INTERNATIONAL FOOD INFORMATION COUNCIL FOUNDATION

Functional Foods

"Functional Foods" are foods or dietary components that may provide a health benefit beyond basic nutrition. You can take greater control of your health through the food choices you make, knowing that some foods can provide specific health benefits. Examples can include fruits and vegetables, whole grains, fortified or enhanced foods and beverages, and some dietary supplements. Biologically active components in functional foods may impart health benefits or desirable physiological effects. Functional attributes of many traditional foods are being discovered, while new food products are being developed with beneficial components.

Demand

Consumer interest in the relationship between diet and health has increased the demand for information about functional foods. Rapid advances in science and technology, increasing healthcare costs, changes in food laws affecting label and product claims, an aging population, and rising interest in attaining wellness through diet are among the factors fueling U.S. interest in functional foods. Credible scientific research indicates there are many clinically demonstrated and potential health benefits from food components. These benefits continue to expand the health claims now permitted to be identified by the Food and Drug Administration (FDA).

Scientific Criteria

Many academic, scientific, and regulatory organizations are considering ways to establish the scientific basis to support and further validate claims for functional components or the foods containing them. FDA regulates food products according to their intended use and the nature of claims made on the package. Five types of health-related statements or claims are allowed on food and dietary supplement labels:

- *Nutrient content claims* indicate the presence of a specific nutrient at a certain level.
- *Structure and function claims* describe the effect of dietary components on the normal structure or function of the body.
- *Dietary guidance claims* describe the health benefits of broad categories of foods.
- *Qualified health claims* convey a developing relationship between components in the diet and risk of disease, as reviewed by the FDA and supported by the weight of credible scientific evidence available.
- *Health claims* confirm a relationship between components in the diet and risk of disease or health condition, as approved by FDA and supported by significant scientific agreement.

A large body of credible scientific research is needed to confirm the benefits of any particular food or component. For functional foods to deliver their potential public health benefits, consumers must have a clear understanding of and a strong confidence in the scientific criteria that are used to

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Examples of Functional Components*

Class/Components	Source*	Potential Benefit
Carotenoids		
Beta-carotene	carrots, pumpkin, sweet potato, cantaloupe	neutralizes free radicals, which may damage cells; bolsters cellular antioxidant defenses; can be made into vitamin A in the body
Lutein, Zeaxanthin	kale, collards, spinach, corn, eggs, citrus	may contribute to maintenance of healthy vision
Lycopene	tomatoes and processed tomato products, watermelon, red/pink grapefruit	may contribute to maintenance of prostate health
Dietary (functional and total) Fiber		
Insoluble fiber	wheat bran, corn bran, fruit skins	may contribute to maintenance of a healthy digestive tract; may reduce the risk of some types of cancer
Beta glucan**	oat bran, oatmeal, oat flour, barley, rye	may reduce risk of coronary heart disease (CHD)
Soluble fiber**	psyllium seed husk, peas, beans, apples, citrus fruit	may reduce risk of CHD and some types of cancer
Whole grains**	cereal grains, whole wheat bread, oatmeal, brown rice	may reduce risk of CHD and some types of cancer; may contribute to maintenance of healthy blood glucose levels
Fatty Acids		
Monounsaturated fatty acids (MUFAs)**	tree nuts, olive oil, canola oil	may reduce risk of CHD
Polyunsaturated fatty acids (PUFAs) —Omega-3 fatty acids—ALA	walnuts, flax	may contribute to maintenance of heart health; may contribute to maintenance of mental and visual function
PUFAs—Omega-3 fatty acids—DHA/EPA**	salmon, tuna, marine, and other fish oils	may reduce risk of CHD; may contribute to maintenance of mental and visual function
Conjugated linoleic acid (CLA)	beef and lamb; some cheese	may contribute to maintenance of desirable body composition and healthy immune function
Flavonoids		
Anthocyanins—Cyanidin, Delphinidin, Malvidin	berries, cherries, red grapes	bolsters cellular antioxidant defenses; may contribute to maintenance of brain function
Flavanols—Catechins, Epicatechins, Epigallocatechin, Procyanidins	tea, cocoa, chocolate, apples, grapes	may contribute to maintenance of heart health
Flavanones—Hesperetin, Naringenin	citrus foods	neutralize free radicals, which may damage cells; bolster cellular antioxidant defenses
Flavonols—Quercetin, Kaempferol, Isorhamnetin, Myricetin	onions, apples, tea, broccoli	neutralize free radicals, which may damage cells; bolster cellular antioxidant defenses
Proanthocyanidins	cranberries, cocoa, apples, strawberries, grapes, wine, peanuts, cinnamon	may contribute to maintenance of urinary tract health and heart health
Isothiocyanates		
Sulforaphane	cauliflower, broccoli, broccoli sprouts, cabbage, kale, horseradish	may enhance detoxification of undesirable compounds; bolsters cellular antioxidant defenses
Minerals		
Calcium**	sardines, spinach, yogurt, low-fat dairy products, fortified foods and beverages	may reduce the risk of osteoporosis
Magnesium	spinach, pumpkin seeds, whole grain breads and cereals, halibut, brazil nuts	may contribute to maintenance of normal muscle and nerve function, healthy immune function, and bone health
Potassium**	potatoes, low-fat dairy products, whole grain breads and cereals, citrus juices, beans, bananas	may reduce the risk of high blood pressure and stroke, in combination with a low-sodium diet
Selenium	fish, red meat, grains, garlic, liver, eggs	neutralizes free radicals, which may damage cells; may contribute to healthy immune function
Phenolic Acids		
Caffeic acid, Ferulic acid	apples, pears, citrus fruits, some vegetables, coffee	may bolster cellular antioxidant defenses; may contribute to maintenance of healthy vision and heart health

