THE WORLD BOOK HEALTH & MEDICAL ANNUAL

WORLD BOOK

The World Book Health & Medical Annual

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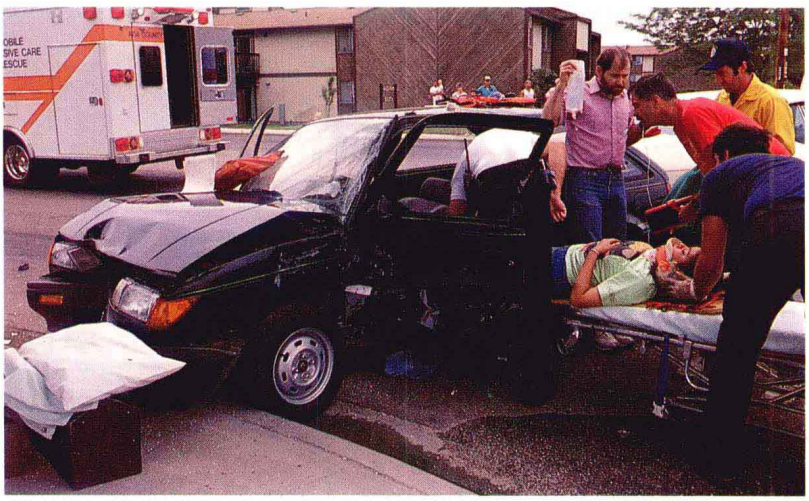
The Year's Major Health Stories

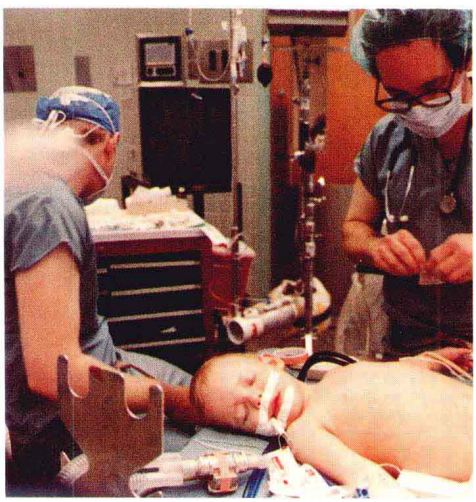
From the revelation that a drug can help prevent paralysis in accident victims to a new study on the life-prolonging properties of exercise, a wealth of discoveries spelled an eventful year in medicine. On these two pages, *Health & Medical Annual* editors highlight the stories they consider the most important, the most memorable, or the most promising, along with details about where to find them in the book.

The Editors

The Perils of Pounds
New studies suggest that women who are even moderately overweight have an increased risk of heart disease and gallstones. In the Health & Medical News Update section, see Weight Control.



Paralysis Preventive
Scientists reported in March 1990 that giving large doses of a drug after a spinal-cord injury greatly reduces the risk of paralysis. In the Health & Medical News Update section, see Emergency Medicine.



Living-Donor Liver Transplant
Surgeons performed the first United States liver transplant using tissue from a live donor in November 1989. In the Health Studies section, see The Promise of Organ Transplants.

