Vitamins C, E may curb effects of fatty meals

Vitamins C and E block some of the harmful effects of a high-fat meal on blood vessels, according to findings published in the Nov. 26, 1997, issue of the Journal of the American Medical Association.

For the clinical study, Gary D. Plotnick and colleagues at the University of Maryland School of Medicine in Baltimore selected 20 healthy hospital employees between the ages of 24 and 54 and examined the short-term effects of a single high-fat meal on endothelial function. The volunteers were randomly given one of three breakfasts: a high-fat meal (900 calories and 50 grams of fat); a low-fat meal (900 calories and zero grams of fat); and a high-fat meal following an oral dose of vitamins C (1,000 mg) and E (800 IU). Researchers measured vasodilation in an artery in the arm before and after the meals to see any effects on endothelial function.

Findings showed that a single high-fat meal decreased endothelial function temporarily for two to four hours, possibly through the accumulation of triglyceride-rich lipoproteins. No reduction occurred with the low-fat meal nor with the high-fat meal plus vitamins.

"Pretreatment with antioxidant vitamins eliminated the decrease in endothelial function following the high-fat meal, but did not increase vasodilation after the low-fat meal. This finding suggests that a high-fat meal impairs endothelial function through an oxidative stress mechanism that is blocked by pretreatment with antioxidant vitamins," the researchers wrote, concluding, "These findings may explain, in part, the inverse effects of fats and antioxidant vitamin intake on coronary heart disease risk and may provide a better mechanistic approach to antioxidant vitamin administration."

Meanwhile, researchers from Denmark have reported that a high-fat meal can spark a dramatic rise in a blood coagulation factor, which may increase the risk of death from heart disease and stroke. Their work appeared in the November 1997 issue of Arteriosclerosis, Thrombosis and Vascular Biology.

Findings indicated that dietary fat, including monounsaturated fat, may increase heart attack and stroke risk by increasing the activity of blood clotting Factor VII. The paper's authors were Lone Frost Larsen, Peter Marckmann, Else-Marie Bladbjerg, and Jorgen Jespersen from the Royal Veterinary and Agricultural University, Frederiksberg, Denmark.

In the study, 18 healthy young men were fed five different fat meals. During a period of nine months, the men were given six different meal tests, each at least three weeks apart. During each test, the men fasted overnight, then were given a test meal enriched with either rapeseed oil, olive oil, sunflower oil, palm oil, or butter in the morning and a low-fat meal consisting of rice, bananas, and raisins in mid-morning. The high-fat meals contained 42% fat mixed with rice, beef, onion, red pepper, and corn. Nonfasting blood samples were collected eight times during the day.

All five high-fat test meals caused significant increases in Factor VII, the paper reported. However, the authors said they were unsure how fat promoted the sudden activation of the coagulation factors in the blood. Although previous studies have suggested that a relationship exists between Factor VII and an immediate rise in triglycerides after consumption of a high-fat meal, the Denmark team found no such association.

Fats rich in monounsaturated fatty acids had the same effects as polyunsaturated or saturated fatty acids on the coagulation factors. Researchers noted that this may be because the study was conducted with Danish men whose normal diets are high in saturated fat.

"It may be that we need to see what happens in individuals who eat different dietary fats for a longer period of time," Larsen said.

The research team said further study is needed to evaluate why high-fat meals lead to Factor VII activation as well as the long-term effects of different edible fats.

Another study shows sitostanol ester benefits

A University of Helsinki study has found that replacing regular canola margarine with one containing sitostanol ester substantially lowered blood cholesterol levels in women patients with diagnosed heart disease and even lowered serum cholesterol to normal levels in a third of those studied.

Publishing their results in the Dec. 15, 1997, issue of Circulation, Tatu Miettinen and colleagues at the University of Helsinki recruited two groups of postmenopausal women with diagnosed heart disease for their study. One group of 22 women ate low-fat diets followed by a similar seven-week diet containing three grams per day of margarine with sitostanol ester. For the next seven weeks, the women ate canola oil margarine without the sitostanol ester. The second group of ten women who were taking the cholesterol-lowering drug simvastatin ate sitostanol margarine for 12 weeks.

