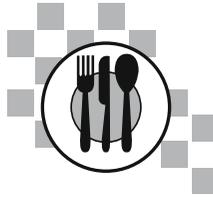


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# Appendices



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## Introduction

There are several parts to these Appendices: I–III.

I. In this portion of the Appendices: Considering the frequency with which terms are used (and used interchangeably!) on labels and in the press, a brief discussion and explanation of terms is provided in these Appendices that follow:

Appendix A—Biotechnology: Genetically Modified Organisms (GMOs)  
Appendix B—Functional Foods  
Appendix C—Nutraceuticals  
Appendix D—Phytochemicals  
Appendix E—Medical Foods

II. In food companies the food scientist who develops new products, the technical staff, and the marketer of these foods must stay abreast of the health concerns of consumers who are making dietary changes in managing their personal healthcare. An expertise in such areas as foods, culinary ideas, consumer

food acceptability, food engineering, food laws, ingredient technology, nutrition, and more positions the food company for product success. (So says the Research Chefs!)

Appendix F—USDA ChooseMyPlate.gov  
Appendix G—Food Label Health Claims  
Appendix H—Research Chefs Association Certification as a Culinary Scientist, etc.

III. New topics continuing to expand on the horizon:

Appendix I—Human Nutrigenomics  
Appendix J—Product Development: Innovation

All of these topics hold great significance for the food scientist today and in the future. Before we forget though, despite what foods *should* and *could* do—taste still rules! A food must please the palate to remain on the shopping list!

## Appendix A

### Biotechnology: Including GMOs

Modern methods of *biotechnology* or *genetic engineering* have led to the production of specific desired traits in plant material. There exists breeding of new types of produce, disease-resistant strains, and longer shelf life. Much of biotechnology addresses *crops*, such as corn, soy, cotton, canola, pepper, and squash; however, biotechnology is not limited to fruits and vegetables. Beyond these plant applications, biotechnology produces other specific desired traits in *animals* and *microorganisms* too. For example, according to The International Food Information Council (IFIC), rennet, an enzyme for making cheeses, and yeast for breads are commonly produced by biotechnology.

The Food and Drug Administration (FDA) definition of biotechnology is as follows:

The FDA Data Standards Council is standardizing vocabulary across the FDA. Therefore, the wording in some terms below may change slightly in the future.

**Biotechnology**—refers to techniques used by scientists to modify deoxyribonucleic acid (DNA) or the genetic material of a microorganism, plant, or animal in order to achieve a desired trait. In the case of foods, genetically engineered plant foods are produced from crops whose genetic makeup has been altered through a process called recombinant DNA, or gene splicing, to give the plant desired traits. Genetically engineered foods are also known as biotech, bioengineered, and genetically modified, although “genetically modified” can also refer to foods from plants altered through methods such as conventional breeding. While in a broad sense biotechnology refers to technological applications of

biology, common use in the United States has narrowed the definition to foods produced using recombinant DNA. For additional information, see the Biotechnology Program on the CFSAN Internet.

<http://www.fda.gov/Food/FoodIngredients-Packaging/ucm064228.htm>

Also see: Chap. 7—a statement by the FDA Biotechnology Coordinator regarding food Biotechnology.

Modern genetic engineering, in practice since the 1970s, is a biotechnology development that inserts a desired gene into another crop’s chromosomes. The resultant cells may be grown into plants, and then conventional breeding techniques follow to yield crops with specific desirable traits. The entire crop is *not* representative of clones of one original plant; rather, the individual plants of a crop are *unique*.

Prior to use of modern biotechnology, rennet was obtained from the intestinal tract of calves’ stomach. Now, the specific gene is available once it is removed and subsequently reproduced in bacteria.

USDA regulation includes:

1. **USDA’s Animal and Plant Health Inspection Service (APHIS)**—According to the **USDA**, companies or organizations, who wish to field test a genetically engineered crop, must obtain permission from the **USDA**.

*Low-risk* traits for familiar crops may have streamlined approval through a *notification procedure*, while *high-risk* traits used for producing pharmaceuticals or industrial compounds require a *permit*. Regardless, field sites are inspected and records audited by APHIS officers.

2. **Biotechnology Regulatory Services (BRS)**, part of APHIS, protects and promotes the US agricultural health by ensuring the safe development and use of agricultural biotechnology products. In June 2002, APHIS created BRS “to place increased emphasis on our regulatory responsibilities for biotechnology. However,

while BRS was established fairly recently, APHIS has a long history of regulating agricultural biotechnology products, overseeing the safe conduct of more than 10,000 field tests of genetically engineered crops and the deregulation, or removal from government oversight, of more than 60 products.

