Biomedicine

Joanne Silberner reports from the American Heart Association meeting in Anaheim, Calif.

Trojan horse of sorts for drugs

The battle against disease lends itself to military metaphors—the immune system produces a variegated arsenal of weapons, magic bullets tend to get sent on seek-and-destroy missions. New on the battlefield is a Trojan horse—a method that relies on hiding drugs inside red blood cells for a safe trip to their target.

The technique is "especially useful in administering drugs that are highly toxic, since the drugs would be encapsulated," says John R. DeLoach, a biochemist with the U.S. Department of Agriculture in Kerrville, Tex., who developed the procedure. He gets the red cells to swell by putting them in a low salt environment, which opens pores on the membranes through which drugs can enter. The cells are shrunk back to normal size by resupplying them with salt, and the pores close with the drug inside.

Once in the body, the drug either diffuses through the cell membrane or is released when the cell is degraded. With the cancer drug cytarabine, DeLoach has extended the half-life — the time after which only half the drug remains—from two hours to four and a half days using the encapsulated drug. He has just finished a successful preliminary study on a drug that treats trypanosomiasis (sleeping sickness).

Caffeine decreases brain blood flow

The amount of caffeine in a cup or two of coffee significantly decreases blood flow to the brain without affecting mood, according to psychiatrist Roy J. Mathew of Vanderbilt University in Nashville, Tenn.

That caffeine cuts cerebral blood flow is not new — it's been used for that purpose in treating migraines—but Mathew's study is the first to test low doses of orally administered caffeine on humans, says John Sterling Meyer, director of cerebrovascular research at the Veterans Administration Medical Center in Houston.

Mathew gave 250 milligrams of caffeine—about the amount in a freshly brewed cup of coffee — to nine healthy volunteers and 500 mg to seven volunteers, and measured a 20 to 25 percent decrease in blood flow in 30 minutes in both groups. No change was seen in eight people who received no caffeine, he will report in the December BRITISH JOURNAL OF PSYCHIATRY.

"The majority of the subjects couldn't tell if they had gotten caffeine," Mathew says. "But there is a substantial decrease in cerebral blood flow."

"Caffeine is supposed to produce arousal and you would expect it to increase cerebral blood flow, and what it does here is exactly the opposite," he says. "So what it means is that caffeine has a direct effect on blood flow which is not related to its effect on mood."

The blood-flow reducing effect of caffeine does not produce problems in healthy people, notes Mathew, a coffee drinker himself. "The unknown here is if it is relevant in people with preexisting cerebrovascular disorders—someone recovering from a stroke, for example." And it may be a factor in figuring how much medication gets to the brain, he says.

Medicine capsules

- James O. Mason, executive director of the Utah Department of Health, will replace William H. Foege as head of the national Centers for Disease Control in Atlanta on Dec. 1. Foege is stepping down to pursue research interests; Mason worked at the CDC for 11 years.
- The bacterial gene responsible for producing the toxin believed to cause toxic shock syndrome has been cloned, scientists from three institutions report in the Oct. 20 NATURE. They say they were unable to find any evidence indicating that the gene is initially introduced into the bacteria via a virus, as had been previously reported (SN: 4/6/83, p. 244).

Listen to your family

Premature heart disease runs in families, but most people apparently won't listen to what their relatives' hearts are telling them.

Diane M. Becker and colleagues at the Johns Hopkins Medical Institutions in Baltimore interviewed 70 brothers and sisters of heart disease sufferers under the age of 59.

Following their siblings' hospitalization, only 10 percent attempted to lower their risk by stopping smoking or adopting a low-fat, low-salt diet. Sixty percent felt their risk was the same or lower than the general population. For them, says Becker, "Knowing that it's in the family had no impact at all."

It wasn't ignorance. "They knew coronary disease clustered in families, they knew about the risk factors," Becker says. "We asked them why they thought their risk was low and they said they didn't look like their brothers, they weren't like them in any way." But in fact, their risk wasn't low. In a second study, Becker and her colleagues found that 60 percent of the siblings unknowingly had risk factors — such as high blood pressure and high cholesterol—that called for medical intervention. "A good number of them actually did have heart disease," she says.

Body to heart: Gesundheit

Your heart doesn't have a nose to sneeze with, but it is capable of an allergic reaction, according to research by L. Michael Graver of the New England Deaconness Hospital in Boston and Roberto Levi of Cornell University in New York.

Graver and Levi presented pieces of human heart muscle (removed in order to hook patients on to heart-lung machines), with an allergic challenge, and found it caused release of histamine. Histamine is the same product released in nasal passages, lungs and elsewhere when an allergy victim encounters an allergen—pollen or dust, for example. Histamine release was "sufficient to produce changes in the function of the heart," Levi says. The beating rate of the isolated muscle nearly doubled, and beats were 43 percent stronger.

If the heart as a whole is capable of an allergic reaction, the finding suggests a cause for the unexplained 10 percent of the 350,000 annual sudden cardiac deaths in the United States each year. "There is a possibility that a certain number of this 10 percent may be due to an allergic reaction," Graver says, but just how many he doesn't know yet.

Histamine from other parts of the body may play a role as well. It is one of a number of substances released in the body during a heart attack, and University of Miami researchers reported success in using Tagament, a drug that suppresses histamine release, to protect against heart arrhythmias in guinea pigs experimentally given heart attacks.

Electrical malfunction in SIDS

A faulty wiring job may be responsible for some of the 7,000 Sudden Infant Death Syndrome (SIDS) cases in this country each year, according to two studies that implicate infection or inborn anomalies in the heart's electrical conduction system.

Saroja Bharati of the Deborah Heart and Lung Center in Browns Mill, N.J., looked at 15 hearts from SIDS babies and eight hearts from babies who died in other ways. The bundle of His—muscle fibers that conduct the heart's contraction-causing electrical currents—was on the left side in eight SIDS hearts, a condition she found in only one of the other hearts. It is usually central. Seven other SIDS hearts showed other abnormalities; in only one was the conduction system anatomically normal.

Thomas A. Marino of Temple University in Philadelphia found abnormalities in the same part of four SIDS hearts. "We speculate that those tissue abnormalities could have caused an abnormal heartbeat which in turn could have led to death," he says.