressed olive oil, and so on. Avoid man-made and highly refined fats whenever possible, including margarine, industrial seed oils like canola oil, soybean oil, and corn oil, trans fats, and hydrogenated oils. These "Franken Fats" are unnatural, unneeded, unhealthy, and interfere with healthy fats in the body.

## Protein

There are approximately 50,000 different proteins in the human body, which are used as building blocks for tissues, organs, nerves, muscles, and more.



### ROLES OF PROTEIN IN THE BODY

In addition to creating tissues, protein is also an essential building block of enzymes, antibodies, hemoglobin, and peptide hormones. Enzymes are specialized protein molecules that act as the managers and catalysts for all biochemical processes. Antibodies are protein structures that help fight infection and destroy foreign invaders. Hemoglobin is a special protein found in red blood cells that transports oxygen around the body. There are numerous important peptide hormones in the human body, including:

- ▶ adrenocorticotrophic hormone (or ACTH), which acts on the adrenal cortex.
- ▶ oxytocin, often called “the feel good hormone.”
- ▶ insulin and glucagon, two hormones released from the pancreas to help regulate blood sugar and energy levels.

Antibodies will be discussed more in the *Immune System Module*, while hormones will be discussed more in the *Blood Sugar Regulation* and *Endocrine System* modules.

### DISPENSABLE VS INDISPENSABLE PROTEINS

To date, hundreds of amino acids have been identified, but only 22 are used in the human body. See the chart below for a complete list.



## AMINO ACIDS

|  | Amino Acids   |
|--|---|
| <b>Essential<br/>(9)</b>               | histidine*<br>isoleucine<br>leucine<br>lysine<br>methionine<br>phenylalanine<br>threonine<br>tryptophan<br>valine |
| <b>Conditionally Essential<br/>(6)</b> | arginine<br>cysteine<br>glutamine<br>glycine<br>proline<br>tyrosine   |
| <b>Dispensable<br/>(7)</b>             | alanine<br>aspartic acid<br>asparagine<br>glutamic acid<br>serine<br>selenocysteine<br>pyrrolysine                |

\*histidine is indispensable for infants but not for adults

9 are considered “essential” since they cannot be made in the body. The 9 indispensable amino acids. Another 6 of the 22 amino acids are “conditionally essential.” Though they *can* be created from other amino acids, the conversion process is extremely inefficient. It’s therefore ideal to get them directly from food. And the last 7 amino acids in the human body are considered dispensable because they can be easily made from other amino acids.

## PROTEIN SOURCING & QUALITY

Not all protein is created equal. While there are some healthy plant proteins, high-quality, humanely raised, and properly prepared protein from animal sources is much more bioavailable and includes all 9 of the essential amino acids necessary for human health. Good sources of protein include wild-caught seafood, meat from grass-fed or pasture-raised animals, pasture-raised poultry and eggs, and organic, non-GMO soybeans.

Also keep in mind that eating enough of the right kinds of protein isn't enough; you also need to have a healthy digestive system to actually *absorb* it. You are not just what you eat. You are what you absorb! This will be discussed more in the *Digestion & Elimination Module*.

# MICRONUTRIENTS

In addition to the three classes of macronutrients, there are two important classes of micronutrients we need to survive and thrive: vitamins and minerals.

## Vitamins

Most vitamins cannot be manufactured by our body, so we must get them by eating the plants and animals that can make them. Moreover, most vitamins produce the best results when paired with trace minerals, enzymes, and other vitamins found in real foods.

## ROLES OF VITAMINS IN THE BODY

Though they only account for less than 1% of the human body, vitamins play many crucial roles in health and growth. For example, they act as cofactors (or “helpers”) in metabolic processes, they support tissue growth, digestion, elimination, and immune function, and they prevent frank deficiency diseases such as scurvy,

pellagra, and rickets as well as pre-clinical symptoms. Understanding symptoms of micronutrient deficiencies is extremely important to our work as practitioners.

