Nutrition

What is clinical nutrition?

Clinical nutrition is the study of the relationship between food and the well-being of the body. More specifically, it is the science of nutrients and how they are digested, absorbed, transported, metabolized, stored, and discharged by the body. Besides studying how food works in the body, nutritionists are interested in how the environment affects the quality and safety of foods, and how these factors influence health and disease.

What are nutrients?

Nutrients are substances that are involved in the creation of every molecule in the body. The body needs more than 45 nutrients, and the ways that nutrients are used are as varied as the molecules, cells, and tissues they help to create. Carbohydrates, proteins, and fats (called macronutrients) are broken down (metabolized) to give the body energy. Vitamins and minerals (called micronutrients) are not themselves metabolized for energy, but they are crucial in helping the macronutrients convert to energy.

What is the history of clinical nutrition?

The study of human nutrition dates back to the 18th century, when the French chemist Lavoisier discovered that there was a relationship between our metabolism of food and the process of breathing. By the early 20th century, scientists had found that diseases were associated with certain diets (beri-beri, rickets, scurvy and pellagra). Later it was found that these diets lacked specific nutrients (namely vitamin B1 [thiamine], vitamin D, vitamin C, and vitamin B3 [niacin] respectively). By 1912, the Polish chemist Casimir Funk had found a substance (vitamin B1) that actually prevented beri-beri, and he named it "vitamine."

In the early 1940s, Recommended Dietary Allowances (RDAs) were established by the National Research Council. The RDAs define the minimal nutrient intakes necessary for the prevention of basic deficiency diseases like beri-beri and rickets. Until recently, these guidelines were used to set nutritional adequacy standards for the general population.

Researchers and scientists also continue to uncover the therapeutic role of individual nutrients in the prevention and treatment of disease. For example, antioxidants like beta-carotene, selenium, vitamin E, and vitamin C, particularly from foods, appear to protect against the development of heart disease, cancer, and other chronic degenerative diseases. Dietary Reference Intakes (DRIs) have been developed to show how much of a nutrient we need every day to maximize health and lower the risk of chronic disease (in contrast to RDAs which state the minimal amount to avoid disease secondary to deficiencies). The field of clinical nutrition has evolved into a practice that is increasingly incorporated into mainstream medical treatment.

What are nutritional supplements?

The term "nutritional supplement" refers to vitamins, minerals, and other food components that are used to support good health and treat illness. For example, plant compounds known as phytochemicals (found abundantly in tomatoes and soybeans, for example) have powerful disease-battling properties. While it's possible almost all of the time to successfully incorporate nutrients into your diet alone, supplementation can help maintain sufficient levels and produce specific desired effects. For example, supplementation with zinc supplementation has been shown to reduce the duration of the common cold and decrease the incidence of acute diarrhea in children.

How do vitamins and minerals work?

Vitamins and minerals play an essential role in the body's normal metabolism, growth, and development. They do this by helping the body to perform various tasks. For example, while a vitamin is not a source of energy in and of itself, it can provide the key the body needs to unlock

energy stored in food. Some vitamins and minerals work together--such as the mineral zinc and vitamin A. Zinc enables the body to use vitamin A to promote good vision. Deficiencies in vitamin A may lead to night blindness, a condition in which the eyes have difficulty adjusting to darkness. Zinc supplementation, therefore, may prevent this condition by keeping vitamin A functioning normally. Supplementation alone, however, is not the answer to long-term good health. Combining a healthful diet with a regular exercise program and a positive mental attitude has been shown, repeatedly, to be the best bet for a healthy lifestyle.

What constitutes a healthful diet?

The optimal diet for improving health has to be individualized to meet your unique needs. The USDA food pyramid suggests that we use fat "sparingly," and that our daily diet include two to three servings of dairy products; two to three servings of meat, poultry, fish, eggs, beans, or nuts; three to five servings of vegetables; two to four servings of fruit; and six to eleven servings of bread, cereal, rice, or pasta. However, the numbers alone do not tell the whole story. Our food needs are influenced by many factors, including age, gender, body size, pregnancy, and health. A clinical nutritionist can help you determine what type of diet is best for you.

