biomedical sciences

A cholesterol test for children

There is mounting interest in childhood preventatives against adult heart attacks, specifically in diagnosing abnormally high levels of cholesterol in children. Cholesterol is a major factor in hardening of the arteries, which is a major factor in heart attacks.

Children with an inherited cholesterol problem tend to have abnormal lipoproteins in their blood. These lipoproteins offer one diagnosis for high levels of cholesterol (SN: 6/10/72, p. 379). Now two Arizona physicians have devised a test for abnormal levels of cholesterol that can be given to all children, whether they have a family history of high cholesterol or not.

The test, described by Glenn Friedman and Stanley J. Goldberg in the Aug. 6 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, involves drawing a sample of blood from the finger. The cholesterol in the sample is analyzed and compared with normal cholesterol levels for a child's particular age group. Friedman and Goldberg arrived at normal and abnormal levels for various age groups by taking cholesterol samples from 2,033 children.

Their sampling also revealed a surprising number of children with levels of cholesterol that are abnormally high for their age.

Membranes' rapid self-repair

Cells are not unlike little houses, their membranes like protective walls. If a membrane springs a leak, the integrity of a cell is threatened, and it would certainly be wise of the cell to repair the leak. But two chemists at Case Western Reserve University have found that the cell may not have to. Apparently membranes can reseal themselves.

As W. T. Mason and Y. F. Lee report in the Aug. 1 NATURE NEW BIOLOGY, they found that three different kinds of membranes were able to reseal themselves. Yet the membranes had widely varying contents of lipids, cholesterol, fatty acids and proteins. Small fragments of membranes took only 15 to 30 minutes to repair their leaks. Large fragments took one to two hours. In all instances the membranes resealed so that they had no surface irregularities.

Only further studies will show whether membranes reseal themselves so that their inherent shapes are preserved.

Migraine action inside the brain

Migraines are undoubtedly the most severe form of headache, often accompanied by depression, irritability, severe pain, nausea and vomiting. An untreated attack can last hours or days. Little has been known about what takes place in the brain during a migraine attack, but a Danish neurologist offers some insights in the August ARCHIVES OF NEUROLOGY.

Erik Skinhøj of Bispebjerg Hospital in Copenhagen studied blood activities in the brain while six patients experienced a migraine. He found reduced blood flow during the initial phase. This reduced flow may have been due to a constriction of tiny blood vessels carrying the blood. Certainly it was not due to resistance in the larger vessels. The reduced flow probably led to oxygen deprivation in the blood, because lactate increased in the blood during the actual headache phase. Too much lactate in the brain is thought to be due to lack of oxygen. The increase in lactate was then probably responsible for excessive blood flow seen during the actual headache phase.

Abnormal blood flow, Skinhøj concludes, causes the symptoms of migraine, and the abnormal flow occurs in both sets of arteries supplying the brain.

natural sciences

Why the honeycreepers died

Since the coming of Western man to Hawaii, at least 25 kinds of birds—40 percent of the native species known—have become extinct. Others have been severely depleted, including the graceful, iridescent honeycreeper, a tiny nectar-feeding bird with a long curved bill for probing deep into trumpet-shaped native flowers. After years of uncertainty, ornithologists believe they have discovered why the delicate birds suddenly began to disappear and what can be done to save them, along with other endangered species.

As told by Richard E. Warner in the August-September NATURAL HISTORY, the honeycreepers experienced catastrophic declines shortly after the arrival of white men in Hawaii. The usual ecological villains—deforestation, new predators, obvious diseases—did not seem to fully account for the demise. Yet, populations dwindled and the survivors inexplicably retreated to elevations above about 2,800 feet.

Avian malaria had long been suspected, but tests for the disease had proven almost entirely negative. Then scientists noted that periodically the birds migrated to lower elevations, presumably because of seasonal weather changes. They captured various healthy birds in the mountains and brought them down to sea level in open air cages. All the native finches and honeycreepers quickly contracted avian malaria, but from a group of white-eyes—introduced to the islands by man and used as controls in the experiments—very few succumbed to the disease.

The picture, Warner says, is now clear. The night-flying *Culex pipiens fatigans* mosquito, probably introduced to Hawaii from a ship's water casks, carries malaria from relatively immune, introduced birds to the virtually helpless indigenous species. The *Culex* mosquitoes almost never fly above 3,000 feet elevation. Periodic migrations expose the high-altitude birds to malaria.

Though the present retreat of the honeycreepers probably cannot be reversed, even worse disasters can be prevented by decisive action based on the new discovery. Most important, high-elevation mosquitoes must be prevented from entering Hawaii and the importation of new birds with even more virulent diseases must halt.

How the owl tracks its prey

After verifying earlier observations that barn owls locate their prey in the dark by sound alone, Princeton University biologist Masakazu Konishi now reports other characteristics of their acute hearing ability.

Konishi trained three barn owls to distinguish between slightly different sounds and to strike in the dark at protected loudspeakers emitting sounds of known properties. He found that the birds are most sensitive to noises in the frequency range of 5.5 to 9.5 kilohertz. His owls also made far more errors locating their targets when the signal stopped upon their take off than when it continued until landing. But the accuracy of attack was not affected until 80 percent of the flight time was devoid of signals.

This suggests, writes Konishi in the July-August AMERICAN SCIENTIST, "that the owl can make midflight course corrections, like the moon shots, in order to strike the target accurately. Small rodents make noises intermittently, and the owl must be able to adjust to this condition."

The heart-shape facial structure of the barn owl resembles a "sound-collecting device," notes Konishi. Upon removing the facial-disk feathers, he found the owl made large errors in landing short of its target. "These observations suggest that the facial disk may be a sound amplifier; it collects sound from a large area and focuses it onto a smaller area."