Cholesterol confab: Advise and dissent

Before concocting that eggnog, you may want to consider leaving out the cholesterol-laden egg yolk. Then again, depending on whom you listen to, you may not.

A panel convened earlier this month by the National Institutes of Health in Bethesda, Md., to determine the role of cholesterol in heart disease has concluded "beyond a reasonable doubt" that lowering blood levels of the fatty substance reduces the risk of a heart attack. They recommend that the 25 percent of the U.S. population with the highest blood cholesterol levels should be actively treated with diet and, if that fails, with drugs. That would include people in their 20s with cholesterol levels over about 200 milligrams per deciliter, people in their 30s with levels over 220, and people in their 40s and beyond with levels over 240.

The panel further recommends that *all* Americans over the age of 2 cut fat intake from the current level of about 40 percent of total calories to 30 percent, limit polyunsaturated fat intake to 10 percent of total calories, and reduce daily cholesterol intake to 250 to 300 mg (about what is found in one egg). Critics of the recommendations contend that there are insufficient data to recommend a change of diet for everyone.

Though the committee was not charged with developing an ideal diet, members suggest replacing whole milk products with skim milk products, reducing egg yolk consumption, limiting red meat to two or three small portions a week, eliminating butter and using such unsaturated oils as vegetable oils that are liquid at room temperature.

The warnings of the panel members are ominous and definite. "The average American has an unhealthy diet. That diet can be changed and it needs to be changed," says James E. Dalen of the University of Massachusetts Medical School in Worcester. "All Americans are at an unnecessarily high risk of coronary heart disease largely because of the kind of diet that we eat," says Daniel Steinberg of the University of California at San Diego, who chaired the panel.

But the recommendation of dietary changes for the entire population sticks in the craw of critics. Says Donald J. McNamara of The Rockefeller University in New York, "The problem is, what represents elevated cholesterol levels in terms of risk? The evidence that risk is linearly related to cholesterol [levels] below 230 [mg/dl] is shaky. [The panel] may be asking people to change life styles in ways that may or may not do any good."

One of the bases for the consensus panel's conclusions came from a multicenter trial in which drugs were used to lower cholesterol in men with very high cholesterol levels (SN: 1/21/84, p. 37). Generalizing the trial results represents a "leap of logic that's annoying to a lot of us," says McNamara. "There are still questions." —*J. Silberner*

Finding a cellular sign of age

For a laboratory dish of cells, old age has conventionally been viewed as the point where the cells stop dividing. A new branch of cell biology is investigating what shuts down the cell's replicative life cycle, and now a researcher from The Rockefeller University in New York reports a novel protein that appears at the landmark point when the cyclic division stops.

The protein, called statin, is the first marker found in a variety of tissues where the cells have stopped dividing. Using monoclonal antibodies as a probe, cell biologist Eugenia Wang found the protein first in aged human fibroblasts, which produce connective tissue that supports the body's organs. She injected mice with cell parts from a 66-year-old human donor to stimulate antibody production, then screened the antibodies to find those that react with proteins in aged cells. Stained with gold particles, one antibody showed that statin appears in the nuclei of lung fibroblasts that have stopped dividing but disappears if the cells are young and growing. Her results will be published in the February JOURNAL OF CELL BIOLOGY.

When she surveyed other tissue cell types with the antibody, Wang found that statin turns up in places like taste buds and heart muscle, where cells aren't dividing. But in kidney or intestine epithelia, where cells turn over many times, statin doesn't appear. So far, she has found the same pattern in dogs, rats, mice and humans.

Wang doesn't know yet what part statin plays in aging but considers it important evidence of a family of genes that govern the cell's final life stage. "I'm looking at what determines how a cell knows this is the final cell cycle, and there is no more division at this point," she told SCIENCE NEWS.

Huber Warner, a molecular biologist at the National Institute on Aging in Bethesda, Md., says that findings such as Wang's are "important leads" to understanding cell and ultimately organismal aging. "We hope they are going to lead to a better understanding of why cells stop proliferating with age and what it is that's unique about the aging cell," he says, and from that simpler system "we can then try to extrapolate back to the organism."

— *C. Mlot*

Hamburger beefs up cancer protection

A University of Wisconsin microbiologist has found naturally occurring chemicals in both raw and cooked beef that help prevent cancer. Based on their performance in the Ames test, a popular bacterial assay, these chemicals inhibit the mutagenic (mutation-causing) activity of certain toxic polycyclic hydrocarbons and heterocyclic amines, including those that form naturally as beef is cooked. Moreover, in three sets of tests involving mice, extracts of the inhibitors from as little as 20 grams of hamburger halved the cancer rate of animals exposed to the synthetic polycyclic hydrocarbon 7, 12-dimethylbenzanthracene (DMBA), a known carcinogen. Michael W. Pariza, the Madison-based cancer researcher, described his surprising findings on Dec. 17 in Honolulu at the International Chemical Congress of Pacific Basin Societies.

Though the formation of weak mutagens in beef through cooking has been recognized for years, Pariza adds that "most mutagens and carcinogens are inert" — it's their metabolites, produced by enzyme-catalyzed reactions, that usually do harm, he says. In the Ames test, rat liver enzymes are used to metabolize the test substance into potentially active mutagens. Pariza told SCIENCE NEWS that the beef inhibitor "seems to have a very pronounced effect on the generation of a particular metabolite [the 3.4 diol] that has been linked to the initiation of cancer."

He stumbled onto the mutagen-inhibiting substance in beef when he compared the reactions of beef extract (a bacterial medium produced by slow-cooking beef broth into a dark tarry substance) and hamburger extracts in the Ames test. Only the beef extract showed mutagenic activity, suggesting there was some confounding agent in the whole meat that wasn't in the broth. Eventually he was able to partially purify that agent and test it. "And we've shown," Pariza says, "that it seems to work most effectively only against certain specific enzymes."

For now Pariza's group is concentrating on identifying the mystery inhibitors and their chemical structure — a process that may take another six months. Then they hope to focus on cataloging which enzymes the chemicals affect and which carcinogens can therefore be inhibited. Someday, Pariza says, "you might imagine that something like this [cancer inhibitor] might be useful as a prophylactic for workers exposed on the jobs to a particular toxic substance."

Two-thirds of the funding for this research came from the National Cancer Institute and the State of Wisconsin. Pariza says the remainder was drawn from the university's unrestricted-research funds provided by the food industry. — *J. Raloff*