Plant Stanols/Sterols		
Free Stanols/Sterols**	corn, soy, wheat, wood oils, fortified foods and beverages	may reduce risk of CHD
Stanol/Sterol esters**	fortified table spreads, stanol ester dietary supplements	may reduce risk of CHD
Polyols		
Sugar alcohols**—Xylitol, Sorbitol, Mannitol, Lactitol	some chewing gums and other food applications	may reduce risk of dental caries
Prebiotics		
Inulin, Fructo-oligosaccharides (FOS), Polydextrose	whole grains, onions, some fruits, garlic, honey, leeks, fortified foods and beverages	may improve gastrointestinal health; may improve calcium absorption
Probiotics		
Yeast, *Lactobacilli, Bifidobacteria*, and other specific strains of beneficial bacteria	certain yogurts and other cultured dairy and non-dairy applications	may improve gastrointestinal health and systemic immunity; benefits are strain-specific
Phytoestrogens		
Isoflavones—Daidzein, Genistein	soybeans and soy-based foods	may contribute to maintenance of bone health, healthy brain and immune function; for women, may contribute to maintenance of menopausal health
Lignans	flax, rye, some vegetables	may contribute to maintenance of heart health and healthy immune function
Soy Protein		
Soy Protein**	soybeans and soy-based foods	may reduce risk of CHD
Sulfides/Thiols		
Diallyl sulfide, Allyl methyl trisulfide	garlic, onions, leeks, scallions	may enhance detoxification of undesirable compounds; may contribute to maintenance of heart health and healthy immune function
Dithiolthiones	cruciferous vegetables	may enhance detoxification of undesirable compounds; may contribute to maintenance of healthy immune function
Vitamins		
A***	organ meats, milk, eggs, carrots, sweet potato, spinach	may contribute to maintenance of healthy vision, immune function, and bone health; may contribute to cell integrity
B1 (Thiamin)	lentils, peas, long-grain brown rice, brazil nuts	may contribute to maintenance of mental function; helps regulate metabolism
B2 (Riboflavin)	lean meats, eggs, green leafy vegetables	helps support cell growth; helps regulate metabolism
B3 (Niacin)	dairy products, poultry, fish, nuts, eggs	helps support cell growth; helps regulate metabolism
B5 (Pantothenic acid)	organ meats, lobster, soybeans, lentils	helps regulate metabolism and hormone synthesis
B6 (Pyridoxine)	beans, nuts, legumes, fish, meat, whole grains	may contribute to maintenance of healthy immune function; helps regulate metabolism
B9 (Folate)**	beans, legumes, citrus foods, green leafy vegetables, fortified breads and cereals	may reduce a woman's risk of having a child with a brain or spinal cord defect
B12 (Cobalamin)	eggs, meat, poultry, milk	may contribute to maintenance of mental function; helps regulate metabolism and supports blood cell formation
Biotin	liver, salmon, dairy, eggs, oysters	helps regulate metabolism and hormone synthesis
C	guava, sweet red/green pepper, kiwi, citrus fruit, strawberries	neutralizes free radicals, which may damage cells; may contribute to maintenance of bone health and immune function
D	sunlight, fish, fortified foods and beverages such as milk, juices, and cereals	helps regulate calcium and phosphorus; helps contribute to bone health; may contribute to healthy immune function; helps support cell growth
E	sunflower seeds, almonds, hazelnuts, turnip greens	neutralizes free radicals, which may damage cells; may contribute to healthy immune function and maintenance of heart health

* Examples are not an all-inclusive list.

** FDA approved health claim established for component.

*** Preformed vitamin A is found in foods that come from animals. Provitamin A carotenoids are found in many darkly colored fruits and vegetables and are a major source of vitamin A for vegetarians.

Source: International Food Information Council Foundation

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document health statements and claims. The scientific community continues to increase its understanding of the potential for functional foods and their role in health.

Nutrigenomics "Personalized Nutrition"

As scientific and technological advances develop in the field of health and nutrition, more and more focus has been directed toward the emerging field of nutrigenomics or "personalized nutrition." The science of nutrigenomics involves the application of the human genome to nutrition and personal health to provide individual dietary recommendations. By using an individual's unique genetic makeup and nutritional requirements to tailor recommendations, consumers may one day have a greater ability to reduce their risk of disease.

Personalizing nutrition to an individual's unique genetic makeup has the potential for positive health outcomes overall. Choosing an individualized approach, over a more traditional or general approach, to health and nutrition recommendations can provide consumers with the most appropriate and beneficial information for their specific nutritional needs. While personalized nutrition seems promising, research is still in the preliminary stages, and years may pass before accurate and effective recommendations can be made for individuals.

Consumer interest in the relationship between diet and health has increased the demand for information about functional foods.

Functional foods are an important part of an overall healthful lifestyle that includes a balanced diet and physical activity. People should strive to consume a wide variety of foods, including the examples listed here. These examples are not "magic bullets." The best advice is to include a variety of foods, as recommended by the *2005 Dietary Guidelines for Americans* and MyPyramid.gov, which would provide many potentially beneficial components.

For more information on Functional Foods:

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