“While biotechnology holds enormous potential for reducing herbicide use, increasing crop health and production, and manufacturing medicines and industrial products, the challenges posed by biotechnology highlight the importance of the regulation of this technology. APHIS BRS is committed to ensuring a dynamic, robust regulatory system based on science and risk which ensures safe field testing and product development in the US, and is mindful of the global implications of our work.” (APHIS) [www.aphis.usda.gov/](http://www.aphis.usda.gov/)

Field sites are inspected and records audited by APHIS officers. Some infractions, investigation, and deliberation result in civil fines and compensation for damage or remediation. Biotechnology should *improve, not harm*, the environment or its people. *Currently* there is strict legislation for use and safety; however, according to some environmentalists, this may not have appeared to be the case with *initial* genetic engineering a decade ago.

## Genetically Modified Organisms (GMOs)

To date, many GMOs have been approved, and seeds have received approval for planting. For example, genetically modified seeds for crops including soy, maize, and cotton are *routinely* planted in the United States. Papaya, potatoes, squash, tomatoes, and more are also produced.

In the United States, GMOs have USDA, FDA, EPA, and other *independent agency oversight* for environmental and food safety protection allowing consumers to be confident and accept usage of GMOs. However, this acceptance is not universal (Huffer 2012). Many European consumers, for example, do *not* have independent regulatory agencies which function independently from the industry that they regulate. This poses a dilemma for acceptance of GMOs by the consumer. Ultimately, it is the consumer’s decision as to what they will consume; however, the food industry is responsible for promoting safe and environmentally sound practices in utilizing GMOs.

Proposition 37, the California ballot measure that would have required (by law) food companies to label genetically engineered foods was defeated in November 2012. Arguments were made, and continue to be made, by both sides. *Proponents* saw passage of Prop 37 as key to the health of Americans. *Opponents* of the Act feared that consumers would “interpret a GE label as a warning label device despite no conclusive data on hazardous effects of GM foods on the market” (Huffer 2012).

The *initial* wave of GMO concentrated on insect resistance and herbicide tolerance. The *next* wave, already seen in the United States, includes developing select attributes—fat type and so forth. The yield is functional or designer foods. In the *future*, entire manufacturing facilities may be dedicated to the production of genetic materials for medical, pharmaceutical, and foods use. (IdentiGEN Genetic Testing Services)

Today, GMOs are banned in *organic* agriculture. The “Non-GMO Project Verified” seal also indicates that the food is not contaminated with GMOs. Also, non-GMO foods by law are grown without pesticides.

## Appendix B

### Functional Foods

Hopefully all foods are “functional” in that they provide aroma, taste, nutritive value, and perhaps “comfort.” Yet, the term “functional food” indicates a different connotation—it is that those named foods provide benefit *beyond* that of basic nutrition. Functional foods may be modified by the addition of nutrients not inherent to the original counterpart (Peter Pan Peanut Butter, Fullerton, CA).

**Functional foods** are a newly evolving area of food and food technology (Chap. 20), which are defined as:

Any modified food or food ingredient that may provide a health benefit beyond the traditional nutrients it contains (Jenkins 1993; Goldberg 1994a).

The term functional foods has *no* legal or general acceptance in the United States. However, it is defined by the Institute of Medicine’s Food and Nutrition Board (IOM/FNB), and is accepted by some, as a modified food or food ingredient for specified health use (Goldberg 1994b; Hasler 1998; Sloan 2000).

The IFIC defines such foods as “. . .foods or dietary components . . .”; “foods that provide health benefits beyond basic nutrition” (International Food Information Council (IFIC)). (So, it may be seen that “beyond” is the operative word!)

According to the IFIC report in “Functional Foods” the *simplest* functional foods are *unmodified* foods such as fruits and vegetables (that Americans do not eat enough of by the way!) (Chap. 7). Examples include broccoli, garlic, oats, purple grapes, soy food, tea, and tomatoes. For example, tomatoes are rich in the food ingredient lycopene, and carrots are rich in beta-carotene. Other functional foods may be *modified* foods including *fortified* foods, and foods *enriched* with components such as

phytochemicals. Thus these foods are supportive of health beyond basic nutrition.

The idea of functional foods originated in Japan, in the mid 1980s. Foods processed to contain specific ingredients significant to health and disease prevention were studied. The aim was solving medical problems such as high blood pressure. Today *in Japan*, products must meet eligibility requirements of the Japanese Ministry of Health and Welfare to bear the approval stamp *FOSHU—Foods for Specified Health Use*. Today, *in the United States*, the functional foods category is *not* recognized legally however; many foods are created to target diseases such as cancer, diabetes, heart disease, hypertension, and more.