Although the regular canola oil margarine reduced cholesterol levels overall by about 5%, the sitostanol ester-enriched spread was much more effective, lowering total blood cholesterol levels by an average of 13% and low-density lipoprotein (LDL) cholesterol by 20%. Combining the sitostanol margarine with drug therapy further reduced total and LDL cholesterol, the study showed.

Individuals taking the sitostanol ester and drug combination were able to reduce their medication dose and sometimes even to eliminate the need for the drug more often than individuals only taking the drug, the researchers reported. Sitostanol reduced cholesterol in all of the 32...
women tested, and trimmed amounts of LDL to below 100 milligrams per deciliter of blood. By contrast, none of the women’s LDL levels went down to this level while on the regular low-fat diet.

Sitostanol-containing margarines, which have been shown to lower blood cholesterol levels in previous studies, currently are sold in Finland by the Raisio Group.

Hardened fats cited in nurses’ study

Follow-up data from the Nurses’ Health Study indicate that total fat content in the diet is not as important as the type of fat consumed concerning the risk of coronary artery disease.

In findings published in the Nov. 20, 1997, issue of the New England Journal of Medicine, Frank Hu and Walter C. Willett of the Harvard School of Public Health and colleagues from related Boston, Massachusetts, research centers reported that 939 nonfatal myocardial infarctions (MI) or deaths from coronary heart disease (CHD) occurred among the more than 80,000 women enrolled since 1976 in this ongoing prospective study.

Their analysis associated higher dietary intake of saturated fat and trans unsaturated fat with increased risk of CHD, while higher intake of monounsaturated and polyunsaturated fats was associated with reduced risk.

CHD risk was lowest in those who consumed the lowest amounts of trans unsaturated fat and the highest intake of polyunsaturated fats, but reducing overall fat intake had little effect on the risk.

The research team estimated that replacing 2% of energy from trans fat in the daily diet with nonhydrogenated, unsaturated fats would reduce CHD risk by 53%. In addition, they estimated that replacing 5% of energy from saturated fat with monounsaturated and polyunsaturated fats would reduce heart disease risk by 42%.

In an accompanying editorial in the same journal, Tim Byers of the Uni-
Leptin's role studied in body weight regulation

Scientists at Oregon Health Sciences University have discovered evidence indicating that certain obese mice develop a tolerance for leptin, a hormone produced by fat cells.

Publishing their results in the Nov. 28, 1997, issue of Science, Bruce Boston and Roger Cone noted, "It has been known that high levels of leptin correlate with increased body fat in both humans and mice. Whereas low levels of leptin are associated with low body fat, extremely low levels are associated with starvation and compel an animal to eat voraciously when food becomes available."

Fat cells produce the protein leptin which enters the bloodstream and travels to the brain where it binds with receptors on nerve cells in the hypothalamus, researchers have found. "The leptin pathway creates a feedback loop for body weight regulation," the authors suggested. Thus, high levels of leptin signal that enough food has been consumed, whereas very low levels initiate the starvation response.

It had been hypothesized that increasing an animal's leptin level would turn down appetite. However, Jeffrey Friedman of the Rockefeller University recently demonstrated that several types of obese mice, including the yellow agouti mouse strain, do not lose weight when they are given increased levels of leptin. These mice thus appeared resistant to the leptin hormone.

Although Friedman suggested that animals may become obese because they are unable to respond to leptin, Boston and Cone said their data imply that obese animals have already responded to the high leptin level in their system and simply cannot respond to additional leptin. This raises questions about the potential therapeutic value of leptin for treating obesity.

Researchers find leptin in human breast milk

The hormone leptin, which may play a role in body metabolism and obesity, has been found in human breast milk.

In a study of 23 lactating women, researchers at Purdue University, the University of Idaho, and Washington State University discovered that the hormone is present in human breast milk at levels lower than, but correlating with, levels in the mother's bloodstream.