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**WATCH FOR VALUABLE INFORMATION ON THE SIGNS AND SYMPTOMS OF NUTRIENT DEFICIENCIES IN YOUR "SIGNS AND SYMPTOMS ANALYSIS FROM A FUNCTIONAL PERSPECTIVE" BOOK.**

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The following is a list of primary vitamins needed to support human life. Some can be made in the body in small quantities, but not enough to support physiological processes. All must be obtained from our food to supply appropriate amounts. This is why it's so important for clients to eat a nutrient-dense, properly prepared, whole foods diet:

- ▶ Vitamin A, which is also called retinol
- ▶ Vitamin B<sub>1</sub>, which is also called thiamin
- ▶ Vitamin B<sub>2</sub>, which is also called riboflavin
- ▶ Vitamin B<sub>3</sub>, which is also called niacin
- ▶ Vitamin B<sub>5</sub>, which is also called pantothenic acid
- ▶ Vitamin B<sub>6</sub>, which is also called pyridoxine
- ▶ Vitamin B<sub>7</sub>, which is also called biotin
- ▶ Vitamin B<sub>9</sub>, which is also called folate (not to be confused with the synthetic form folic acid)
- ▶ Vitamin B<sub>12</sub>, which is also called cobalamin
- ▶ Vitamin C

- ▶ Vitamin D (which can be made in the skin when exposed to sunlight, but is conditionally essential based on the season and quantity of sun exposure).
- ▶ Vitamin E
- ▶ Vitamin K<sub>1</sub> and K<sub>2</sub>

## FAT VS. WATER-SOLUBLE VITAMINS

Vitamins can be further classified into two main types based on whether they are soluble in fat or water:

- ▶ **Fat-soluble vitamins** are only soluble in lipids, not water, and can only be absorbed from food when sufficient quantities of dietary fat are present. As mentioned earlier, fat soluble vitamins include vitamins A, D, E and K. Excess fat soluble vitamins beyond what is needed by the body in the moment are stored in fat tissue\*.
- ▶ **Water-soluble vitamins**, as the name implies, are vitamins soluble in water. Examples include the B vitamins, vitamin C, inositol, and choline. Unlike fat soluble vitamins, excess water-soluble vitamins are excreted in the urine.

\*Vitamin B12 is also minorly stored in fat tissue.

## VITAMIN SOURCING & QUALITY

The best sources of vitamins are nutrient-dense, properly prepared, whole foods such as:

- ▶ local, seasonal, colorful, and, when possible, organic fruits, vegetables, nuts/seeds, grains and legumes
- ▶ whole, raw, unrefined, and cultured foods
- ▶ pasture-raised meat, poultry, and eggs

- ▶ wild-caught fish and seafood

Targeted supplementation can also be necessary for some clients, but it's important to always use high-quality, professional-grade supplements to avoid undesirable fillers, questionable ingredients, and poor nutrient-density. Additionally, many companies have poor raw material and product testing practices, and this can greatly influence the quality of supplement you receive.

## Minerals

Minerals cannot be produced by the body and must therefore be obtained from the food and beverages we consume. Out of the 118 elements on the [Periodic Table](#), 18 native element minerals are required for human health, while many more may prove to be beneficial.

### ROLES OF MINERALS IN THE BODY

Minerals act like the body's "spark plugs," acting as cofactors for enzyme reactions, regulating the proper pH of the blood, facilitating the transfer of nutrients across cellular membranes, maintaining proper nerve conduction, contracting and relaxing muscles, regulating tissue growth, and providing structural and functional support.

### MINERAL CLASSES

Minerals can be divided into two main groups: **macrominerals** and **microminerals**.

The macrominerals, of which we need relatively large amounts, include:

- ▶ calcium
- ▶ chloride
- ▶ magnesium
- ▶ sodium

- ▶ sulfur
- ▶ phosphorous
- ▶ potassium

The microminerals, also called “trace minerals” since we only require trace amounts, include:

- ▶ boron
- ▶ chromium
- ▶ copper
- ▶ germanium
- ▶ iodine
- ▶ iron
- ▶ lithium
- ▶ manganese
- ▶ molybdenum
- ▶ rubidium
- ▶ selenium
- ▶ silicon
- ▶ vanadium
- ▶ zinc

A whole food diet rich in plants is the best source of minerals.

## **MACRO- & MICRONUTRIENT RELATIONSHIPS**

Nutrients do not work in isolation. Each macro- and micronutrient works in synergy with other available nutrients. Some nutrients are synergistic, enhancing the qualities of each other. Others are antagonistic, inhibiting or interfering with the physiological action other nutrients.