Such foods have been associated with the treatment and/or prevention of other medical maladies including neural tube defect and osteoporosis, as well as abnormal bowel function and arthritis (International Food Information Council (IFIC)).

### Use of Functional Foods

While research shows beneficial properties of specific substances, such as iron and vitamins, their *survival* in the food manufacturing process and their *contribution* to appearance, texture, and flavor are *also* important considerations. Usage of functional food components by an individual and/or company must consider the risk:benefit ratio, and follow acceptable scientific guidelines with regard to toxicity (ADA Position of the American Dietetic Association 1995). With availability of these types of foods, greater health benefits may be provided by the formulation of food products with added nutrients/nutrient combinations (Pszczola 1998).

### Functional Foods

*Volume 109, Issue 4, Pages 735–746 (April 2009)*

*This position paper has expired and it has been reaffirmed to be updated. The updated position paper is under development.*

### Functional Food Abstract

All foods are functional at some physiological level, but it is the position of the American Dietetic Association (ADA) that functional foods that include whole foods and fortified, enriched, or enhanced foods have a potentially beneficial effect on health when consumed as part of a varied diet on a regular basis, at effective levels. ADA supports research to further define the health benefits and risks of individual functional foods and their physiologically active components. Health claims on food products, including functional foods, should be based on the Significant Scientific Agreement (SSA) standard of evidence and ADA supports label claims based on such strong scientific substantiation. Food and nutrition professionals will continue to work with the food industry, allied health professionals, the government, the scientific community, and the media to ensure that the public has accurate information regarding functional foods and thus should continue to educate themselves on this emerging area of food and nutrition science. Knowledge of the role of physiologically active food components, from plant, animal, and microbial food sources, has changed the role of diet in health. Functional foods have evolved as food and nutrition science has advanced beyond the treatment of deficiency syndromes to reduction of disease risk and health promotion. This position paper reviews the definition of functional foods, their regulation, and the scientific evidence supporting this evolving area of food and nutrition. Foods can no longer be evaluated only in terms of macronutrient and micronutrient content alone. Analyzing the content of other

physiologically active components and evaluating their role in health promotion will be necessary. The availability of health-promoting functional foods in the US diet has the potential to help ensure a healthier population. However, each functional food should be evaluated on the basis of scientific evidence to ensure appropriate integration into a varied diet.

Academy of Nutrition and Dietetics.  
Formerly The ADA.

Thus, functional foods include those foods whose nutritional value is enhanced by natural ingredient addition, and they may offer health benefits when consumed as part of a varied diet (ADA).

Functional foods may be derived from *plant and animal sources*. The Scientific Status Summary of the Institute of Food Technologists reviewed the literature for the primary plant and animal foods linked with healthful benefits. The review focused on foods, rather than specific compounds isolated from foods. (Scientific Status Summary of the Institute of Food

Technologists Functional Foods: Their Role in Disease Prevention and Health Promotion. *Food Technology* 1998. 52 (2): 57–62.)

“Although the term ‘functional foods’ may not be the ideal descriptor for this emerging food category, focus-group research conducted by the IFIC showed that this term was recognized more readily and was also preferred by consumers over other commonly used terms such as ‘nutraceutical’ or ‘designer foods.’ Widespread use and general acceptance of the term ‘functional foods’ by the media, scientists, and consumers have led the ADA to work within this framework rather than introduce a new, more descriptive term.”

Several parties identified in the following have contributed to input in public hearings.

- The Institute of Food Technologists (IFT)
  - *Advocate* of functional food category for several years. A *new* category is needed so

that food marketers could describe items as functional foods, as long as labels were reflective of scientific evidence.

- “Under existing regulatory policies, some food label claims cannot be factual and still accurately represent the science. This limits the scope and accuracy of consumer information and hinders the development and marketing of functional foods.” (IFT)
- The Center for Science in the Public Interest (CSPI).
  - *Wary* of the creation of a new category. In *theory* it may help consumers. In *practice*, industry and government regulators may not make it workable.
  - “The food industry is pressuring the ... Administration to extend already weak standards for ... ingredients and label claims ... about as dependable as nineteenth-century snake oil.”

**Functional Food Center** (Dallas, TX) has adopted a new definition of functional foods: **Functional Food** is a “natural or processed food that contains known or unknown biologically-active compounds; which in defined quantitative and

qualitative amounts, provide a clinically proven and documented health benefit, and thus are important sources in the prevention, management and treatment of chronic diseases in the modern age.” (2013 <http://www.functionalfoodscenter.com>. “Providing research expertise for further development of functional food innovations.”)

