Food Science

Garlic fights nitrosamine formation . . .

Nitrosamines and related toxic N-nitroso compounds induce cancer through the formation of adducts — their tight chemical bonds to DNA. But at least in rats, adding high concentrations of garlic powder to the diet can greatly quash the formation of such adducts, according to nutritionists at Pennsylvania State University in University Park.

John A. Milner and his colleagues exposed their animals for 2 or 3 weeks to chemicals known to generate nitrosamines in the gut — and subsequent liver or mammary cancers. Over the same period, some of the animals consumed large amounts of garlic: 2 to 4 percent of their diet by weight. The treated rodents didn't seem to object to the heavy seasoning, since they ate as much food as rats offered garlicfree chow.

The big difference appeared in the number of adducts the rats developed, Milner and his coworkers report in the Feb. 8 CARCINOGENESIS. Penn State's cuisine produced a drop of some 40 to more than 80 percent — depending on the amount of garlic in the diet — in the predominant liver adducts that form in animals administered the nitrosamine or nitrosamine precursors used in this experiment. Garlicky chow also produced a dose-dependent reduction of 55 to 69 percent in mammary adducts associated with another nitrosamine.

Milner's team suspects that some of garlic's anticancer benefits also stem from the ability of its organic sulfur compounds to break down and detoxify nitrosamines.

. . . as do tomatoes and other produce

Two years ago, Cornell University food scientists published data showing that eating green peppers, pineapples, carrots, strawberries — and especially tomatoes — can suppress the formation of nitrosamines in humans. Though these fruits and vegetables all contain vitamin C, which can derail the reaction that produces nitrosamines, the researchers began looking for additional blockers when they determined that each food's nitrosamine-inhibiting potency was greater than could be accounted for by its vitamin C alone.

In the January AGRICULTURAL AND FOOD CHEMISTRY, Cornell's Michael A. Helser and Joseph H. Hotchkiss now identify two new nitrosamine blockers — p-coumaric and chlorogenic acids. Together, these phenols provide about 35 to 40 percent of a juiced tomato's nitrosamine-inhibiting activity. Though these compounds occur in many types of produce, green coffee beans constitute one of the richest sources of chlorogenic acids.

Overall, Helser and Hotchkiss find, the ascorbate (vitamin C) fraction of a tomato contains about half the fruit's nitrosamine-inhibiting activity. However, their data also suggest that because pure vitamin C appears to account for only about one-quarter of the inhibition associated with a tomato's ascorbate fraction, even the vitamin C portion appears to carry potent, as-yet-unmasked nitrosamine blockers.

These findings emphasize that people should rely on whole foods — rather than a battery of vitamins — to stay healthy, Hotchkiss concludes.

Making the best of oat bran

Botanists at Purdue University in West Lafayette, Ind., have engineered minifactories from the sugar-making systems in corn plants to produce beta-glucan — that potent, cholesterol-lowering compound found in oat bran (SN: 5/26/90, p.330). The new process can't compete economically with harvesting beta glucan from oats (SN: 1/8/94, p.28); however, the Purdue scientists do see it as a first step toward engineering plants either to boost their normal production of this beneficial polymer or to begin synthesizing it.

Can cholesterol-lowering broccoli be far behind?

Science & Society

FDA mulls over cigarette ban

Last month, federal health officials blasted the tobacco industry with both barrels.

On Feb. 24, Surgeon General Joycelyn Elders released a report on tobacco use among young people. It notes that more than 3 million adolescents in the United States now smoke cigarettes. The Surgeon General's report comes down hard on the subject of nicotine addiction, noting that many teens quickly become hooked on this substance and can't kick their smoking habit.

The very next day, the Food and Drug Administration accused tobacco companies of manipulating the amount of nicotine in cigarettes in order to keep smokers addicted. FDA Commissioner David A. Kessler is now considering classifying tobacco products as drugs, thus allowing the agency to regulate them under the Federal Food, Drug, and Cosmetic Act.

"Evidence brought to our attention is accumulating that suggests that cigarette manufacturers may intend that their products contain nicotine to satisfy an addiction on the part of some of their customers," says a Feb. 25 letter from Kessler to an antismoking coalition formed by the American Heart Association, the American Lung Association, and the American Cancer Society. The groups formed a coalition in 1982 to warn the public about the health dangers of smoking.

"The current evidence suggests that nicotine, when delivered by cigarettes, produces physiological dependence, resulting in withdrawal symptoms when smokers are deprived of nicotine," the letter states.

Although technology to remove nicotine from tobacco was developed years ago, cigarette manufacturers shun it, Kessler says. Instead, the companies control with precision the amount of nicotine in their products, ensuring that it is sufficient to maintain an addiction, his letter adds.

FDA's move could lead to a complete prohibition on nicotine-containing cigarettes. Alternatively, Congress could give FDA the authority to regulate the sale, labeling, and promotion of tobacco products. Legislation proposed by Rep. Mike Synar (D-Okla.) and Rep. Richard J. Durbin (D-Ill.) would do just that.

Will cigarettes finally fall under greater government scrutiny? "It really depends on whether Congress has the political guts to take on the tobacco industry once and for all," says Scott D. Ballin, chairman of the coalition of health groups and vice president for public affairs of the American Heart Association. "We cannot continue to turn our backs on the issue of tobacco," he says.

Women and clinical research

Does gender make a difference when it comes to a person's response to a medical treatment? A new report suggests that it does. Researchers should recruit more women, including pregnant women in some cases, for participation in clinical trials.

Women cannot benefit fully from advancing knowledge unless they participate fully in clinical research, says the report, "Women and Health Research." It was written by a panel of 16 doctors, lawyers, and ethicists assembled by the National Academy of Sciences' Institute of Medicine.

Gender differences can have important implications for diagnosis and medical treatment, the panel concludes. Monthly hormonal fluctuations or gender-based physiological differences, for example, may affect some therapies.

In 1990, the General Accounting Office found that women remain underrepresented in research trials. Many well-known clinical studies of cardiovascular disease, for example, have included only male participants. When results start to roll in, researchers don't really know whether the findings apply to women as well as men, a conundrum that affects the way women receive medical treatment, the panel concludes.

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