Dear Alice,

As a cancer survivor, I am looking for ways to keep my body healthy. What fruits and vegetables are high in antioxidants?

— Jill

Answer

Dear Jill,

You're right in thinking that some foods can help improve health or protect against disease. Some of these disease-fighting substances in food are vitamins and minerals, but another diverse group of plant chemicals are called phytochemicals. Phytochemicals, many of which are antioxidants, impart distinct flavors, aromas, and pigments to foods. For example, one enormous class of antioxidants, flavonoids, includes a group called allyl sulfides, which are found in garlic, onions, and shallots. It's believed that allyl sulfides may help produce a detoxification enzyme that protects against carcinogens. Other antioxidants are detectable by their colors — vividly colored fruits and veggies are rich sources of beneficial plant chemicals. For example, anthocyanins are antioxidants that lend the deep red, blue, and purple hues to raspberries, blueberries, eggplant, and red cabbage.

So how do antioxidants work? They are believed to protect cells from "free radicals," which are harmful oxygen molecules. Free radicals may cause damage to cells, possibly resulting in cancer. Smoking, air pollution, infection, and excessive sunlight can all increase production of free radicals, although they are also formed from normal bodily functions. Antioxidants may help prevent the formation of carcinogens (cancer causing substances), block the actions of carcinogens, and/or suppress cancer development. Most of these actions have yet to be proven in humans; however, foods containing antioxidants (mostly plants) contain many other healthy components.

The following list includes various classes of antioxidants and other phytochemicals, some of their rich food sources, and how they are believed to work:
• Vitamin C (found in citrus fruits, tomatoes, peppers, broccoli, leafy vegetables, strawberres, potatoes) inhibits nitrosamine formation, a potentially dangerous carcinogen.
• Carotenoids (apricots, papaya, sweet potatoes, tomatoes, mangoes, carrots, pumpkin, red peppers, spinach, corn, cantaloupe) has numerous anti-cancer functions.
• D-limonene (citrus fruits) may detoxify cancer promoters.
• Lycopene (cooked tomato products, watermelon, pink grapefruit) is a class of carotenoids that's protective against prostate and possibly other cancers.
• Anthocyanins (blueberries, strawberries, raspberries, blackberries, grapes, cherries, red peppers, eggplant, red cabbage) offer antioxidant cell protection and may help prevent binding of carcinogens to DNA.
• Allyl sulfides (garlic, onions, shallots, leeks, chives, scallions) have various anti-carcinogen functions.
• Monoterpenes (parsley, carrots, broccoli, cabbage, cucumbers, squash, eggplant, peppers, mint, basil, citrus fruits) aid protective enzyme activity.
• Flavonoids (parsley, carrots, citrus fruits, broccoli, cabbage, cucumbers, squash, tomatoes, eggplant, peppers, soybeans, berries) block receptor sites for hormones that promote cancer.
• Indoles (cabbage, Brussels sprouts, kale) stimulate production of enzymes that break down cancer causing agents.
• Phenolic acids (parsley, carrots, broccoli, cabbage, tomatoes, eggplant, peppers, citrus fruits, whole grains, berries) have antioxidant properties and inhibit nitrosamine formation and help form protective enzymes.
• Catechins (green tea, berries) are antioxidants linked to lower rates of gastrointestinal cancer.

As you can see, a wide variety of fruits and veggies fall into one or more of the categories named above. Of note, the benefit from phytochemicals comes from eating the food, not in taking pills or supplements. Fruits and veggies contain a variety of phytochemicals, vitamins, and minerals, as well as fiber — these can't be replicated in a pill form. In addition, excessive amounts of certain vitamins or other compounds found in some supplements have the potential to cause harm.

To optimize your antioxidant intake, you can include at least five servings of fruits and veggies a day. If you're already doing this, why not aim for even more? Researchers have found that five to nine servings per day are most beneficial. Set your sights on variety, too. To obtain the benefits of these plant compounds, try to vary your selections from day to day, and from week to week. Include red, yellow, green, orange, blue, purple, brown, and white fruits and veggies, and enjoy a colorful (and healthful) eating plan!

Alice!
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