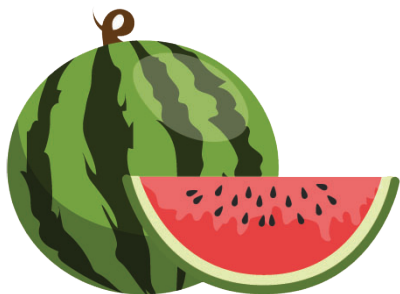
*You will learn more about these synergistic and antagonistic relationships throughout the course.*

# NUTRITION GUIDELINES

One of the best things you can do for your clients is to teach them how to transition their diets to a properly prepared, nutrient-dense diet. There are four main steps in this process:

- ▶ Transitioning to real food.
- ▶ Adjusting macronutrient ratios to meet bio-individual needs.
- ▶ Preparing foods properly.
- ▶ Eating mindfully.

## HOW TO TRANSITION TO REAL FOOD



The first step in effective Nutritional Therapy is helping clients begin the transition to eating more real food. For many people, this process can be intimidating, and some may struggle to change old habits. Others find transformation exciting and will welcome dietary and lifestyle changes with enthusiasm. In either case, always meet clients

where they are by using these three strategies:

- ▶ Elicit personal goals and change language from your client through Motivational Interviewing instead of dictating the changes you want to make. This increases client retention, buy in, and follow through.
- ▶ Ensure that all dietary and lifestyle changes are tailored to the unique bio-individual needs of every client. Some clients do well with slow and gentle shifts, while others prefer more rapid change. For the former group, you may



need to focus on changing just one ingredient or meal at a time, while the latter group may do better completely overhauling their fridge and pantry.

- ▶ Focus on positive additions first by adding in new healthy and enjoyable foods and supporting your client to replace less than optimal food choices with these additions.

## HOW TO ADJUST MACRONUTRIENTS TO MEET BIO-INDIVIDUAL NEEDS

An important step in Nutritional Therapy is ensuring that each client eats a bio-individually appropriate balance of carbohydrates, fats, and proteins. **There is no one-size fits all ratio that is perfect for every person, every day of their life.**

Changes in activity levels, stress levels, or personal health goals, for example, will all change the needs for each macronutrient. One's ancestry, genetics, epigenetics, and lifestyle choices will also impact nutrient needs.

Both research and institutionally-based recommendations for dietary macronutrient distributions vary. The World Health Organization recommends 0.66-0.83 g/kg of body weight in protein per day, and 10% or less calories from sugar, however they do not weigh in on carbohydrate needs (Healthy Diet, 2015) The European Food Safety Authority recommends 45-60% of our macronutrients come from carbohydrates and 20-35% of calories be derived from fat.

The USA and Canada have recommendations at 45-60% calories from carbohydrates, 20-35% from fat, and 10-35% from protein. (Macronutrients, n.d.)

Compare these numbers with data collected on traditional hunter-gatherer diets. In 2000, Loren Cordain reported data from a diverse group of world-wide communities. He found calories from carbohydrates to range from 22-40%, protein from 19-35%, and fat from 28-58%. Criticism of this study points out a potential underestimation of dietary carbohydrates, as researchers tracked the diets of males

(generally hunters) as opposed to females (generally plant material gatherers). (Cordain, et al., 2000)

As a basic starting point, the NTA recommends tracking a client's macronutrients to determine the current ratios. Suggested tools are [MyFitnessPal](#) or [Cronometer](#). Then, use the Fine-Tuning graph found on page 3 of the Macronutrient Guidelines & Fine-Tuning document found in the Basics of Nutrition Reference Materials.

## Carbohydrate Range

Carbohydrate needs are highly bio-individual, and we must be careful to avoid labelling them “good” or “bad” across the board. When it comes to carbs, NTPs and NTCs should always consider quality, sourcing, and preparation, context, and balance, not just quantity. For example, carbohydrate needs vary significantly based on one's activity level, insulin sensitivity, digestion status, and so on. As a basic starting point, clients should aim for 22 to 40% of calories to come from carbohydrates, with roughly half from starchy and half from non-starchy whole food sources.

## Fat Range

Fat is a vital building block and source of energy in the body. Just like with carbohydrates, each individual's daily fat needs will vary based on age, activity level, health status, goals, digestive function, and so on. However, as a basic starting point, clients should aim for 28-58% of calories to come from healthy fats. Then adjust this percentage based on each client's needs.

## Protein Range

Given its myriad roles in the body, it is critical to consume enough protein each day. As a basic starting point, clients should aim for 19-35% of calories to come from

protein. However, each client's daily protein intake should be tailored to their physiological needs, goals, activity, satiety levels, and digestion status.

