Unusual fats lose heart-friendly image

Hoping to find tasty alternatives to the cholesterol-elevating saturated fats in meats and butter, health-conscious diners have been scrutinizing food labels in search of products containing fats that are easier on the heart. A new study has just made that hunt harder by seriously tarnishing the image of two prospects.

The study focused on data from men with atherosclerosis who took part in a 3-year dietary trial at St. Thomas' Hospital in London. Researchers at the University of London advised some of the men to cut their consumption of fats, especially saturated fats, and offered other nutrition guidance. Other men were prescribed a specific diet to benefit the heart and were offered free foods to encourage them to adhere to the diet. A third group received both the diet and a cholesterol-lowering drug.

Measurements of the interior diameter of each man's coronary arteries showed that the less fat he had eaten, especially saturated fat, the less rapidly his arteries had accumulated vessel-clogging plaque. The cholesterol-lowering drug slowed progression of the disease further. However, the fats' role in artery narrowing appeared to be independent of their effect on cholesterol concentrations in the blood, observes Gerald F. Watts, a study author now at the University of Western Australia in Perth.

To pinpoint which foods proved most deleterious, Watts' team reanalyzed dietary surveys from the 50 men who had not received the cholesterol-lowering drug. In the August AMERICAN JOURNAL OF CLINICAL NUTRITION, they report that eating lamb and dairy products correlated most strongly with worsening disease.

Further dietary analysis showed that the amount of two types of fats consumed, both characterized by carbon chains 18 atoms long, appeared to be the best predictor of how the disease would progress. Stearic acid, found in meats and cocoa butter, is unique among saturated fats for its inability to raise cholesterol in the blood. The remaining suspects are *trans* fatty acids, common in margarines, shortening, and animal products. *Trans* fats mimic saturated fats by remaining solid at room temperature.

Each of these findings has surprised some nutritionists.

"I think the big story here is the stearic acid," says Watts, "because in the States, the big names in nutrition claim that stearic is good for you."

Indeed, notes Thomas A. Pearson of the Mary Imogene Bassett Research Institute in Cooperstown, N.Y., who edited a monograph on stearic acid, "we generally felt that it differed from the other saturated fats in that it lacked deleterious effects" because it doesn't raise blood cholesterol concentrations. Acknowledging that animal tests had hinted it might promote blood clots—thus presenting a risk of stroke or heart attack—he said there was little evidence of this effect in human trials.

Against this backdrop, Pearson says, "the new report is worrisome." However, while the study "might be good for generating hypotheses," he finds its design doesn't support a conclusion that stearic acid causes heart disease.

William E. Connor of the Oregon Health Sciences University in Portland disagrees. Having performed some of the early animal studies on stearic acid and blood clots, he told SCIENCE NEWS that "I was always inclined to view stearic acid as not benign. This study now confirms that."

For Meir J. Stampfer of the Harvard School of Public Health in Boston, the most interesting findings involve the *trans* fats. While earlier studies had shown that at least some of these increase coronary risk factors, there was some indication that the 18-carbon *trans*-oleic variety might be benign (SN: 2/25/95, p. 127). This study, he argues, now "shows in a highly selected, carefully studied group that [these fats] contribute to the progression of coronary disease." —*J. Raloff*

Yeast peptide goes forth and multiplies

Even the most efficient corporation would envy the teamwork exhibited by the molecules in a cell. At some point, though, before the first cells appeared on Earth, organic molecules would have been on their own, replicating without help from others. So far, scientists studying the origin of life have come across RNA-like molecules that can perform this trick, but no one had proved that proteins could do the same—until now.

Researchers have found the first evidence that peptides, short chains of the amino acids that make up proteins, can copy themselves by aligning and joining two pieces. Since much of the effort to understand the origin of life has focused on RNA (SN: 11/26/94, p. 362; 8/10/96, p. 93), these results may broaden the thinking on self-replication in biological molecules, some scientists say. Whether the results will influence theories about the origin of life, however, must be determined by further studies. The ideas may also lead to new ways of synthesizing chemicals.

M. Reza Ghadiri and his colleagues at the Scripps Research Institute in La Jolla, Calif., demonstrated self-replication in a peptide. Made of 32 amino acids wound into a tight helical structure, the peptide came from a yeast protein that regulates the activity of genes in the cell. The scientists reported their results in the Aug. 8 NATURE.

The researchers took two near-halves of this peptide, one segment with 15 amino acids and the other with 17, and allowed them to react in solution. They saw that the presence of completed peptides caused the segments to assemble at up to 500 times the expected rate.

The peptides catalyzed the reaction, acting as matchmakers. The segments lined up alongside the full molecule, coming close to each other in an orientation amenable to bonding. Otherwise, the segments would have been left to bump into each other at random while floating in the vast solution.

This yeast peptide does not play a special part in theories about the origin of life. "There's nothing magical about this particular sequence," Ghadiri says. "It's one of the most well-studied, so we know the molecular interactions of this peptide." Its simple helical structure and its ability to form a paired molecule made it a good candidate for acting as its own catalyst.

On the other hand, RNA has the important quality of being able to transmit information. That doesn't mean peptides cannot, says Leslie Orgel, a chemist at the Salk Institute for Biological Studies in La Jolla, but "right now, it appears that this peptide fits into the category of noninformational self-replication."

Unlike RNA, whose information resides in its nucleotide sequence, a peptide's three-dimensional structure must be considered before concluding that it does not transmit information, responds Ghadiri.

Stuart Kauffman, a theoretical biologist at the Santa Fe (N.M.) Institute, calls the results "very exciting." He finds in them support for his own theories about "collectively autocatalytic" systems, sets containing molecules that act as catalysts for each other.

He cautions, however, that Ghadiri's finding "could be a quirk of a single peptide or of a class of peptides," something further experiments should determine.

Gerald F. Joyce, also a chemist at Scripps, agrees that the peptide's behavior is not "general-purpose, but maybe that's OK." If self-replication happens in a large enough set of peptides, even though it's not universal, he says, it opens up the interesting possibility that a natural selection process occurs. That would suggest that peptides could evolve.

"There's no reason why there should not be many [other examples]," Ghadiri says. "I should go buy a lottery ticket if I were so lucky as to pick the only one."

—*C. Wu*

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