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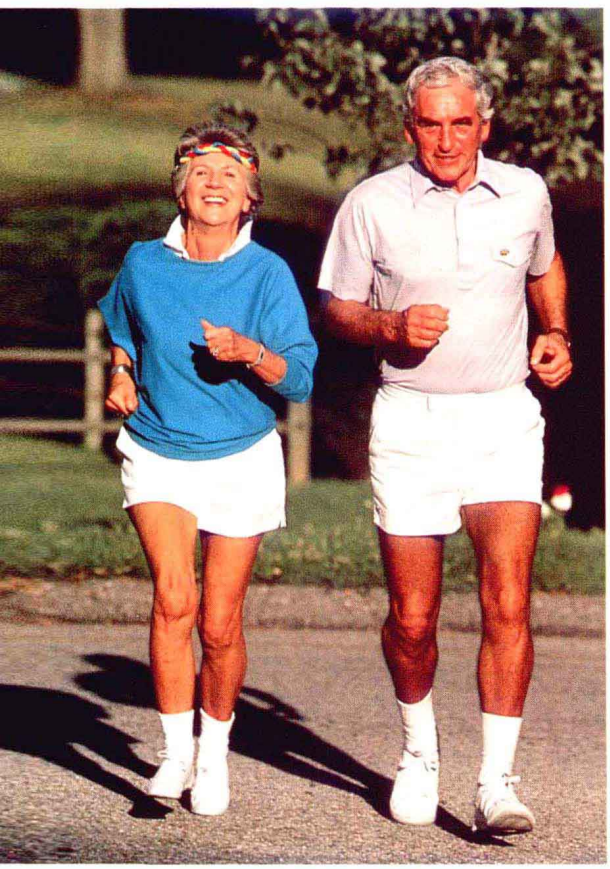
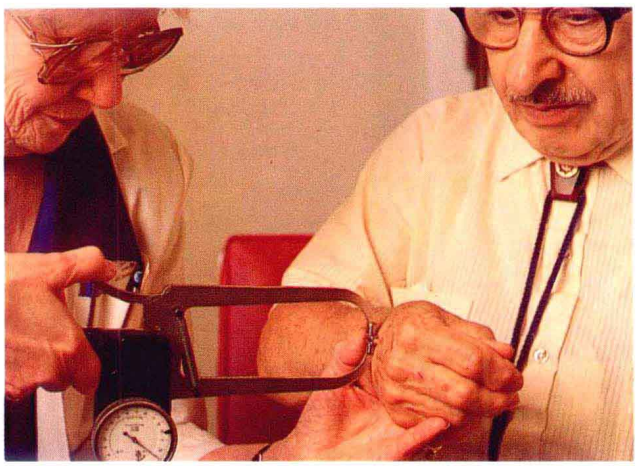
Exercise Benefits
Even modest amounts of exercise help prolong life and reduce the risk of death from heart disease and cancer, a November 1989 report revealed. In the Health & Medical News Update section, see EXERCISE AND FITNESS.

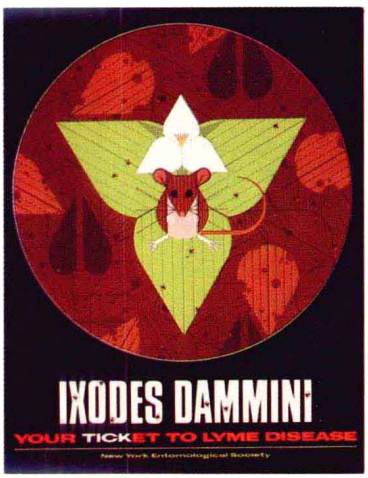


Human Gene Therapy Approved
Proposals to insert new genes into cells to correct genetic disorders received the go-ahead in August 1990. In the Health & Medical News Update section, see GENETICS.

Fetal Surgery
Doctors performed the first major operation on a fetus in June 1990. In the Health & Medical News Update section, see PREGNANCY AND CHILDBIRTH.



Human Growth Hormone and Aging
Human growth hormone can reverse some of the effects of aging on the body, scientists reported in July 1990. In the Health & Medical News Update section, see AGING.



Test for Lyme Disease
Scientists announced in November 1989 the development of a new, highly sensitive test for Lyme disease. In the Health & Medical News Update section, see INFECTIOUS DISEASES.

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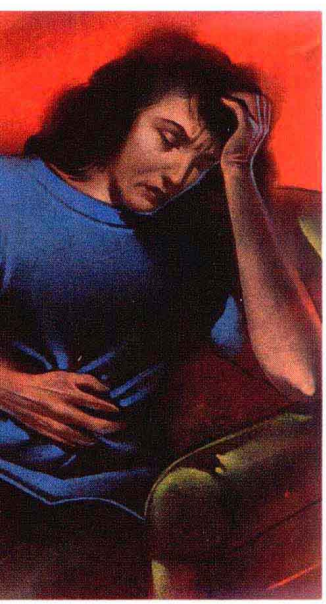

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Forty-one alphabetically arranged articles report on the year's major developments in health and medicine, from "Aging" and "AIDS" to "Veterinary Medicine" and "Weight Control." In addition, six Close-Up articles focus on noteworthy developments as well as common medical problems:

People in Health Care 338

Two articles spotlight people who contribute to health care—ordinary citizens who donate blood and intensive care nurses whose vigilance helps critically ill patients survive.