See also: <http://www.mdheal.org/articles/word2/functionalfoods2.htm> Functional Foods. Leo Galland—Director, Foundation for Integrated Medicine

### **Functional Foods Fact Sheet: Probiotics and Prebiotics (IFIC)**

Wise food choices may increase control of personal health. Terms such as “functional foods” or “nutraceuticals” (Further discussed in the next Appendices) are widely used in the marketplace. Such foods are regulated by FDA under the authority of the Federal Food, Drug, and Cosmetic Act, even though they are not specifically defined by law.

## Appendix C

### Nutraceuticals

Nutraceuticals is the name given to a proposed new regulatory category of food components that may be considered a food or part of a food. Although they may supply medical or health benefits including the treatment or prevention of disease, the FDA does *not* recognize the term. Such foods, as “functional foods” are regulated by FDA under the authority of the Federal Food, Drug, and Cosmetic Act, even though they are not specifically defined by law.

The term nutraceutical was originally defined by Dr. Stephen L. DeFelice, founder and chairman of the Foundation of Innovation Medicine (FIM), New Jersey. Since the term was initially coined by Dr. DeFelice, its meaning has been modified. The word is created from using the words *nutrition* and *pharmaceutical*.

A *nutraceutical* is *not* a food or drug; therefore, it is not recognized by the FDA. It falls outside FDA regulations because of the following: **Foods** are defined as “products primarily consumed for their taste, aroma, or nutritive value.” The category of food is further divided into *conventional food* and *dietary supplements*. **Drugs** are defined as “intended for use in the diagnosis, cure, mitigation, treatment or prevention of disease or to affect the structure or a function of the body.” Unlike prescription drugs or over-the-counter medicines, dosages and composition of some nutraceuticals do *not* need to meet a quality control standard. Of course this leads to skepticism and may be harmful to users

who believe and follow claims made by the manufacturer of nutraceuticals.

*Nutraceuticals* are defined by the Foundation for Innovation in Medicine as:

Any substance that may be considered a food or part of a food and provides medical or health benefits, including the prevention or treatment of disease. Nutraceuticals may range from isolated nutrients, dietary supplements, and diets to genetically engineered ‘designer’ foods, herbal products, and processed products, such as cereals, soups, and beverages (Report 2001).

So, they may range from isolated nutrients to processed food products with a lot in between! Foods may also be known as *designer foods* or may even be referred to as *functional foods*.

According to the *American Nutraceutical Association*, nutraceuticals are functional foods with properties which are potentially disease-preventing and health-promoting. They also include naturally occurring dietary substances in forms similar to pharmaceutical dosages—capsules, etc., and “dietary supplements” as defined by the Dietary Supplement Health and Education Act of 1994 (DSHEA).

The Nutraceuticals Institute is a joint partnership of Rutgers (State University of New Jersey) and St. Joseph’s Philadelphia Jesuit University. Nutraceuticals are defined as “natural, bioactive chemical compounds that have health promoting, disease preventing or medicinal properties.” Their mission is to involve universities, government and industry in research, development of safe products and link with the health care industry, and develop markets.

## Appendix D

### Phytochemicals

**Phytochemicals** (phyto = plant) are important non-nutrients in food that may be responsible for disease prevention such as reduction of cancer. While many frequently consumed foods including grains, legumes, seeds, fruits and vegetables, as well as green tea are *naturally* a source of phytochemicals, a product may contain *added* phytochemicals (Chaps. 7 and 17). If added, the label must state on the food package that the product contains phytochemicals; however, no nutritional claim may be made other than stating the already approved (Table 20.2) nutritional or medical benefits that are based on sound scientific data.

Therefore, whether naturally available in the diet, added, or in supplement form, phytochemicals are defined as:

Substances found in edible fruits and vegetables that may be ingested by humans daily in gram quantities and that exhibit a potential for modulating human metabolism in a manner favorable for cancer prevention (Jenkins 1993).

**Examples:** The list is long of the many examples of such plant chemicals. It includes the following:

- Carotenoids—beta-carotene, orange- and yellow-pigmented, and green leafy vegetables
- Flavonoid group of pigments—many fruits and vegetables
- Indoles, isothiocyanates—cruciferous (“cross-shaped blossom,” cabbage family) vegetables
- Isoflavones—soybeans, tofu
- Limonoids—citrus
- Lycopene—tomatoes
- Phenols—many fruits and vegetables
- Polyphenols—grapes, green tea, red wine
- Protease inhibitors—beans
- Saponins—legumes – beans and peas
- Sterols—broccoli, cabbage, cucumbers, egg plant, peppers, soy, whole grains
- Sulfur-containing allyl sulfide and sulforaphane—garlic, leeks, onion
- Terpenes—cherries, citrus peel

These are among the plant chemicals that may be effective in disease prevention.

