Biomedicine

Detecting heart defects prenatally

In the United States, fewer than 1 in 10 heart defects in children are detected before birth. If pregnant women were tested by ultrasound later in their pregnancy than the first trimester, the odds of finding such a defect would improve greatly, as would the survival chances of a baby with a congenital heart problem, says Mary Jo Rice, a cardiologist at Oregon Health Sciences University in Portland. Rice spoke at a seminar in Portland sponsored by the American Heart Association in July.

First-trimester ultrasound examinations are typically done to predict birth date and to check overall development of the fetus, but they cannot get clear images of its tiny heart. Rice estimates that one-third of pregnant women in the United States do not get an ultrasound at all.

Heart defects occur in 8 of every 1,000 babies. Before birth, the baby receives oxygenated blood from its mother, but once the baby is born, its heart takes on this task. A structural defect can be fatal at this point. Prenatal detection would allow a mother to give birth at a cardiac center, where a team of heart specialists could be ready should an operation on the newborn prove necessary, Rice says. Early detection could also help prepare the family for the emotional strain, expense, and logistical problems of surgery on the newborn. "We need to optimize delivery to maximize survival," says Rice.

Some heart problems could even be treated prenatally. In cases of fast heartbeats, for example, doctors can give medicine to the mother or the fetus directly through the umbilical vein. Rice advocates training ultrasound technicians to check images for cardiac irregularities.

Although some families—those with a history of heart disease or diabetes, for example—are at greater risk than others, 60 to 70 percent of babies born with heart defects had no risk factors, Rice says. The only way to find out whether such babies have a defect is through ultrasound screening.

In Great Britain, where ultrasound is routine at 18 to 20 weeks, 80 to 85 percent of heart defects are detected before birth. The detection rate in the United States is only 8 to 10 percent, Rice says.

"The point is to pick a time in gestation, at 18 to 20 weeks, when we can get good pictures of the heart," says Henry Sondheimer, a cardiologist at Children's Hospital at the University of Colorado at Denver. —*N.S.*

Blood carries HIV from mouth to mouth

A woman may have been infected with HIV from a man's bleeding gums during "deep kissing," reports the federal Centers for Disease Control and Prevention in Atlanta. The woman also had gum disease, which may have made it easier for the AIDS virus to enter her body. Scientists think that blood, not saliva, was the vehicle of transmission, emphasizes Scott D. Holmberg, a CDC epidemiologist.

The woman contracted the virus despite an apparent lack of behavior that would have put her at high risk, the CDC reports. The pair was part of a study of couples in which only one member was initially infected with HIV. Analysis of viral samples from the man and woman later in the study indicated that both were infected with the same strain, suggesting that HIV had passed from one to the other. Although no one can prove the route of transmission, the most likely possibility is that the virus in the man's bloody saliva infected the woman, says Nancy S. Padian, an epidemiologist at the University of California, San Francisco who directed the study.

This case shows that HIV may enter the body through the mouth, says Holmberg. "This has implications for couples who have unprotected oral sex and engage in deep kissing. We don't think transmission happens often this way, but it can." —*E.S.*

Biology

Biological control for deer ticks

Symbiotic microbes and nematodes make a versatile combination that is lethal to a variety of insects found in soil (SN: 7/26/97, p. 58). That combination may now prove useful in controlling not just pests of plants but of people. Researchers from the Department of Agriculture are exploring the use of nematodes in attacking the hard-to-spot ticks involved in the spread of Lyme disease to humans.

At the Agricultural Research Service in Beltsville, Md., parasitologist Dolores Hill has tested *Steinernema* and *Heterorhabditis* nematodes for their ability to control adult deer ticks. The nematodes crawl or bite into the tick's body, then release their microbial partners, which infect and kill the tick within 24 hours. "Nematodes are extremely effective" against one stage of the ticks' life cycle, says Hill.

She plans this fall to test woodsy residential areas visited by tick-carrying deer. It may be possible to reduce the numbers of egg-laying female ticks and thus reduce the number of young, disease-transmitting ticks the following spring.

Other USDA researchers are exploring the use of fungi as yet another biological alternative to tick-killing chemical sprays. —*C.M.*

Diversity in tropical forest edges . . .

Interesting things happen at the edges, whether of continental plates or cultural periods. In ecology, too, the edges of habitats—called ecotones—are happening places. If they're large enough, they can be cradles of biological diversity, researchers report in the June 20 SCIENCE.

Biologist Thomas B. Smith of San Francisco State University and his colleagues studied a dozen populations of a small bird, the little greenbul (*Andropadus virens*), in Cameroon. Half of the populations lived in the dense tropical rain forest, while the other half came from the extensive and patchy edge habitat that separates the forest from the savanna. Although all of the birds were genetically similar and could interbreed, those from the edge habitat differed physically from the forest birds. They weighed more and had longer wings, for example.

The researchers maintain that these differences—as significant as the differences between some species—are good evidence of natural selection linked to the habitats the bird populations occupy. Longer wings might offer a faster means of escape in the edge habitat, where predators may be a greater problem. These habitats, though relatively neglected by conservationists, may therefore "be integral to the production and maintenance of biodiversity in tropical rain forests," the researchers say. —*C.M.*

. . . and tropical forest soils

Tropical forests are famous for their biological diversity, much of it undescribed, but the real mother lode of new tropical species is underfoot, not overhead, according to an analysis of soil microbes from the eastern Amazon Basin in Brazil.

Rather than growing and then counting species and numbers of bacteria from a soil sample in the lab, agronomists James Borneman and Eric W. Triplett of the University of Wisconsin-Madison extracted DNA from samples of forested and deforested soil and analyzed 100 of the sequences they obtained.

"The microbial diversity [from this snapshot] is immense," the team reports in the July APPLIED AND ENVIRONMENTAL MICROBIOLOGY. None of the sequences were duplicates, and none had been reported previously. Most of the sequences were related to those of bacteria such as *Clostridium* and *Planctomyces*, but 18 could not be assigned to any known bacterial group. Most of the novel sequences, presumably representing unknown microbes, came from the forested soils. Two sequences belong to microorganisms from the ancient and little-known domain of archaea (SN: 8/24/96, p. 116). —*C.M.*