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Cross-Reference Tabs

A tear-out page of cross-reference tabs for insertion in *The World Book Encyclopedia* appears before page 1.

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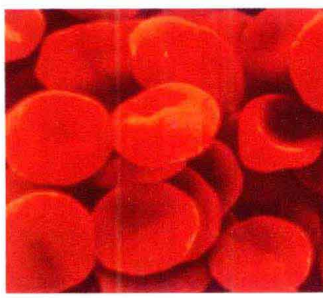

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Staff

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Special Reports

Fifteen Special Reports present in-depth information about topics of current importance in health and medicine.

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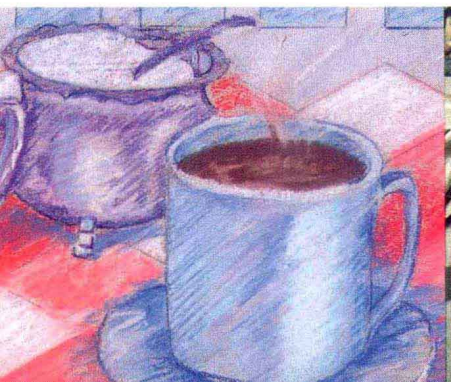

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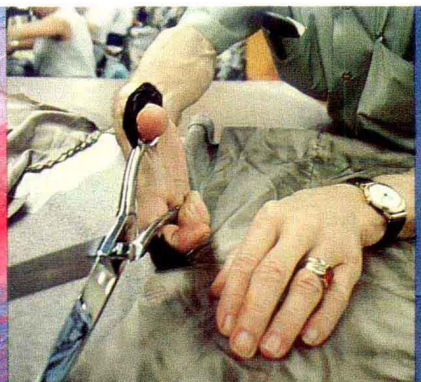

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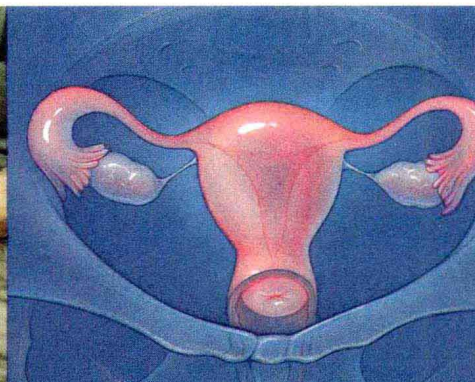

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Caffeine provides the punch in many drinks, foods, and drugs. But controversy continues to brew over its other effects.

Is Caffeine Bad for You?

By Patricia Thomas

Coffee in the morning, cola at lunch, afternoon tea, hot chocolate before bed—Americans love their caffeine.

Of course, few of us think of our favorite beverages as just a way to get a dose of a chemical. But caffeine *is* a chemical—and is responsible for much of the lift we get from coffee and tea, cola and cocoa, and even chocolate cake and candy bars. Not only that, caffeine is an active ingredient in many nonprescription painkillers, cold remedies, diet aids, and "wake-up" pills, and in some prescription drugs as well.

There are so many sources of caffeine in everyday life, no wonder it's often called the world's most popular drug. In fact, market research shows that 80 to 90 per cent of adults in North America regularly consume caffeine. For most, it's a quick pick-me-up, an aid to concentration, and perhaps the best home remedy for grogginess on the job or on the road.

Many worry, however, that anything so enjoyable must be bad for them. And newspaper articles, doctors' warnings, and ads for "caffeine-free" products constantly suggest that our favorite chemical companion has a dark side. It might, we hear, cause heart disease, infertility, even cancer.

Still, after decades of study, scientists can agree only that the situation is hardly clear-cut. They know what caffeine's direct effects are. But any link between moderate use of caffeine and a host of health problems remains uncertain.

Caffeine in the body

Caffeine occurs naturally in some 60 species of plants, none of which grow in the continental United States. The most important plant sources are coffee beans, tea leaves, cacao beans, and kola nuts.

People have been extracting caffeine from plants for well over 1,000 years. The Chinese may have begun brewing tea as early as A.D. 350, and from the beginning they credited the beverage with relieving aches and pains and increasing longevity. Coffee drinking, historians say, began in Arab countries in the 800's, when physicians prescribed it for such ailments as measles, smallpox, tiredness, headache, and troublesome erotic thoughts. These early doctors warned, however, that adding milk to coffee could cause leprosy.