[http://lpi.oregonstate.edu/infocenter/phytochemicals/flavonoids/#disease\\_prevention](http://lpi.oregonstate.edu/infocenter/phytochemicals/flavonoids/#disease_prevention)

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## Appendix E

### Medical Foods

*Medical foods* are regulated by the FDA Office of Special Nutritionals on a case-by-case basis. They are used as enteral foods (not administered into a vein parenterally, but not traditional foods) to improve nutritional support of the hospitalized patient. In 1988, Congress provided the first legal definition of “medical food” as food formulated to be consumed or administered enterally under the supervision of a physician and which is intended for the specific dietary management of a disease or condition for which distinctive nutritional requirements based on recognized scientific principles are established by medical evaluation (U.S. Congress 1988).

The medical foods can be ingested via tube feeding or the mouth and are strictly foods designed to meet specific nutritional requirements for people diagnosed with specific illnesses.

Medical foods may either supplement the diet or be the sole source of nutrition and are used based on medical evaluation. Currently, such

medical foods are not available “over-the-counter” and may not be subject to NLEA labeling regulations, as they are not considered the same as foods for special dietary use. The fact that both categories of foods often overlap poses new FDA policy/regulatory discussion.

The FDA regulates medical foods and considers such foods to be “formulated to be consumed or administered internally under the supervision of a physician, and which is intended for the specific dietary management of a disease or condition for which distinctive nutritional requirements, on the basis of recognized scientific principles, are established by medical evaluation” (Huffer 2012). Nutraceuticals and dietary supplements do not meet these distinctive nutritional requirements and are not classified as Medical Foods.

The USDA recognizes medical foods as non-prescription nutrition used for dietary management of a disease or condition. It needs to be noted that such foods are not the same as reduced-fat or low-sodium for example. They are not used by the general public and are not available in supermarkets.

Hippocrates once said “Let food be thy medicine, and medicine be thy food.”

## Appendix F

### ChooseMyPlate.gov



MyPlate illustrates the five food groups that are the building blocks for a healthy diet using a familiar image—a place setting for a meal. Before you eat, think about what goes on your plate or in your cup or bowl. To learn more about building a healthy plate, select a food group below. Vegetables, Fruits, Grains, Dairy, Protein Foods  
10 Tips Nutrition Education Series

## 10 tips

The Ten Tips Nutrition Education Series provides consumers and professionals with high quality, easy-to-follow tips in a convenient, printable format. These are perfect for posting on a refrigerator.

These tips and ideas are a starting point. You will find a wealth of suggestions here that can help you get started toward a healthy diet. Choose a change that you can make today, and move toward a healthier you. These tips are also available in [Spanish](#).

- [ChooseMyPlate](#) [color; b/w]
- [Add More Vegetables to Your Day](#) [color; b/w]
- [Focus on Fruits](#) [color; b/w]
- [Make Half Your Grains Whole](#) [color; b/w]
- [Got Your Dairy Today?](#) [color; b/w]
- [With Protein Foods, Variety Is Key](#) [color; b/w]
- [Build a Healthy Meal](#) [color; b/w]
- [Healthy Eating for Vegetarians](#) [color; b/w]
- [Smart Shopping for Veggies and Fruits](#) [color; b/w]
- [Liven up Your Meals with Vegetables and Fruits](#) [color; b/w]
- [Kid-Friendly Veggies and Fruits](#) [color; b/w]
- [Be a Healthy Role Model for Children](#) [color; b/w]
- [Cut Back on Your Kid's Sweet Treats](#) [color; b/w]
- [Salt and Sodium](#) [color; b/w]
- [Eat Seafood Twice a Week](#) [color; b/w]
- [Eating Better on a Budget](#) [color; b/w]
- [Use SuperTracker Your Way](#) [color; b/w]
- [Enjoy Your Food, But Eat Less](#) [color; b/w]
- [Make Better Beverage Choices](#) [color; b/w]
- [Make Celebrations Fun, Healthy & Active](#) [color; b/w]
- [The School Day Just Got Healthier](#) [color; b/w]
- [Choosing Whole-Grain Foods](#) [color; b/w]
- [Be Food Safe](#) [color; b/w]
- [MyPlate Snack Tips for Parents](#) [color; b/w]
- [Healthy Eating for an Active Lifestyle](#) [color; b/w] **NEW**
- [Be Choosey in the Dining Hall](#) [color; b/w] **NEW**
- [Mini-Fridge Makeover](#) [color; b/w] **NEW**
- [Stay Fit on Campus](#) [color; b/w] **NEW**
- [Be an Active Family](#) [color; b/w] **NEW**
- [Be Active Adults](#) [color; b/w] **NEW**