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**REMEMBER: START WITH WHERE YOUR CLIENT IS AT, AND ADJUST MACROS AS NEEDED!**

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## HOW TO SOURCE REAL FOOD

### The 4 Keys to Sourcing Real Food

There are four key ways to help clients add in more real food, all of which involve changes in mindset, not just purchasing and eating habits:

- ▶ **Think variety.** Encourage clients to eat a diverse range of plants and animals. Most people today get 60% of their calories from just 3 foods: corn, wheat, and soy. Our ancestors ate a much wider variety of species, and our genes expect the same. A good trick is trying to get at least five different colors on one's plate at each meal.
- ▶ **Think locally.** Eat foods sourced as close as possible to where you live. This supports local farmers, reduces emissions, and reduces the risk of contamination.
- ▶ **Think seasonally.** Eat foods that are in season where you live. Throughout most of human evolutionary history, most fruits and vegetables were only available for short periods of the year. This ensures a wider diversity of nutrients and helps prevent food sensitivities that can develop from chronic overconsumption of certain foods.
- ▶ **Think quality.** If geographically and economically feasible, encourage clients to source the highest quality plant and animal foods possible. It's especially important to buy organic when one is consuming one of the "Dirty

Dozen” (more on this in a moment). When buying animal foods, it’s ideal to purchase meat sourced from 100% grass-fed, grass-finished animals or pasture-raised poultry. For seafood, wild-caught is preferably to farm-raised varieties.

If available near your clients, the best way to get diverse, local, in-season, high-quality food is visiting farmers markets or getting a CSA box. Farmers markets are a great way to find delicious, high-quality produce and meat sold directly from local farmers and ranchers. Many producers also offer Community Supported Agriculture (or “CSA”) shares, which are weekly subscription-based programs where you pay a set price to have a box of produce or meat delivered right to your doorstep each week. You support your local community and get the freshest food in return!

## Buy Properly Raised Food

There are lots of words now used in the marketplace to describe how particular foods are raised, and it can be difficult to know what’s what. Here are a few of the most common terms that clients will encounter and what they actually mean.

### **GRASS-FED VS. PASTURE-RAISED**

When ruminant animals like beef, lamb, buffalo, bison, and goat are labelled “grass-fed,” it means that they have been fed grass for at least some of their lives. This is in stark contrast to animals raised exclusively on feedlots, where they are raised on corn, grains, and commercial feed, none of which they are evolved to eat. That said, the term is not tightly regulated, and even “grass-fed” animals can actually be finished on grains for the last few months before they come to market. To ensure that an animal has only eaten grass as nature intended, look for meats labeled “Grass-Fed, Grass-Finished” or “100% Grass-Fed.”

This is important because animals fed exclusively grass live healthier lives and produce healthier food. 100% grass-fed beef, for example, has a much more

favorable ratio of omega-6 to omega-3 fats than those raised on corn, grains, etc. We'll talk more about the importance of this ratio in the Fatty Acid Module.

“Pasture-raised” or “pastured” animals spend most of their time outside, meaning they often have access to their natural diets: grass for cows, insects for chickens, etc. But some pasture-raised animals may be fed grains, too, especially in the winter when the pasture is covered with snow.

The key here is that pasture-raised refers more to where an animal eats, while grass-fed refers to what.

Want to know exactly how your food was raised and what they ate? Your best bet is to get to know your local farmers or ranchers. It creates a more visceral connection with your food, shows respect for those who grow it, and allows you to ask questions directly. When talking with farmers and ranchers, please be respectful and suspend judgement. These heroes work really hard to balance the welfare of their animals and the economic realities of the modern world.

### **CAGE-FREE VS. FREE-RANGE POULTRY & EGGS**

You will often see poultry and eggs labeled as “cage-free” or “free-range.” So what's the difference? And why should you care? As the name implies, “cage-free” means that animals are not confined to cages. While this is certainly better for their lives and our bodies than confinement, this is not actually a very meaningful term. Cage-free animals still live their lives in tight quarters, away from sunlight, fresh air, and their natural diets.

Similar to cage-free poultry, their “free-range” counterparts live most of their lives indoors. The key difference is that free-range animals have access to the outdoors, while cage-free animals do not. The problem with this term is that you have no way to know how much time the animals actually spend outdoors (often little to none), and whether the outdoor space is on grassy pasture, dirt, or even concrete!

From a nutrition and animal welfare point of view, pasture-raised poultry and eggs are the best choice. But just as we said earlier, the key is befriending farmers, so you can know firsthand how the animals are raised and what they are fed.

## **HUMANE CERTIFICATIONS**

In recent years, a number of new certifications have been developed to help consumers choose animal products that have been raised humanely.