What happens during a visit to a clinical nutritionist?

During the initial part of the visit, the clinical nutritionist will ask you questions about your medical history, family history, and personal lifestyle. The medical history might include questions about your diet, digestion, history of weight loss or gain, sleep and exercise patterns, and relaxation habits. Some clinical nutritionists will ask you to bring to your first meeting a 3-day food diary and list of any herbs, supplements, or medicines that you take regularly. Laboratory tests might be used to find any deficiencies and test organ function. This way, a nutritionist will get a full picture of your nutritional lifestyle.

During the second part of the visit, the nutritionist will recommend ways that you can fill the gaps and reduce the nutritional "overloads" in your diet. For example, if appropriate, he or she may suggest that you schedule your meals at different times or cut down on the amount of carbohydrates that you eat. He or she will also offer advice on specific nutritional supplements if necessary (see below). The nutritionist will then schedule follow-up visits to monitor the progression of your health.

What is clinical nutrition good for?

Studies show that eating habits play a major role in the development of certain chronic diseases (such as heart disease, obesity, cancer, and diabetes). Dietary changes can help to both prevent and treat these conditions. For example, lowering fat and cholesterol intake and adding whole grains to the diet can atherosclerosis (plaque build up in the arteries) which can lead to heart disease or stroke. Reducing caloric intake can help lower weight. Cutting down on simple sugars (glucose, sucrose, fructose, and lactose) can prevent diabetes, and high fiber diets (especially soluble fiber) can help control diabetes.

Scientists have found many other connections to diet and disease. In a study of 20,000 men, for example, one fishmeal per week was linked to a 52% reduction in the risk of sudden death from a heart attack. Fish is high in omega-3 fatty acids, which are essential components of cells and can protect the heart from, for example, fatal arrhythmias (abnormal heart rhythm).

In another study of more than 42,000 women, those who ate many fruits, vegetables, whole grains, low-fat dairy, and only lean meats lived longer. High intake of fruits, vegetables, and legumes is associated with a lower risk of developing heart disease.

There are numerous, ongoing studies regarding clinical nutrition. Some interesting results indicate that:

high dietary intake of folate (found in leafy greens, dry beans and peas, fortified cereals and grain

products, and some fruits and vegetables) may lower risk of stroke and heart disease
eating small amounts of fish in pregnancy may protect against early delivery and low birth weight infants
iron supplementation in iron depleted women improves aerobic training ability
lutein and zeaxanthin (carotenoids) in the diet may reduce risk of cataracts
lutein from dietary sources (such as kale and spinach) may protect against colon cancer
flavonoids (found in broccoli, citrus fruits, apples, onions, and carrots) may protect against certain types of lung cancer
vitamin E (in the diet from fruits and vegetables) may reduce the risk of angina (chest pain) and heart attack in people with atherosclerosis
In hospitals, nutrition is used to improve the overall health of patients with a wide range of conditions. Examples of these conditions are AIDS, cancer, osteoporosis, lung disease, obesity, burns, metabolic disorders, and kidney, liver, and pancreatic disorders. Patients who need surgery are also supported with clinical nutrition.

Is there anything I should watch out for?

Adverse interactions between medications and nutritional supplements can happen; therefore, it is very important to inform your physician about any dietary supplements you are considering taking.
If taking any supplements according to label directions unless otherwise advised by a qualified practitioner.
Be aware that there is little scientific information about the effect of so-called functional foods – foods to which vitamins, minerals, herbs, or other dietary substances are added --despite their growing popularity in the market place and claims of beneficial effects. Examples include calcium–fortified orange juice or soups containing Echinacea. .
There are many websites offering nutrition information, but not all are accurate. Visit the Tufts University Nutrition navigator at www.navigator.tufts.edu for a rating guide to nutrition websites.
Some common foods, including nuts, wheat gluten, dairy products, fish, shrimp, soy, bananas and eggs may trigger allergic reactions. If suspected, your doctor can test for such possible allergies.
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Supporting Research

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