Results, which were published in the December 1997 issue of Biochemical and Biophysical Research Communications, also showed that the amount of leptin in the milk correlates with the amount of body fat of the mother. Obese mothers, the study found, produce large amounts of leptin, while thin mothers produce almost no leptin in their breast milk.

Since its discovery in the early 1990s, researchers have been trying to learn more about leptin's role. Animal studies have shown that obese mice injected with leptin soon lose their excess weight.

Although leptin was found in human milk, researchers still aren't sure what role the hormone plays for mothers or infants. "Like many hormones in breast milk, it is difficult to determine what it is doing. It may be that leptin is doing nothing; it may be that the leptin is just there," according to Karen Houseknecht, assistant professor of animal science at Purdue and adjunct assistant professor of endocrinology and metabolism at the Indiana University School of Medicine, who led the study.

Fatty acids' role in diseases explored at U.K. meeting

Researchers at Brigham and Women's Hospital, Boston, have developed a theory as to how marine fish-based fatty acids may reduce inflammation, and thus offer some relief to those suffering from rheumatoid arthritis.

Reporting results in December at the British Society of Immunology 5th Annual Congress in Brighton, United Kingdom, Richard Sperling of Brigham and Women's Hospital noted that dietary eicosapentaenoic acid (EPA) reduces the production of leukotriene B4 by neutrophils, both from healthy donors and from patients with inflammatory disorders.

In addition, a diet rich in EPA and other marine-derived fatty acids has been shown to have other beneficial effects on neutrophil activity. For instance, neutrophils are less likely to migrate to the site of inflammation, or to release other molecules and enzymes which may cause damage at these sites.

Noting that a number of studies have shown that diets enriched in marine fish oils have a modest benefi-
cial effect in patients with rheumatoid arthritis and inflammatory bowel disease, Sperling said these results suggest that this is because these oils may have a calming effect on neutrophil activity.

Also speaking at the same congress, Laurence Harbige of the University of Greenwich and St. Thomas’ Hospital, London, United Kingdom, presented work centering on the effects of fatty acids in experimental models of multiple sclerosis (MS).

Harbige and colleagues have found that fatty acids from various plants and fungi can alter the course of MS in animal models. When fed these fatty acids in a purified form, rodents with an experimental disease resembling MS did not develop disease.

The next stage, he noted, is to find out whether this treatment will be effective in people with MS. A double-blind clinical trial was to begin at St. Thomas’ Hospital early in 1998 to explore this question.

“Further rigorous clinical and laboratory research is essential before we can recommend any such treatment for MS,” Harbige said.

Red wine’s resveratrol seen as a phytoestrogen

Researchers at the Northwestern University Medical School in Chicago have found that resveratrol—the chemical in red wine believed to help reduce cardiovascular disease (CVD) risk—is a phytoestrogen.

Resveratrol is highly concentrated in the skin of grapes and is abundant in red wine. Because it has a molecular structure similar to that of the synthetic estrogen diethylstilbestrol, Barry D. Gehm, J. Larry Jameson, and colleagues at Northwestern investigated whether it might have pharmacologic properties similar to those of estradiol, the major natural human estrogen.

Their results, published in the Dec. 9, 1997, Proceedings of the National Academy of Sciences, showed that resveratrol is estrogenic. At concentrations similar to those required for its other biological effects, resveratrol activated expression of both artificial-ly introduced “reporter” genes and naturally occurring estrogen-regulated genes in cultured human cells.

The researchers also found that resveratrol could replace estradiol in supporting the proliferation of certain breast cancer cells that require estrogen for growth.

Green tea ingredient kills cancer cells

Researchers at the Case Western Reserve University School of Medicine in Cleveland, Ohio, have found an ingredient in green tea that kills cancer cells.

The ingredient, epigallocatechin-3-gallate, is a major constituent of the polyphenols found in green tea.

In the study reported in the Dec. 17, 1997, issue of the Journal of the National Cancer Institute, investigators tested the compound on cancerous human and mouse cells of the skin, lymph system, and prostate, and on normal human skin cells. In the test tube, the compound led to apoptosis (programmed cell death) in the cancer cells, but left the healthy cells unharmed.