We know now that caffeine is not quite that potent. But the ancients were correct in recognizing that caffeine is a drug. Pharmacologists today class caffeine as a mild stimulant of the central nervous system. Like other stimulants, it increases alertness. It also speeds up heartbeat and breathing rate and affects some other organs as it moves through the body.

When we drink a beverage, eat a food, or take a pill that contains caffeine, the caffeine goes first into the stomach. There, it increases the production of stomach acids, which can cause stomach upset in some people. The intestines quickly absorb the drug and pass it into the bloodstream, which carries it throughout the body and into the brain. Caffeine's level in the blood peaks after 15 to 45 minutes, but its effects last for at least 2 hours—up to 12 hours in some people.

The blood also passes through the liver, which removes the caffeine and breaks most of it down into several other chemicals. This process works more slowly in pregnant women, people with liver disease, and people taking certain medications, including oral contraceptives or the ulcer drug cimetidine. Smokers, however, break down caffeine much faster. For this reason, many smokers who quit find that their usual dose of caffeine affects them far more than they are used to.

About 3 to 6 per cent of a dose of caffeine survives the trip in its original form, passing through the kidneys and leaving the body mostly in urine. While in the kidneys, caffeine stimulates urine production. Because caffeine thus helps the body get rid of water, some nonprescription menstrual medications include caffeine in an effort to counter the water retention that bothers some women during their periods.

The author:

Patricia Thomas is Boston correspondent for *Medical World News*.

Scientists think that caffeine's effects on mood and alertness stem from its similarity to a natural brain chemical called *adenosine*. Adenosine is one of many *neurotransmitters*, brain chemicals that ferry signals among brain cells. Adenosine's job is to tell the brain—and hence the body—to slow down and be less active. It gives this command by locking into *receptors* (molecules that serve as doorways) on brain cells. Certain receptors are shaped especially to receive adenosine.

A caffeine molecule, however, is structured so much like an adenosine molecule that the receptors can't tell the difference. So, when caffeine floods the brain, it shoulders some of the adenosine out of the way, taking its place on many receptors and blocking the usual "slow down" signals. The result is the lift that every coffee, tea, or cola devotee knows.

Caffeine as a drug

Like many drugs, caffeine is addictive: Because it makes people feel good, they want to keep taking it. Of course, caffeine is hardly as dangerous as the drugs we usually think of as addictive, such as cocaine; caffeine addicts rarely seek ever-increasing doses or steal to support their habit. But neither is it as innocuous as milk. Anyone who has ever been desperate enough to chug warm cola or to make instant coffee with motel tap water can verify that caffeine addicts will go to great lengths to satisfy their cravings.

One of the hallmarks of an addictive drug is that addicts feel bad when they stop using it. In caffeine's case, the bad feeling is more than just a psychological letdown; it is a physical reaction to the *withdrawal* (removal) of a drug the body has learned to expect. Doctors have described patients with caffeine withdrawal since 1833, according to Roland R. Griffiths, a behavioral pharmacologist at Johns Hopkins University in Baltimore, who in 1988 compiled a review of studies on caffeine's ability to cause physical dependence.

Withdrawal symptoms—typically headache

If you're drunk, coffee isn't the cure. Contrary to folklore, coffee won't sober you up enough to drive home safely. In one study, scientists gave 48 men various amounts of alcohol and recorded their performances on a set of tests designed to resemble driving. The men then were given capsules containing 200 to 400 milligrams of caffeine and were put through the tests again. The caffeine was able to correct alcohol-induced errors in men whose blood alcohol level was below the common legal limit for intoxication. But caffeine could not improve the sloppy performance of those with a higher blood alcohol level—those who would be arrested if found behind the wheel of an automobile.

and tiredness—begin 12 to 24 hours after the last dose of caffeine. Many people who consume caffeine routinely at work are familiar with "weekend withdrawal," which strikes if they miss their usual daily fix when they're away from work. A dose of caffeine will banish the symptoms; in fact, some over-the-counter pain relievers contain caffeine partly because so many American headaches are due to caffeine withdrawal.

