

Excess Iron Linked to Heart Disease

High levels of iron stored in the body may boost the risk of heart disease, according to a new study by a team of Finnish researchers. In fact, stored iron may prove a more significant risk factor for coronary disease than total blood cholesterol levels, they say.

The new study, published in the September *CIRCULATION*, provides the first empirical evidence for this theory. "It is the first time that iron stores have been looked at as a risk factor," comments Jerome L. Sullivan of the Medical University of South Carolina in Charleston. Sullivan first proposed the iron and heart disease hypothesis more than a decade ago.

Basil Rifkind of the National Heart, Lung, and Blood Institute calls the Finnish findings "interesting." He points out, however, that this is the first time scientists have shown a link between iron stores and heart disease. Other researchers must confirm the finding before public health experts can make any recommendations to reduce iron stores, he adds.

Epidemiologist Jukka T. Salonen of the University of Kuopio and his Finnish colleagues focused on 1,931 middle-aged men who showed no sign of heart disease at the study's start in 1984. The researchers drew blood to test for stored iron and cholesterol and asked the men about other risk factors for heart disease. The team then estimated dietary iron intake by asking the men to record their food choices during a four-day period.

After adjustment for risk factors such as cholesterol, the data revealed that men with high concentrations of ferritin in their blood (more than 200 micrograms per liter) were twice as likely to suffer a heart attack as men with lower ferritin values. Ferritin is a molecule that stores iron in the blood and other parts of the body. The researchers found that every 1 percent increase in blood ferritin was associated with a more than 4 percent rise in the risk of heart attack.

Men who typically ate iron-rich foods faced a higher likelihood of heart attack than did those who had an iron-poor diet, Salonen says. Red meats, which also contain a lot of fat, are rich in iron.

There's no doubt that iron-depleted blood can cause anemia, a medical disorder that can result in fatigue. But Sullivan and Salonen propose that, although people need a trace amount of iron in their diet to remain healthy, too much iron can promote the formation of free radicals.

Free radicals may injure the cells lining artery walls and damage heart muscle, Sullivan says. Free radicals may also lead to the formation of a dangerous type of cholesterol known as oxidized low-density lipoprotein (LDL). Scientists believe

that oxidized LDL cholesterol is more likely than nonoxidized LDL to stick to artery walls and thus to trigger the buildup of fatty plaque that can clog arteries and lead to heart attacks.

The iron theory may help explain the mysterious gender gap in heart disease rates. Cardiologists have long noticed that premenopausal women remain largely protected from the ravages of heart disease, whereas men start suffering heart attacks in their forties. Many scientists believe the sex hormone estrogen helps women ward off heart disease until menopause, when the production of estrogen tapers off and heart attack rates go up.

Sullivan remembers puzzling over that gender gap during his medical training. At the same time, he was studying normal iron metabolism. "When I saw those curves for iron acquisition in men and women, I really had a eureka moment," he says, noting that men build up iron stores steadily, while women don't start accumulating iron until menopause.

Sullivan thinks that young women are shielded from heart disease because they

lose iron every month during menstruation. After menopause, the stored iron in a woman's body builds up rapidly – and women's advantage in terms of heart disease gradually disappears, he adds.

The iron theory might also explain why aspirin and fish oil help protect people from heart attacks, Sullivan adds. He notes that both substances may increase chronic blood loss through minor bleeding and thus loss of iron.

The findings, if confirmed, could force public health experts to rethink dietary recommendations for iron ingestion. Even normal levels of stored iron may prove damaging, Sullivan says. Over-the-counter vitamin supplements often contain iron, as do some enriched foods such as cereals, he notes.

Sullivan offers a few simple solutions for people worried about the iron-heart disease connection. "I think we can say that adults should avoid iron supplements unless they have iron-deficiency anemia," Sullivan says. "Also, I think people should consider blood donation."

– K.A. Fackelmann

UV hazard: Ozone lost versus ozone gained

Living amid polluted air can cause serious health problems, especially for the elderly and asthma sufferers. But bad air also has its good side. Measurements in New Zealand and Germany reveal that a polluted environment can provide significant protection against the harmful ultraviolet (UV) radiation streaming through Earth's damaged ozone layer.

"We found unexpected, big differences in the UV radiation at the two sites," New Zealand and Germany, says Gunther Seckmeyer, an atmospheric scientist with the Institute for Biochemical Plant Pathology in Neuherberg, Germany. Levels of UV light were nearly twice as high in the relatively clean air of New Zealand as in the more polluted air of Germany, report Seckmeyer and Richard L. McKenzie of the National Institute of Water and Atmospheric Research, Ltd., in Omakau, New Zealand.

UV light from the sun can cause skin cancers and cataracts and can lower immunity to diseases. The ozone layer in Earth's stratosphere filters out most of this harmful radiation, but scientists warn that UV levels will climb as human-made chemicals thin the ozone layer.

In the last several years, satellite and ground-based instruments have detected significant thinning of stratospheric ozone over much of the world. However, it is not clear how UV levels at Earth's surface have changed, because no world-

wide measurement network exists.

Reports from limited regions differ on whether UV levels have risen. While measurements in the Alps show a strengthening in UV intensity, those in the United States show a weakening, causing some to wonder whether pollution masks the loss of stratospheric ozone. (SN: 2/20/88, p.119; 4/14/90, p.228).

In their study, Seckmeyer and McKenzie compared UV levels during cloud-free days in New Zealand at 45 degrees south latitude and in Germany at 48 degrees north latitude. By using the same spectroradiometer in both locations, the researchers eliminated errors caused by comparing data from two instruments.

Seckmeyer and McKenzie found that on a summer day at each site, DNA-damaging wavelengths of UV were 90 percent higher in New Zealand, while wavelengths capable of producing sunburn were 60 percent higher there. Although many factors can control the amount of UV light reaching the surface, analysis of the light's strength at various wavelengths indicates that ozone differences accounted for the big discrepancy between the two sites. Wavelengths of light not affected by ozone were virtually the same at the two sites.

To examine whether the UV levels on the days studied were typical of an entire summer, the researchers used a model to calculate average UV levels on the basis