Vegetables	Fruits	Grains	Dairy	Protein foods
Eat more red, orange, and dark-green veggies like tomatoes, sweet potatoes, and broccoli in main dishes or serve as a main dish	Use fruits as snacks, salads, and desserts. At breakfast, top your cereal with bananas or strawberries; add blueberries to pancakes	Substitute whole-grain choices for refined-grain breads, bagels, rolls, breakfast cereals, crackers, rice, and pasta	Choose skim (fat-free) or 1 % (low-fat) milk. They have the same amount of calcium and other essential nutrients as whole milk, but less fat and calories	Eat a variety of foods from the protein food group each week, such as seafood, beans and peas, and nuts as well as lean meats, poultry, and eggs
Add beans or peas to salads (kidney or chickpeas), soups (split peas or lentils), and side dishes (pinto or baked beans), or serve as a main dish	Buy fruits that are dried, frozen, and canned (in water or 100 % juice), as well as fresh fruits	Check the ingredients list on product labels for the words “whole” or “whole grain” before the grain ingredient name	Top fruit salads and baked potatoes with low-fat yogurt	Twice a week, make seafood the protein on your plate
Fresh, frozen, and canned vegetables all count. Choose “reduced sodium” or “no-salt-added” canned veggies	Select 100 % fruit juice when choosing juices.	Choose products that name a whole grain first on the ingredients list	If you are lactose-intolerant, try lactose-free milk or fortified soy milk (soy beverage)	Choose lean meats and ground beef that are at least 90 % lean
				Trim or drain fat from meat and remove skin from poultry to cut fat and calories

**For a 2,000-calorie daily food plan, you need the amounts below from each food group. To find amounts personalized for you, go to [ChooseMyPlate.gov](http://ChooseMyPlate.gov)**

<b>Eat 2½ cups every day</b>	<b>Eat 2 cups every day</b>	<b>Eat 6 ounces every day</b>	<b>Get 3 cups every day</b>	<b>Eat 5½ ounces every day</b>
What counts as a cup? 1 cup of raw or cooked vegetables or vegetable juice; 2 cups of leafy salad greens	What counts as a cup? 1 cup of raw or cooked fruit or 100 % fruit juice; ½ cup dried fruit	What counts as an ounce? 1 slice of bread; ½ cup of cooked rice, cereal, or pasta; 1 ounce of ready-to-eat cereal	What counts as a cup? 1 cup of milk, yogurt, or fortified soy milk; 1½ ounces natural or 2 ounces processed cheese	What counts as an ounce? 1 ounce of lean meat, poultry, or fish; 1 egg; 1 Tbsp peanut butter; ½ ounce nuts or seeds; ¼ cup beans

# 10 tips

**Nutrition  
Education Series**

# choose MyPlate

## 10 tips to a great plate



### Making food choices for a healthy lifestyle can be as simple as using these 10 Tips.

Use the ideas in this list to *balance your calories*, to choose foods to *eat more often*, and to cut back on foods to *eat less often*.

#### 1 balance calories

Find out how many calories YOU need for a day as a first step in managing your weight. Go to [www.ChooseMyPlate.gov](http://www.ChooseMyPlate.gov) to find your calorie level. Being physically active also helps you balance calories.

#### 2 enjoy your food, but eat less

Take the time to fully enjoy your food as you eat it. Eating too fast or when your attention is elsewhere may lead to eating too many calories. Pay attention to hunger and fullness cues before, during, and after meals. Use them to recognize when to eat and when you've had enough.



#### 3 avoid oversized portions

Use a smaller plate, bowl, and glass. Portion out foods before you eat. When eating out, choose a smaller size option, share a dish, or take home part of your meal.

#### 4 foods to eat more often

Eat more vegetables, fruits, whole grains, and fat-free or 1% milk and dairy products. These foods have the nutrients you need for health—including potassium, calcium, vitamin D, and fiber. Make them the basis for meals and snacks.



#### 5 make half your plate fruits and vegetables

Choose red, orange, and dark-green vegetables like tomatoes, sweet potatoes, and broccoli, along with other vegetables for your meals. Add fruit to meals as part of main or side dishes or as dessert.

#### 6 switch to fat-free or low-fat (1%) milk

They have the same amount of calcium and other essential nutrients as whole milk, but fewer calories and less saturated fat.



