## What Are Dietary Supplements?

Dietary supplements are intended to add to or supplement the diet and are different from conventional food. Generally, to the extent a product is intended to treat, diagnose, cure, or prevent diseases, it is a drug, even if it is labeled as a dietary supplement. Supplements are ingested and come in many forms, including tablets, capsules, soft gels, gel caps, powders, bars, gummies, and liquids.

Common supplements include:

- Vitamins (such as multivitamins or individual vitamins like vitamin D and biotin).
- Minerals (such as calcium, magnesium, and iron).
- Botanicals or herbs (such as echinacea and ginger).
- Botanical compounds (such as caffeine and curcumin).
- Amino acids (such as tryptophan and glutamine).
- Live microbials (commonly referred to as "probiotics").

## Indications

Even the most  consumers find it difficult to get all the nutrients they need from food alone, and dietary supplements can help fill nutrient gaps. A sensible program of nutritional supplementation for most adults definitely would include a multivitamin, preferably with minerals. Other nutritional supplements could be added on the basis of a person's age, gender, and dietary pattern.  Dietary supplements can help you improve or maintain your overall health, and supplements can also help you meet your daily requirements of essential nutrients.

The RDA and the AI are intended as targets for individual intakes, and the EAR is a tool used by researchers to determine whether a population is at risk of inadequacy or deficiency. The UL, or Tolerable Upper Intake Level, is the "highest average daily nutrient intake level likely to pose no risk of adverse health effects for nearly all people in a particular group."

If people fall short of the RDA or the AI, they are falling short of the nutrient intake recommended for individual health. If a population falls short of the EAR, that population may be at actual risk of inadequacy or deficiency. To illustrate the difference in values, the table below shows the EAR, the RDA, and the UL for vitamin C and vitamin E for men and women. (Institute of Medicine, 2006)

- Low intakes level of Vitamin E

- Low intakes and low serum levels on Vitamin C
- Low intakes of Vitamin B6
- Low intakes of iron zinc and magnesium
- Low intakes of calcium
- Low intakes of

Dietary improvement is a desirable goal, but changing dietary patterns is extremely difficult. On the assumption that it is better for people to obtain recommended amounts of vitamins and minerals than to limp along with low intakes, a multivitamin with minerals which can be purchased for less than a dime a day would clearly fill a number of known nutrient gaps. Additional calcium with vitamin D is also advisable for a large fraction of the population

For example, calcium and vitamin D can help build strong bones, and fiber can help to maintain bowel regularity. While the benefits of some supplements are well established, other supplements need more study. Also, keep in mind that supplements should not take the place of the variety of foods that are important for a healthy diet.

## What Are the Benefits of Dietary Supplements?

Normally, We should be able to get all the nutrients we need from a balanced diet. However, supplements can provide us with extra nutrients when our diet is lacking or certain health conditions (such as cancer, diabetes, or chronic diarrhea) trigger a deficiency.
In most cases, a multivitamin/mineral supplement will provide all the micronutrients to our body needs. They are generally safe because they contain only small amounts of each nutrient (as measured by the daily value, or DV).

- Individual nutrients are available as supplements, usually in doses larger than your typical multivitamin. They can be used to treat a deficiency, such as an iron deficiency, or reduce the risk of a medical condition, such as hypertension.
- For example, large doses of vitamin B3 (niacin) can help raise "good" high-density lipoprotein (HDL) cholesterol
- Folic acid has long been used to reduce the risk of a birth defect called spina bifida.
- Antioxidants, such as vitamin C and vitamin E, may reduce the toxic effect of chemotherapy drugs (allowing patients to tolerate larger doses of chemo).

Unless a specific deficiency is identified, a supplement is usually not necessary if you eat and exercise properly. The appropriate use of supplements can help you avoid side effects and toxicities associated with overuse.

## What Are the Risks of Dietary Supplements?

Before buying or taking a dietary supplement, talk with a health care professional—such as your doctor, nurse, registered dietician, or pharmacist—about the benefits and risks.

Many supplements contain ingredients that can have strong effects in the body. Additionally, some supplements can interact with medications, interfere with lab tests, or have dangerous effects during surgery. Your health care professional can help you decide what supplement, if any, is right for you.

When taking dietary supplements, be alert to the possibility of a bad reaction or side effect (also known as an adverse event).

Problems can occur especially if you:

- Combine supplements.
- Mix medicines and supplements.
- Take too much of some supplements.
- Take supplements instead of medications.

If you experience an adverse event while taking a dietary supplement, immediately stop using the supplement, seek medical care or advice, and report the adverse event to the FDA.

# Nutraceuticals

Nutraceuticals are products, which are used for medicinal purposes apart from nutrition. A nutraceutical product may be used for physiological purposes or to treat a chronic illness. Sourced from plant, animal, and microbial sources, nutraceuticals include whole foods, food additives, herbs, phytonutrients, probiotics, vitamins, minerals, and herbal products.