The most rigorous such certification is Animal Welfare Approved, which certifies that meat, eggs, and dairy products come from animals raised outside in their natural habitats.

Global Animal Partnership is another popular certification system which assigned “GAP Step® ratings” as follows:

- ▶ Step 1 indicates that animals were raised without cages, crates, or crowding.
- ▶ Step 2 indicates that animals were raised in an “enriched” environment.
- ▶ Step 3 indicates that animals had enhanced access to the outdoors.
- ▶ Step 4 indicates that animals were raised primarily in pasture.
- ▶ Step 5 indicates animals are raised as naturally as possible with no physical alterations.
- ▶ Step 5+ indicates that animals are raised in natural environments and spend their entire lives on the farm.

Certified Humane, which certifies that animals are never confined to cages, crates, or stalls, and are provided the means to express their natural behaviors, may it be perching for chickens or rooting for pigs.

However, no label or certification can replace a direct relationship with a farmer or rancher.

## **WILD-CAUGHT VS. FARM-RAISED SEAFOOD**

When buying fish and seafood, the most important word to look for is “wild-caught.” This term means that the sea creature you are buying grew up in its natural habitat, eating the foods it evolved to consume. “Farm raised” seafood, on the other hand, is produced in small enclosures and fed unnatural diets, both of which can increase disease, leading many producers to use antibiotics (something you don’t want in your seafood or your gut). Regardless of which type you choose, try to eat smaller fish that are lower on the food chain like sardines, salmon, and tilapia, and shellfish like oysters and clams. This is because, sadly, many of the toxins now in our oceans bioaccumulate (or build up) in larger, predatory fish like tuna, shark, swordfish, and marlin.

## **ORGANIC VS. CONVENTIONAL**

One of the most common words you will see at the store is “organic.” But exactly what does this mean? Different countries have different regulations around the term, but in the United States, the “certified organic” label is only given to farmers who undergo annual audits to ensure they meet the following federal standards:

- ▶ No synthetic fertilizers or pesticides.
- ▶ No antibiotics or hormones.
- ▶ No GMOs.

It’s important to understand that “organic” produce is usually raised with fertilizers and pesticides, too. The difference is that conventional produce relies on synthetic chemicals, while organic produce makes use of less processed versions created from natural sources such as plant and animal waste. Regardless of whether you buy organic or conventional produce, we recommend washing your produce before eating it.

If you *do* buy conventional produce, try to avoid what the [Environmental Working Group](#) calls the “Dirty Dozen,” specific fruits and vegetables that tend to have the most pesticide residues. As of today, this list includes:

- ▶ strawberries
- ▶ spinach
- ▶ nectarines
- ▶ apples
- ▶ peaches
- ▶ pears
- ▶ cherries
- ▶ grapes
- ▶ celery
- ▶ tomatoes
- ▶ sweet bell peppers
- ▶ potatoes

Alternatively, the Environmental Working Group also has a list called the “Clean Fifteen,” of the produce that tends to have the least amounts of pesticide residues. As of today, this list includes:

- ▶ avocados
- ▶ sweet corn
- ▶ pineapples
- ▶ cabbages



- ▶ onions
- ▶ sweet peas (frozen)
- ▶ papayas
- ▶ asparagus
- ▶ mangoes
- ▶ eggplants
- ▶ honeydew melons
- ▶ kiwis
- ▶ cantaloupes
- ▶ cauliflower
- ▶ broccoli

Organic animal products are raised using only organic feed, including organic grasses or grains. The term “organic” alone, therefore, does not specify whether a given animal is grain-fed, grass-fed, or pasture-raised.

If it makes sense for you and your family, buying organic is usually a good investment (especially for animal foods and produce with edible skins). But please keep in mind that many smaller farmers may in fact follow organic practices to the letter (or sometimes even go far beyond the minimum requirements), but simply cannot afford the money and time required for organic certification.

Get to know your farmer and find out for yourself how they produce food, instead of just relying on potentially misleading terms and labels.

## LOCAL

There is no official definition of “local” when it comes to food, but most people tend to consider foods as “local” if they are grown within 100 miles or 160 kilometers of where they are purchased or consumed. Eating locally produced food has many ecological, economical, and nutritional benefits:

- ▶ Less fuel is required to transport the food.
- ▶ Food can be picked when it is ripe and full of both flavor and nutrients, instead of being picked early so that it ripens by the time it arrives at its final destination.
- ▶ By default, eating locally means you are eating with the seasons.
- ▶ Buying local food supports your community, and helps create a direct connection with the individuals who grow it.
- ▶ Local food production is safer, less fragile, and more transparent.