#### 7 make half your grains whole grains

To eat more whole grains, substitute a whole-grain product for a refined product—such as eating whole-wheat bread instead of white bread or brown rice instead of white rice.

#### 8 foods to eat less often

Cut back on foods high in solid fats, added sugars, and salt. They include cakes, cookies, ice cream, candies, sweetened drinks, pizza, and fatty meats like ribs, sausages, bacon, and hot dogs. Use these foods as occasional treats, not everyday foods.

#### 9 compare sodium in foods

Use the Nutrition Facts label to choose lower sodium versions of foods like soup, bread, and frozen meals. Select canned foods labeled "low sodium," "reduced sodium," or "no salt added."



#### 10 drink water instead of sugary drinks

Cut calories by drinking water or unsweetened beverages. Soda, energy drinks, and sports drinks are a major source of added sugar, and calories, in American diets.

## Appendix G

### Food Label Health Claims

**Health claims** describe an association between a nutrient or food substance and disease or health-related condition. Food processors may choose to use any additive, including nutrients or non-nutrient supplements, in the manufacture of food products. Regardless of what is used, they must comply with all Nutrition Labeling and Education Act (NLEA) regulations regarding the contents and stated **health claims** of their products. They must use vitamin and mineral additives judiciously (not just to enhance the values on their food label), and then only make label claims regarding nutritional benefits that are allowed (Chap. 20). A research dietitian with the USDA Agricultural Research Services has said:

Although compounds in foods that must be concentrated to obtain physiologic effects should be regulated as drugs, foods and purified food constituents in amounts commonly consumed should not be classified as drugs simply because they are being tested for potential health effects or disease prevention. Research should not be discouraged by requiring investigative new drug procedures for substances in amounts available in the diet. (USDA)

Improving nutrient density may be researched more via reading (Berry 2012)

#### Examples of Approved Health Claims

- Calcium and lower risk of osteoporosis
- Sodium and a greater risk of hypertension (high blood pressure)

- Saturated fat and cholesterol and a greater risk of coronary heart disease (CHD)
- Dietary fat and a greater risk of cancer
- Fiber-containing grain products, fruits, and vegetables and a reduced risk of cancer
- Fruits, vegetables, and grain products that contain fiber (particularly soluble fiber) and a reduced risk of CHD
- Fruits and vegetables and a reduced risk of cancer
- Folate and reduced risk of neural tube defect
- Sugar alcohols and reduced risk of tooth decay
- Soluble fiber from whole oats and psyllium seed husk and reduced risk of CHD
- Soy protein and reduced risk of CHD
- Whole grains and reduced risk of CHD and certain cancers
- Plant sterol and plant stanol esters and reduced risk of CHD
- Potassium and reduced risk of high blood pressure and stroke

The FDA allows health claims to be one of three types:

1. Unqualified health claims (allowed since 1993). The claim must meet the SSA standard
2. Qualified health claim (2003). SSA not met. Use of the term “may.”
3. Structure/function claims. The effect that a substance has on the structure or function of the body—not a specific disease. That is, calcium and strong bones

## Appendix H

### Research Chefs Certification as a Culinary Scientist and More

The *Research Chefs Association* (RCA) certifies that food science, as well as culinary knowledge, is held by an individual. [www.researchchef.org](http://www.researchchef.org) or <http://www.culinology.com>

The Research Chefs Association Certification Commission (RCACC) was founded in 2003. It was to “promulgate policies, procedures and criteria which will enhance the certification process for Certified Research Chefs (CRCs) and Certified Culinary Scientists (CCSs). To guide its activities, the RCACC strives to meet National Commission for Certifying Agencies (NCCA) standards.” (RCA)

According to the RCA, it is “the leading professional community for food research and development. Its members are the pioneers of the discipline of Culinology® - the blending of culinary arts and the science of food.”

#### Certified Research Chef Eligibility (CRC)

In order to be eligible to become a Certified Research Chef, applicants first must meet eligi-

bility criteria in the categories of Education, Food Service Experience, and Research and Development Experience. Having done so, candidates then must pass a certification exam on their knowledge of food science and related subjects. (RCA)

#### Certified Culinary Scientist Eligibility (CCS)

In order to be eligible to become a Certified Culinary Scientist, applicants must first meet eligibility criteria in the categories of Education, Food Science Experience, and Food Service Experience. Having done so, candidates then must pass a certification exam on their knowledge of culinary arts and related subjects. (RCA)

#### RCACC Approved Definitions for Eligibility

A *Research Chef* for purposes of certification is defined as one who works in food product development, has expertise in culinary arts, and a baseline knowledge of food science.