“We found that this particular compound, which is present in the amount of about 200 mg in one cup of green tea, can kill a variety of cancer cells through apoptosis without affecting the normal cells,” according to Hasan Mukhtar, a professor of dermatology at Case Western and senior author of the paper. He noted that the polyphenol broke the DNA of the cancer cells into fragments, a characteristic of apoptosis.

Polyphenols induce the demise of cancer cells, but scientists do not yet know why this happens, Mukhtar said. He and his colleagues concluded that these findings should be further evaluated in human trials.

Fatty acids and cancer findings presented

A supplement to the December 1997 issue of The American Journal of Clinical Nutrition presents the proceedings of a symposium held in June 1996 on individual fatty acids and cancer.

Summarizing what is known from human studies on the effects of fatty acids on cancer, Johanna T. Dwyer of Tufts University Schools of Medicine and Nutrition wrote: “More complete food-composition data with respect to fatty acids and more comprehensive food tables are needed, as are better methods for measuring fat intakes, better markers of progression, and more definitive epidemiologic and clinical studies.

At present there is insufficient evidence to conclude that specific fatty acids are associated with cancer development in humans.”

She added, “Whether specific fatty acids are associated with cancer development is a question that will not be answered definitely until the next millennium. Much remains to be learned about the effects, protective or prejudicial, of fatty acids on development of breast, prostate, and colon cancers. Specific fatty acids appear to protect against heart disease, and they may also do so for certain cancers.”

Guest editors of the supplement were Clement Ip and Kenneth Carroll. Sponsor was ILSI North America. The supplement was published by The American Society for Clinical Nutrition Inc., 9650 Rockville Pike, Bethesda, MD 20814-3998.

Eating fish may reduce sudden cardiac death risk

Eating at least one fish meal per week may cut in half the risk of sudden cardiac death in men, according to an article in the Jan. 7, 1998, issue of The Journal of the American Medical Association (JAMA).

Christine M. Albert and colleagues of Brigham and Women’s Hospital in Boston, Massachusetts, studied 20,551 male physicians, aged 40 to 84 years, in the Physicians’ Health Study to investigate the association between fish consumption
and the risk of sudden cardiac death, defined as death within one hour of the onset of symptoms.

The researchers found that eating fish at least once a week was associated with a 52% lower risk of sudden death compared with those eating fish less than once a month. The n-3 fatty acids found in seafood also were associated with a reduced risk of sudden death, but less significantly. However, fish and n-3 fatty acid consumption were not linked to risk of heart attack, coronary heart disease death, or nonsudden cardiac death.

Approximately 250,000 sudden cardiac deaths occur in the United States every year. Of the sudden deaths, 55% have no previous history of heart disease and most die prior to reaching the hospital.

"All levels of fish consumption were associated with a decreased risk of sudden death, but the size of reduction did not appear to differ substantially at levels of consumption greater than one fish serving per week, suggesting a threshold effect. This small amount of fish may be sufficient to provide an essential amount of long-chain n-3 polyunsaturated fatty acid or some unidentified nutrient or both that decrease sudden cardiac death," according to the researchers. Fatty fish includes tuna, salmon, mackerel, and shellfish.

Tests with red meat, chicken, vegetables, fruits, dairy, and fried foods did not find any association with sudden cardiac death.

The researchers pointed out that part of the association between fish consumption and a lower risk of sudden death may be explained by the fact that fish consumption is a marker for a healthier lifestyle. On the other hand, fish consumers were more likely to have high cholesterol or hypertension and a family history of coronary heart disease.

In an accompanying editorial, Daan Kromhout of the National Institute of Public Health and the Environment in The Netherlands said the study did not provide any clear-cut answers because no association was observed with nonsudden cardiac death and coronary heart disease death. Also, this study differed from the previous Western Electric study, which found a significant inverse association between fish consumption and coronary heart disease death and nonsudden cardiac death but not with sudden cardiac death.

The different findings may be attributed to different methods used for interpreting data and different definitions of what constitutes "sudden" cardiac death, Kromhout wrote.