As Joel Salatin says:

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**“THE SHORTER THE CHAIN BETWEEN RAW FOOD AND FORK, THE FRESHER IT IS AND THE MORE TRANSPARENT THE SYSTEM IS.”**

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## NATURAL

When it comes to food, the term “natural” is so overused and poorly defined that you can safely ignore it. Typically, natural foods are minimally processed and lack artificial ingredients or preservatives (which is good), but can still contain antibiotics, growth hormones, and MSG (which is not so good).

## Eat Some Fermented Foods

If tolerated, clients should experiment with adding in at least a small quantity of fermented or cultured foods. They help introduce beneficial bacteria into our digestive tracts, help keep harmful bacteria at bay, provide helpful digestive enzymes, are nutrient-dense, and low-cost. In fact, clients can easily make them for pennies on the dollar at home. Here are some good ferment options for clients to consider:

- ▶ raw kimchi (lacto-fermented napa cabbage and radishes)
- ▶ raw sauerkraut (lacto-fermented cabbage)
- ▶ raw beet kvass (a fermented beetroot juice drink)
- ▶ kefir (a fermented dairy drink)

Note that all of these should be purchased raw, not pasteurized. You can find raw ferments and cultured foods in the refrigerated section of the store.

Also, be aware that some individuals, especially those with histamine intolerance, should limit or avoid fermented foods.

## Avoid Refined Foods

Once a client has successfully added in some bio-individually appropriate real foods, you can begin to remove refined, processed, denatured foods that don't support health. Here are some of the most deleterious foods to focus on:

- ▶ **Refined vegetable oils.** Despite the marketing claims, margarine and industrial oils such as canola, soybean, corn, and safflower are *not* healthier than saturated animal fats. They can cause a host of health problems, usually contain harmful trans fats, and are unstable when exposed to heat and light. More stable, natural fats such as butter, ghee, tallow, coconut oil, and extra-virgin olive oil are better for the body *and* palate.

- ▶ **Refined sugar, corn syrup, high-fructose corn syrup, and dextrose.** In general, most clients will benefit from reducing overall sugar intake and overcoming the craving for sweet tastes, but as a transitional step, you can consider helping them transition to natural sweeteners that include vitamins, minerals, and polyphenols such as raw honey, pure maple syrup, and unrefined stevia leaf.
- ▶ **Refined grains and white flour products.** If tolerated, clients should instead choose whole, unrefined varieties that have been soaked, sprouted, or leavened before consumption.
- ▶ **Canned and packaged foods.** Though some high-quality canned and packaged foods can be part of a healthy diet, it's best to eat fresh, local, unprocessed foods whenever possible. Many commercially canned and packaged foods contain preservatives, and some can leach harmful chemicals into your food such as BPA or aluminum.
- ▶ **Pasteurized, homogenized, skim, and low-fat milk products.** If a client tolerates dairy, they can consider raw, full-fat dairy instead.
- ▶ **Synthetic vitamins and fortified foods.** The list of added vitamins on a food label may seem like a positive, but these are often synthetic forms that are more difficult to absorb and utilize in the body. In general, it's best to get the natural form of vitamins from real, whole foods, especially since this ensure they come packaged together with the required cofactors.
- ▶ **Toxic additives, preservatives, emulsifiers, and colorings.** Most processed and packaged foods contain a variety of flavorings, colorings, preservatives, and emulsifiers that might be good for business, but are certainly not good for our bodies. Encourage clients to avoid foods that contain MSG (often camouflaged as “natural flavor” in ingredients lists), diacetyl (used in microwaveable popcorn), preservatives like BTA, BHA, benzoates, propionates, nitrates, and sulfites, emulsifiers like carrageenan, polysorbate

80, and propylene glycol, and food colorings like Red #40, Yellow #5, and Yellow #6.

- ▶ **Refined table salt.** Though natural forms of salt have many health benefits, refined forms such as table salt should be avoided since they are stripped of important minerals and often include harmful additives such as anti-caking agents.

As Michael Pollan puts it:

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**“THERE ARE A GREAT MANY FOOD-LIKE ITEMS IN THE SUPERMARKET YOUR ANCESTORS WOULDN'T RECOGNIZE AS FOOD... STAY AWAY FROM THESE!”**

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## HOW TO PREPARE FOOD PROPERLY

### Eat Some Foods Raw

While some nutrients become more bioavailable when cooked, others are better retained when eaten raw. For example, the following nutrients are susceptible to various effects of cooking and may be best absorbed when consumed raw.

