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PHYTOCHEMICALS

&

PLANT STEROLS

**TABLE 10.2**
Foods High in Phytochemicals Promote Health

Food	Phytochemicals It Contains	How It Benefits You
Apricots, carrots, cantaloupe, tomatoes, sweet potatoes, broccoli, spinach, and other leafy greens	Carotenoids: α -carotene, β -carotene, β -cryptoxanthin, lutein, zeaxanthin, lycopene	Some are converted to vitamin A, provides antioxidant protection; some decrease the risk of macular degeneration
Berries, citrus fruits, onions, purple grapes, green tea, red wine	Flavonoids (quercetin, kaempferol, myricetin), flavones (apigenin), flavanols (catechins)	Makes capillary blood vessels stronger; blocks carcinogens and slows the growth of cancer cells
Tofu, soy milk, soybeans, flaxseed, rye bread	Phytoestrogens including isoflavones such as genistein, biochanin A, and daidzein and lignans	Mimics effect of estrogen; induces cancer cell death; slows the growth of cancer cells; reduces blood cholesterol; may reduce risk of osteoporosis
Nuts, seeds, legumes	Phytosterols: β -sitosterol, stigmasterol, and campesterol	Decreases cholesterol absorption, reduces the risk of colon cancer by slowing growth of colon cells
Hot peppers	Capsaicin	Modulates blood clotting
Broccoli, Brussels sprouts, and cabbage	Glucosinolates, isothiocyanates, indoles	Increases activity of enzymes that deactivate carcinogens; alters estrogen metabolism; affects the regulation of gene expression
Onions, garlic, leeks, and chives	Sulfides and allium compounds	Deactivates carcinogens, kills bacteria
Sesame seeds and soybeans	Inositol	Protects against free radicals; protects against cancer
Beans and herbs	Saponins	Decreases cholesterol absorption, decreases cancer risk, antioxidant
Nuts, grapes, and strawberries	Ellagic acid	Anticancer properties; prevents the formation of carcinogens in the stomach
Tea	Tannins, catechins	Antioxidants; cancer protection
Turmeric and mustard	Curcumin	Reduces carcinogen formation, antioxidant, antiinflammatory
Broccoli	Sulforaphane	Detoxifies carcinogens, shown to protect animals from breast cancer
Citrus fruit peels	Limonene	Inhibits cancer cell growth

Game Plan**Tips for Increasing Your Phytochemical Intake**

As we explained in the text, phytochemicals (pronounced “fight-chemicals”) help your body to fight chronic disease. So it makes sense to include an appropriate variety of them in your daily diet. But what’s appropriate for you? And how can you select and prepare them in ways that work for your busy lifestyle?

How Many Servings?

Start by reviewing Table 6.5, which identifies the largest groups of phytochemicals. Because most of these are plant pigments, and many fruits and vegetables contain several different types, you can be sure you are getting a wide variety if you eat 5 to 12 servings of brightly colored fruits and vegetables every day. Children and others who consume about 1,600 kcal a day should eat about 5 to 7 servings, whereas adolescent boys and adult male athletes might want to aim for 10 to 12 servings.²⁴ For a definition of serving sizes, see Chapter 1, page 19.

Shopping: Build a Rainbow!

Next, check out the food rainbow from the 5 A Day The Color Way Campaign: it groups phytochemical-rich foods according to color. The 5 A Day Campaign promotes eating at least 5 servings of colorful fruits and vegetables each day to fight cancer, heart disease, and the effects of aging. Here are only a few examples of the wide variety of foods in each group:

- Blue-purple foods include eggplant, red onions, purple cabbage, cherries, blackberries, blueberries, raspberries, red grapes, and plums.
- Green foods include avocados, broccoli, Brussels sprouts, chives, cabbage, collard greens, green peppers, kale, Swiss chard, leaf lettuces, spinach, and kiwifruit.
- White foods include cauliflower, bok choy, white turnips, mushrooms, garlic, onions, leeks, scallions, and bananas.
- Yellow-orange foods include carrots, corn, yellow peppers, pumpkin, butternut and other winter squashes, sweet potatoes, cantaloupe, apricots, oranges, papaya, and mangoes.
- Red foods include tomatoes, red peppers, apples, strawberries, pink grapefruit, and watermelon.



*Diets rich in fruits and vegetables may reduce the risk of some types of cancer and other chronic diseases.

When shopping, build a rainbow in your shopping cart. That way, you’ll have on hand several colorful choices to incorporate into meals and snacks each day. Because fruits and vegetables are perishable, purchase only an amount of fresh produce that you know you can consume within a few days. Nutrient losses increase with each day of storage.

Remember to choose less-perishable forms of fruits and vegetables, such as dried fruits, 100% fruit and vegetable juices, soups, canned fruits and vegetables (check for no-sugar and no-sodium added), and frozen vegetables. By the way, the phytochemicals in some fruits and vegetables are even more readily absorbed in processed products such as juices and sauces!

Keep It Fresh!

When you get home, wash your fresh fruits and vegetables thoroughly, except for berries, which should be washed immediately before eating to discourage spoilage. Store tomatoes, garlic, and bananas at room temperature. Store unripened avocados, pears, and other fruits in a lightly closed paper bag until ripe. Then consume or refrigerate. Store potatoes and onions in a cool, dark location such as a cellar or cool cupboard.

Nutrients become depleted when exposed to air, so peel and cut fruits and vegetables only when you are ready to eat them. Many fruits and vegetables have edible peels that contain important nutrients and fiber, so wash them and eat them un-

Table 1. Plant Sterol Content* in a Selection of Foods	
Food	Sterol Content†
	<i>mg/100 g edible</i>
<i>Fruits and Vegetables</i>	
Broccoli, frozen	44
Green peas, frozen	25
Orange	24
Apple	13
Cucumber	6
Tomato	5
<i>Cereals</i>	
Wheat bran	200
Swedish knackebrot	89
Wholemeal bread	53
Rolled oats	39
Wheat bread	29
<i>Fats and Oils</i>	
Corn oil	912
Rapeseed (canola) oil	668
Liquid margarine	522
Sunflower oil	213
Spreadable butter	153
Olive oil	154
<p>* Analyzed at the Department of Clinical Nutrition, the Sahlgrenska Academy at the University of Göteborg.^{36,37,40}</p> <p>† Total plant sterols are the sum of β-sitosterol, campesterol, and stigmasterol, together with β-sitostanol and campestanol.</p>	