If the person quits entirely, the symptoms may persist for about a week. Moderate as well as heavy users may suffer from withdrawal, and the intensity of the symptoms varies widely. Some people find the headache and exhaustion—or the prospect of life without caffeine—so daunting that they can't imagine quitting. Others stop cold with no ill effects.

Children can also be caffeine addicts. Recent surveys show that 2- and 3-year-olds who drink soft drinks typically consume twice as much caffeine in proportion to their weight as do coffee-drinking adults, according to a 1988 report. The American Academy of Pediatrics' nutrition handbook recommends that children consume as little soda pop as possible, not only because it contains caffeine but also because it is full of excess sugar and non-nutrient additives.

As with many drugs, it is possible to overdose on caffeine. Too much caffeine can produce nervousness, irritability, insomnia, trembling, ringing in the ears, and many other symptoms. How much caffeine is too much depends on the speed with which the caffeine is consumed, the individual's body size, and whether the person is used to caffeine. Fortunately, it is hard to kill yourself with caffeine, especially if you take it in its usual food or beverage forms. For information on caffeine's toxic effects, see CAN CAFFEINE KILL? on page 24.

Measuring caffeine consumption

Although caffeine's direct effects are relatively clear, its long-term effects are less certain. Researchers have explored caffeine's relationship to more than 100 diseases, disorders, and physical responses—good and bad. Many of their findings, however, have been contradictory or inconclusive.

One reason for the uncertainty may be that caffeine consumption is hard to measure. Outside scientists who have taken a critical look at caffeine research say that many studies are suspect because they did not take into account the tremendous variation in the caffeine content of coffees and teas.

In 1985, government scientists at Canada's Health Protection Branch in Ottawa analyzed cups of coffee prepared by 58 women enrolled in a study at Ottawa's Carleton University. To their surprise, the caffeine content varied massively—from 21 to 148 milligrams per cup. The researchers went on to test restaurant coffee and found that the strength of the coffee at

The cholesterol question

One of the biggest popular medical debates of 1989 involved both America's favorite drug and its newest popular health concern, cholesterol. High levels of this fatty substance, which occurs naturally in the blood, have been cited as a risk factor for heart disease.

Researchers have long looked for a link between caffeine—or at least coffee—and cholesterol, but results have been mixed. Then, in November 1989, two separate studies added new twists to the debate.

In one study, researchers at Erasmus University Medical School in the Netherlands examined whether coffee's apparent link to cholesterol might depend on how the coffee is brewed. They noticed that some earlier studies that found a link were conducted in Scandinavia, where coffee is commonly made by steeping coffee grounds in boiled water for about 10 minutes. (Most Americans brew their coffee by pouring hot water through a filter full of grounds.)

The Dutch scientists asked 107 healthy adults with normal cholesterol levels to drink boiled coffee, filtered coffee, or no coffee at all for nine weeks. At the end of that period, they found that blood cholesterol levels had risen about 10 per cent for the boiled-coffee drinkers but were unchanged for those who drank filtered coffee or none at all.

The researchers speculated that some factor in the brewing method—such as the water temperature, the brewing time, or the act of filtering—somehow changes the coffee's chemical makeup in a way that affects blood cholesterol. But because both coffee-drinking groups got the same amount of caffeine, the cholesterol rise couldn't be blamed on the stimulant.

Another report, from Stanford University in California, may have unnerved people who drink decaffeinated coffee because they believe it is healthier than the regular brew. Researchers reported that levels of *low-density lipoprotein* (LDL), the so-called bad cholesterol, rose 7 per cent in a group of middle-aged men who drank three to six cups of decaf daily for two months. Cholesterol levels were unchanged in similar groups of men who drank regular coffee or none at all.

The researchers didn't think that the lack of caffeine made the difference, however. Rather, they suggested that the key lay in the type of bean used in making the coffee. Most regular coffee is made from mellow-tasting *arabica* beans. But supermarket brands of decaffeinated coffee, such as the one used in the study, typically use hardier *robusta* beans to make up for the loss of flavor caused by the decaffeination process.

Gourmet coffee purveyors rushed to emphasize that their decaf coffees, as well as their regular brews, are made of the higher-priced arabica beans. Meanwhile, other scientists hastened to assure the public that decaf coffee was no killer; the rise in blood cholesterol was so small as to make no significant difference to health. [P. T.]