A *Culinary Scientist* for purposes of certification is defined as one who works in food product development, has expertise in food science/technology, and a baseline knowledge of culinary arts. *Food Science Related Degrees* include Culinology®, Food Technology, Microbiology, Chemistry, Nutrition, Biochemistry, Meat Science, Dairy Science, Cereal Science, Biology, Fish Science, Poultry Science, and Food Engineering. (RCA)

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## Appendix I

### Human Nutrigenomics

By definition *genomics* refers to the *complete* genetic makeup of an organism. Some human genomic test assessments began in the 1980s, and are now becoming more available. Results may show a patient's individual risk of disease or its recurrence, which can help medical care providers and patients make better informed and more personalized treatment decisions.

*Nutrigenomics* is the new science of *nutritional genomics*. It is the application of the science of genomics to human nutrition—and it views the relationship between nutrition and health. Research in nutrigenomics covers *cellular and molecular processes* and the relation to many diseases, including degenerative diseases such as atherosclerosis and cancers, as well as aging. Research is focused on the *prevention* of disease and requires understanding of nutrient-related interactions at the level of the gene.

Nutrigenomics can be approached in more than one way. For instance, personalized nutrition may be offered to people based on small differences in their genome (single nucleotide polymorphisms, or SNPs) compared to another person. Nutrigenomics can also be considered when molecules in certain foods have the ability to change the expression of genes in an individ-

ual, by increasing or decreasing the expression of a gene into a protein. An example of each of these is given below.

Personalized nutrition may be used as evidence accumulates that certain foods may be harmless to some people yet detrimental to others. For instance, some people have a version of a gene that codes for a protein that makes them susceptible to myocardial infarction (MI) with intake of caffeine because they metabolize caffeine slowly, while others with a different version of the same gene make a protein that metabolizes caffeine fast and their risk for MI is lowered. People with the slow version gene could be counseled about their increased risk for MI with caffeine intake (Cornelis et al. 2006).

Food also comes into play when considering gene expression in general. Not all genes are expressed in all tissue; only those genes necessary for that tissue are expressed into proteins. Researchers are finding that certain molecules in foods can affect the expression of certain genes. For instance, research has shown that vitamin D can increase the expression of genes that code for anti-inflammatory proteins and decrease the expression genes coding for pro-inflammatory proteins, thus helping with chronic inflammatory conditions such as autoimmune disease. Vitamin D is fat-soluble and should not be taken in excess (Mark & Carson 2006).

(This Nutrigenomics Appendix I is written with the assistance of B.L. Mark Ph.D., R.D.)

## **Appendix J**

### **Product Development: Innovation**

“Innovation is alive and well in the food industry, albeit within the strictures of consumer acceptance—along with government regulation and public safety of course” reports the editor of *New Product Design* magazine. (Kuntz, L.A. Innovation in the food industry. *New Product Design*. 2012. October: 12.)

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## Glossary

**Biotechnology** Biogenetic engineering of animals, microorganisms, and plants to alter or create products that have increased resistance to pests, improved nutritive value, and shelf life.

**Culinary Scientist** For certification—defined as one who works in food product development, has expertise in food science/technology, and baseline knowledge of culinary arts.

**Drugs** Intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease or to affect the structure or function of the body.

**Enrichment** The addition of nutrients to achieve established concentrations specified by the standards of identity.

**Foods** Products primarily consumed for their taste, aroma, or nutritive value.

**Fortification** The addition of nutrients at levels higher than those found in the original or comparable food.

**Functional foods** Any modified food or food ingredient that may provide a health benefit beyond that obtained by the original food; the term has no legal or general acceptance in the

United States, although it is accepted by some as food for specified health use.

**Genetically Modified Organisms (GMOs)**

Genetically modified seeds for crops.

**Medical foods** Food formulated to be consumed or administered enterally under the supervision of a physician and which is intended for the specific dietary management of a disease or condition for which distinctive nutritional requirements based on recognized scientific principles are established by medical evaluation (U.S. Congress 1988).

**Nutraceuticals** The name given to a proposed new regulatory category of food components that may be considered a food or part of a food and may supply medical or health benefits including the treatment or prevention of disease; a term not recognized by the FDA.

**Nutrigenomics** The new science of *nutritional genomics*. It is the application of the science of genomics to human nutrition.

**Phytochemicals** Plant chemicals; natural compounds other than nutrients in fresh plant material that function in disease prevention; they protect against oxidative cell damage or facilitate carcinogen excretion from the body and exhibit a potential for reducing the risk of cancer.

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