- ▶ Most water and fat-soluble vitamins, naturally occurring enzymes, many carotenoids, many polyphenols, and taurine.

Foods:

- ▶ Organic 100% grass-fed raw dairy products such as milk, cheese, or yogurt.
- ▶ Organic, 100% grass-fed raw meat dishes such as steak tartare.
- ▶ Wild-caught sushi, carpaccio, marinated fish, and fish eggs.

- ▶ Organic, local, seasonal fruits and vegetables, especially avocados, bell peppers, carrots, celery, and citrus fruits.
- ▶ Organic, pasture-raised eggs.
- ▶ Organic, local raw honey
- ▶ Fermented and cultured foods. As mentioned above, fermented and cultured vegetables and dairy should be eaten raw to keep their natural probiotic content intact.

## Cook Some Foods to Maximize Nutrition

While the nutrients and foods previously mentioned are best eaten raw, many others are best consumed cooked.

Foods rich in lycopene, beta-carotene, carotenoids in green vegetables, sulphoraphane, folate, iron, antioxidant rich foods, and high protein foods are, optimally, cooked, in order for us to best utilize these compounds.

Here's why:

- ▶ Cooking makes the proteins in meat, fish, poultry, and eggs much easier to digest. Just be careful not to overcook animal products as this can create undesirable compounds.
- ▶ Cooking increases the bioavailability of iron and other key minerals we need to survive and thrive.
- ▶ Sautéing or baking onions improves their flavonol content, which are believed to have numerous potential health benefits, including increasing antioxidant activity, decreasing oxidative damage, and helping prevent damage to DNA.

- ▶ Cooking decreases possibly detrimental phytonutrients found in many plant foods, including root vegetables, grains, legumes, and nightshades like potatoes and tomatoes.
- ▶ Cooking tomatoes increases the bioavailability of lycopene, a powerful antioxidant that helps stunt cancer growth and support the health of the eyes, heart, brain, and bones. Incidentally, lycopene is the pigment that makes tomatoes red and stains your cookware orange. A small price to pay for its amazing list of benefits!
- ▶ Cooking increases the bioavailability of beta carotene, a pigment with numerous health benefits found in most red, orange, and yellow colored plant foods like tomatoes, carrots, and sweet potatoes.

## Use Safe Cookware & Storage Containers

The more a client cooks, the more they need to be mindful of what materials they use to prepare and store your food. There is no one perfect material, with each having their pros and cons, but in general, we recommend avoiding the following:

- ▶ Teflon coated pots and pans
- ▶ Aluminum or copper pots and pans
- ▶ Plastic storage containers, wrap, bags, bottles, etc.

Instead, we recommend using the following:

- ▶ Cast iron or stainless-steel pots and pans
- ▶ Ceramic coated cast iron or steel pots and pans
- ▶ Glass or stainless-steel storage containers and bottles
- ▶ Parchment paper or beeswax wraps

## Prepare Nuts, Seeds, Grains & Legumes Properly

Just like humans, plants evolved a number of adaptations to survive and thrive. While they might not always have the ability to take flight, they certainly have been equipped to put up a fight against predators and environmental factors that pose a threat. Plants' most powerful line of defense is a system of chemical compounds known as phytonutrients or phytochemicals, which include terpenes, amines, organosulfurs, phenols, polysaccharides, organic acids, and lipids. (Physiological Functions of Phytonutrients, n.d.) Some of these compounds ensure germination, such as phytic acid and enzyme inhibitors. Some ward off predators, such as lectins.

Many factors influence whether these compounds are beneficial or detrimental to human health at a given time. We will discuss some of the intricacies of this throughout the course.

For example, phytic acid is the storage repository of phosphorus for a plant, to ensure that a seed has what it needs for germination. Research indicates that most (56-66%) of phytic acid is degraded by stomach acid (Schlemmer, Frølich, Prieto, & Grases, 2009). In diets high in processed foods, low in overall nutrient quantity, vegan diets, or in bodies with a higher than metabolically typical mineral need, this could be a significant contributor to mineral deficiencies. However, phytates have also been associated with health benefits, such as protection from cancer, cardiovascular disease, insulin resistance, and bone loss in post-menopausal women. After human ingestion, it may bind to some of the phosphorus, calcium, magnesium, copper, iron, and zinc that is simultaneously present in the digestive tract, preventing its absorption.

