

BIOMEDICINE

Smoking decreases 'good' lipoproteins

The connection between smoking and heart attacks is clear, but the precise mechanism that links them remains elusive. Part of the answer may be that smoking decreases the levels of high-density lipoproteins (HDL) in the blood, according to a recent study sponsored by the National Heart, Lung and Blood Institute. HDL is a "good" form of blood fat believed to protect, to a degree, against coronary heart disease. The study results were presented by Michael Criqui at a recent meeting of the American Heart Association.

The study, which was part of the Institute's lipid research clinic, involved dozens of researchers who examined 5,000 men and women, aged 20 to 69, from ten communities. They looked at five variables believed to alter HDL levels: age, obesity, alcohol use, regular exercise and the use of hormones by women.

When analyzed, the data showed distinct differences between smokers and non-smokers in HDL levels. Men who smoked 20 cigarettes per day showed HDL levels 11 percent lower than those of non-smokers. Women who smoked had HDL levels that averaged 14 percent below those of non-smokers.

The study design, which controlled for the five variables, allowed researchers to separate the effects of the various factors. "Smokers had lower HDL levels than non-smokers before we adjusted for any of the variables," Criqui said. "But the apparent effect of cigarette smoking on HDL was even more dramatic after we statistically controlled for the five variables."

Tea with lemon and polystyrene, please

A warning to tea-drinkers: If you prefer lemon-flavored tea and drink it from polystyrene cups, look out. The tea won't hurt you, but the cup might.

Michael Phillips, a researcher at the University of Connecticut Health Center in Farmington, was drinking his lemon tea from a polystyrene cup when he noticed that the interior of the cup was dissolving before his very eyes. Phillips lost interest in drinking that particular cup of tea and decided that the matter warranted laboratory investigation.

Taking 16 polystyrene cups, he weighed them and put boiling water and a tea bag in each one. He squeezed slices of lemon into eight of them, let them steep (stirring frequently) for 15 minutes, then emptied, dried and weighed the cups.

All of the tea-with-lemon cups showed erosion, while those without lemon didn't. This, together with the fact that the eroded cups showed a significant net gain in weight, led Phillips to believe that "the substance in lemon tea may solubilize polystyrene and possibly combine with it chemically," which certainly suggests that lemon tea drinkers are also consuming an "appreciable amount" of the polystyrene container along with the tea. Since polystyrene is carcinogenic in laboratory animals, Phillips suggests drinking lemon tea from china cups — more aesthetically pleasing and less hazardous to the health.

Eating less but weighing the same

We are eating less than we did 12 years ago, but in general we don't seem to be getting any thinner. This fact — distressing to dieters around the nation — comes from a new Department of Agriculture study. According to the study, men are consuming ten to fifteen percent fewer calories than they did in 1966, and intake among women has declined by five to ten percent. Protein consumption dropped among all groups except persons older than 65, and everyone ate less fat. But unfortunately, according to Eleanor Pao of the Consumer Food and Economics Office, "... the drop in caloric intake does not appear to be associated with a loss of weight."

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EARTH SCIENCES

Susan West reports from the meeting in San Diego of the Geological Society of America

Date a rodent

In the dating game, says Charles Repenning of the U.S. Geological Survey in Menlo Park, Calif., fossil mice are the best.

Twenty years ago, researchers used the fossil remains of horses to attach a relative date to a particular rock layer. The horse has a slow, clear-cut evolution spanning 50 million years; the presence of different equine fossils in two layers of rock could tell a geologist which was older. But horses went the way of the buggy whip when radiometric dating methods — which use the half-life of a radioactive element — came along. By measuring the decay of potassium to argon in a rock, for instance, researchers can get an actual, rather than relative, date.

But K/Ar dating is subject to laboratory mistakes, it has a wide margin of error — usually plus or minus 500,000 years — and, because it can be measured only in igneous rocks, it requires the presence of a lava flow. Such problems can be overcome, says Repenning, by using the fossils of microtine rodents, a group that includes meadow mice, lemmings and muskrats. Because these rodents evolved very rapidly during the past 6 million years, each evolutionary change provides a recognizable marker for approximately every 200,000-year period, he says.

Rodents won't replace radiometric dating, however. Like the horse, rodent fossils alone can give only a relative age. But when calibrated to the K/Ar scale, they can narrow the margin of error by about half. Because fossil identification is an observational technique, it is not prone to laboratory error, Repenning notes, and the fossils can be found worldwide (from the Arctic to the equator) in any sort of rock. But because rodents are identified by their teeth, the problem is finding the fossils. "If you don't need great precision [in dating a rock], then you don't want to use this," he says. "Because if you want the precision, you have to get down on your hands and knees — literally."

Well preserved plankton

In most of the ocean, oxygenated water dissolves some organic material from sediments on the sea floor. Because of that process, researchers who study deep sea sediments for clues to past ocean and climate conditions assumed they were losing the calcareous remains of some species of plankton and therefore part of their record. In at least one case, however, that probably isn't so, according to Nancy L. Penrose and James P. Kennett of the University of Rhode Island.

Penrose and Kennett compared the number of species of the plankton foraminifera in aerobic (oxygenated) sea surface sediments to that found in anoxic (unoxxygenated) sediments from the Orca Basin in the northern Gulf of Mexico. Foraminifera are among the most common markers of ancient climate conditions that are used by paleoclimatologists. In the Orca Basin, salt leaking from nearby salt domes creates a dense, heavy layer of brine just above the sea floor that, because it contains no oxygen, preserves the underlying sediments and organic matter.

The researchers found, as they expected, that the delicate features of the microfossils were exceptionally well preserved in the anoxic samples. But unexpectedly, says Penrose, they found only "minor statistical differences" between the number of species of foraminifera in the aerobic and anoxic samples. "It was surprising," says Penrose. "Because of the difference in quality, we expected a difference in quantity as well. This indicates that the loss of foraminifera species [in aerobic sediments] is perhaps not as large as we thought."

As another example of the Orca Basin's unique ability to preserve organic matter, Penrose and Kennett described an intact piece of 10,000-year-old Sargassum seaweed found under 10 meters of sediment. Under normal ocean conditions, the seaweed would have been destroyed by aerobic bacteria.

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