Unlike normal pharmaceuticals, nutraceuticals can not be patent protected because they occur naturally. Pharmaceutical and nutraceutical compounds can be used in conjunction to treat ailments, but only pharmaceutical compounds are government-sanctioned. Showing no signs of declining in popularity, the global nutraceuticals market is projected to reach $578.23 billion by 2025. Increased awareness and education about the relationship between food and health are constantly persuading more people to incorporate the benefits of nutraceuticals into their health regimen.

**Benefits of Nutraceuticals**

The benefits of nutraceuticals are limitless and new uses for them are being discovered every day. From physiological to psychological health, nutraceuticals have the potential to treat a wide array of illnesses and ailments. Nutraceuticals have been used to:

- improve overall health
- boost energy
- relieve anxiety
- improve mental clarity
- enhance sleep quality and quantity
- prevent chronic diseases
- reduce drug cravings
- delay the aging process
- increase life expectancy
- support and regulate bodily functions

In addition to these health benefits, recent studies have shown promising results for the effectiveness of herbal nutraceuticals on disorders related to oxidative stress including allergies, Alzheimer's, cardiovascular disorders, cancer, diabetes, inflammatory diseases, Parkinson's disease, and obesity.

Popular Nutraceuticals

Because nutraceuticals are not regulated by the United States Food & Drug Administration, several products can be classified as nutraceuticals including amino acids, vitamin D supplements, key herbal extracts, whole foods and more. Some commonly used nutraceuticals include:

Vitamin B12- Vitamin B12 is a water-soluble vitamin that occurs naturally in foods such as beef, tuna, and dairy products. Many people take Vitamin B12 as a dietary supplement to maintain healthy nerves, aid in the production of DNA and red blood cells, and to increase energy levels.

Green Tea – Green tea extract is one of the most powerful and popular herbal extracts in the world. Green tea acts as an antioxidant that imparts vitamins and nutrients that slow down the aging process and protects the skin from oxidative stress and environmental damage. It has also been used to enhance the ability of the body to burn fat, increase fat oxidation, and increase thermogenesis

Ginseng – Ginseng has historically been used to purify and nourish the skin, balance the gastrointestinal tract, regulate appetite, increase circulation, decrease stress, balance the central and peripheral nervous systems and stabilize blood sugar. It also acts as a natural energizer.

Glucosamine – Glucosamine is an amino sugar that plays a significant role in building cartilage in the body. While this substance occurs naturally around the joints and in bone marrow, many people take a glucosamine supplement to treat arthritis and joint pain.

Fennel – This flavorful culinary herb has powerful health benefits due to its antioxidant and anti-inflammatory properties. Fennel is packed with vitamins and minerals and when taken as a dietary supplement it acts as a natural appetite suppressant.

# Food Supplements

What are food suplements?

The idea behind food supplements, also called dietary or nutritional supplements, is to deliver nutrients that may not be consumed in sufficient quantities. Food supplements can be vitamins, minerals, amino acids, fatty acids, and other substances delivered in the form of pills, tablets, capsules, liquid, etc.1 Supplements are available in a range of doses, and in different combinations. However, only a certain amount of each nutrient is needed for our bodies to function, and higher amounts are not necessarily better. At high doses, some substances may have adverse effects, and may become harmful. For the reason of safeguarding consumers' health, supplements can therefore only be legally sold with an appropriate daily dose recommendation, and a warning statement not to exceed that dose.

Supplement use varies in Europe. For example it is common in Germany and Denmark (43% and 59% of the adult population respectively) but is less so in Ireland and Spain (23% and 9% respectively). Women use supplements more than men.

## Indications

Supplements are not a substitute for a balanced healthy diet.1 A diet that includes plenty of fruits, vegetables, whole grains, adequate protein, and healthy fats should normally provide all the nutrients needed for good health. Most European countries agree that messages aimed at the general public should focus on food-based dietary guidelines.7 Supplements do not feature in these guidelines, but there are certain population groups or individuals who may need advice about supplements, even when they eat a healthy balanced diet, i.e. women of childbearing age, individuals on specific medications.

- Partly due to our modern lifestyle, not everyone manages to eat a healthy diet.
- A recent comparison of national surveys showed widespread concern about vitamin D intakes, whereas certain age groups are more likely to have low intakes of minerals. For example, there is concern about adequate intakes of iron amongst teenage girls in Denmark, France, Poland, Germany and the UK.
- Poor iron status in young women also increases the risk of infants being born with low-birth weight, iron deficiency and delayed brain development.
- Folate status is also critical for women who may become pregnant. They are advised to take folic acid before conception, and continue for the first 12 weeks of pregnancy. An adequate folate status can decrease the risk of having a baby with neural tube defects such as spina bifida.

# Examples of population groups requiring specific advice about supplements

| Population group | Nutrients |
|---|---|
| People over age 50 | Vitamin D, Vitamin B12, folate<br><br>Frail elderly may benefit from a low-dose multivitamin supplement. |
| Women of childbearing age | Folic acid and vitamin D, possibly iron |
| Children under age 5 | Vitamin A, vitamin C, vitamin D, although children with a good appetite who eat a wide variety of food may not need them. |
| Breastfeeding individuals | Vitamin D |
| People with insufficient sun exposure or darker skin | Vitamin D |
| Vegans | Vitamin B12, vitamin D2 |