Lectins are carbohydrate binding proteins present in most plants, especially seeds and tubers like cereal grains, potatoes, and beans. Not much is known about the role of lectins in plant physiology, but some research shows they are involved in germination and protection of the plant (Plant Lectins, n.d.). In human physiology



lectins may alter gut tissue permeability and function, and/or stimulate the immune system. In some people this equals a negative effect on digestive or immune function, while in others there can be health benefits. So, should we try to avoid high lectin foods, as some authors and bloggers suggest? As with everything else, it depends on specific bio-individual needs. If someone is already compromised due to long term infection, digestive ailments, or immune weakness, avoiding lectin rich foods may be beneficial (Freed, 1999).

While all foods will confer positive and negative benefits, the detrimental effects of consuming some plants foods have led many people to the conclusion that eliminating these foods from the diet is the best pathway to optimal health. Yet the wisdom of our ancestors reveals that there are traditional methods of preparation such as soaking, sprouting, fermenting, and leavening that actually neutralize most problematic compounds, increase the bioavailability of beneficial nutrients, and improve digestibility by breaking down complex starches and activating phytase so that these foods can still be enjoyed by almost all people as part of a nutrient-dense diet.

Prior to the industrialization of the food system, almost all traditional cultures soaked, sprouted, fermented, or leavened such foods before consumption. For example, such was the case for rice and lentils in India, corn in Mesoamerica, teff in Ethiopia, sourdough in Europe and the early U.S., and oatmeal in Scotland. In fact, the original instructions on Quaker Oats called for overnight soaking!



**SEE THE “SOAKING & SPROUTING GUIDE” IN THIS MODULE’S REFERENCE DOCUMENTS FOR A CLIENT-FRIENDLY GUIDE TO SOAKING AND SPROUTING COMMON GRAINS, LEGUMES, NUTS, AND SEEDS.**

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# HOW TO EAT MINDFULLY

Eating nutrient-dense, properly prepared, whole foods is a great start, but of equal importance to overall health is making sure that clients are in the right state to fully benefit from the nutrients contained in their food.

## Rest to Digest

Digestion will be discussed in more detail in the *Digestion & Elimination Module*, but I'd like to quickly touch on the importance of clients eating in a calm, relaxed state. For food to be properly broken down and absorbed, the body needs to be in what's called a **parasympathetic state**. Here are a few ways to help clients shift their nervous system to this "rest and digest" mode before, while, and after eating:

- ▶ Sit down at the table instead of standing.
- ▶ Avoid eating on the run or in the car.
- ▶ Avoid multi-tasking. Turn off phones, computers, televisions, etc.
- ▶ Take a few deep breaths.
- ▶ Feel gratitude for what one is about to eat. Do a short meditation or say grace if that suits one's beliefs.
- ▶ Lightly rub the area just behind and below your earlobes (this can help stimulate the vagus nerve, which sends signals throughout the digestive tract).
- ▶ Pay attention to the food before taking the first bite. How does it look? How does it smell? What are the colors like?
- ▶ Then, take one's first bite. What are the textures you sense? The tastes? What is the temperature like?

- ▶ As one eats a meal, savor it like it were a fine wine.

## Eat Slowly

Clients should try to chew each bite 25 to 30 times, making sure the food has been liquified before swallowing. If needed, they can sing the alphabet song in their head from A to Z to give them an idea of how long they should be chewing eat bite. It can also be helpful to have clients put down their fork between bites. The slower, and more mindfully a client eats, the deeper their nourishment and satisfaction.



NUTRIENT-DENSE FOOD + MINDFUL EATING PRACTICES = DEEP NOURISHMENT & SATIATION

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# MODULE SUMMARY

The most important take away from this module is that one size never fits all when it comes to nutrition. We each have unique needs for macro- and micronutrients to feel and perform our best, and we should experiment to find what works best for us. However, as we discussed, there some general guidelines we recommend to everyone:

- ▶ Eat the most nutrient-dense foods possible.
- ▶ Eat properly raised foods.
- ▶ Eat whole foods.
- ▶ Eat properly prepared foods.
- ▶ Eat with the seasons.
- ▶ Eat locally sourced foods.
- ▶ Eat enough high-quality fats.
- ▶ Avoid processed foods and reactive foods.
- ▶ Eat slowly and mindfully.

Nutrition may not be the only factor in health, but it is certainly one of the most important. Providing our bodies with the basic building blocks they need is the first step toward feeling and performing our best.

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