Biomedicine

AIDS virus: Questions of identity

And the winner may be . . . human immunodeficiency virus-I (HIV-I). Like everything else about the virus or viruses believed to cause AIDS, naming it has been thorny. The culprit is known variously as LAV-I (lymphadenopathy-associated virus), HTLV-III (human T-lymphotropic virus) and ARV (AIDS-associated retrovirus). At a National Institutes of Health lecture last week in Bethesda, Md., LAV discoverer Luc Montagnier of the Institut Pasteur in Paris said the international committee assigned to come up with the name had settled on HIV-I. Harold Varmus of the University of California at San Francisco, who chairs the committee, would not confirm or deny the comment, saying only that the committee has been deliberating and hopes to publish its consensus soon.

On the topic of identity, in the April 18 SCIENCE Raymond V. Gilden, Robert C. Gallo and their colleagues at the National Cancer Institute in Bethesda, and Bionetics, Inc., in Kensington, Md., report that they had inadvertently used a picture of a virus grown from material provided by Montagnier's laboratory — thus, LAV-I — as an illustration in their initial article describing the HTLV-III virus (SN: 4/28/84, p. 260). They note that the other pictures accompanying the series of reports were all of HTLV-III in culture. Subsequent genetic sequencing of the two viruses has shown that they are very similar (SN: 1/26/85, p. 53).

Sounding out gallstones

If shock waves can be used to bust up kidney stones, why not gallstones? The Food and Drug Administration has approved the use of a shock-wave generator for kidney stones (SN: 1/12/85, p. 24); now a West German group has successfully used the machine, called a lithotripter, on patients with gallstones.

In the procedure, the patient sits in a water-filled stainless steel tub. An underwater spark-gap electrode is fired, releasing a shock wave that is aimed by a reflector toward the gallbladder. As many as 1,500 shocks are given, each lasting a microsecond, and stone-disintegrating drugs are used to dissolve the fragments that remain.

University of Munich researchers led by Tilman Sauerbruch used the technique on 14 patients with stones in the gallbladder or bile duct. In six of nine patients with stones in the gallbladder, the fragments disappeared completely within 25 weeks. And bile duct stones in four of five patients were broken up and spontaneously passed or removed by a tube threaded into the duct, the researchers report in the March 27 NEW ENGLAND JOURNAL OF MEDICINE. The only adverse effects seen were transient pain in two people and mild inflammation of the pancreas of one person.

But the technique has definite limitations, they note. Fragments still remained in some of the patients. The study involved only patients in good health, with but a few small stones that could be easily visualized with X-rays or ultrasound. By these criteria, they note, only 5 to 10 percent of people with gallstones are good candidates. Their cautionary note is echoed in an accompanying editorial by Albert G. Mulley Jr. of Harvard Medical School, who states that randomized trials comparing lithotripsy with other techniques are needed.

The procedure may prove worthwhile in combination with direct infusion of a stone solvent, says Johnson Thistle of the Mayo Clinic in Rochester, Minn. Thistle's group has worked out a way to dissolve gallstones by feeding methyl tert-butyl ether into the gallbladder (SN: 2/16/85, p. 104), which has continued to be successful in clinical trials, he told SCIENCE NEWS. They are looking into the lithotripter procedure to see if it can be used in combination with the solvent. "There may be selected patients for whom breaking up the stones beforehand will make them dissolve more quickly," he says.

Earth Sciences

Gravity lines linked to mantle motion

In the 20 years since the theory of plate tectonics was proposed, scientists have unraveled the kinematics or relative motions of the dozen or so plates that make up the outer shell of the earth. But the dynamics of this motion — what convection patterns in the mantle might drive plate tectonics, for example — remain elusive, primarily because so few of the observations made at the earth's surface directly relate to the mantle motions below.

Now two researchers at Lamont-Doherty Geological Observatory in Palisades, N.Y., report in the March 10 JOURNAL OF GEOPHYSICAL RESEARCH on a new surface observation that may directly reflect small-scale mantle processes. When analyzing data collected in 1978 by the Seasat satellite, William F. Haxby and Jeffrey K. Weissel discovered lineated patterns of variation in the gravitation field over the Pacific and Indian oceanic plates. The discovery of these lines, which in the east central Pacific span an area the size of the continental United States, could not have been made without the large-scale view available for the first time from Seasat, says Haxby. Last summer, Weissel and others aboard a research ship confirmed the satellite findings and studied the patterns in finer detail.

Because the lines in the eastern Pacific run parallel to the direction of plate motion, the researchers believe they directly overlie 100-kilometer-deep cells of mantle convection, which, as predicted by one model, are thought to be shaped by plate motion into longitudinal rolls. One possibility being explored, says Haxby, is that the upwelling and downwelling of mantle material pushes up and pulls down the overlying crust, making ripples in the seafloor topography and the gravity field. An unexpected aspect of the lineations, he notes, is that they begin in 5-million- to 10-million-year-old crust — much younger than had been predicted by other models simulating the onset of mantle convection under the cooling ocean crust.

When southwestern deserts were wet

For more than a decade scientists have puzzled over the climatic behavior of the United States' southwestern desert region during the last glacial period. Researchers have understood that the invasion of massive ice sheets into North America, down to latitudes of Seattle and New York, made the Mojave and nearby deserts wet enough to sustain woodlands by changing the atmospheric circulation and storm patterns over the continent. But why did the deserts remain moist for several thousands of years after the ice sheets began their last retreat 12,000 years ago?

W. Geoffrey Spaulding at the University of Washington in Seattle and Lisa Graumlich at the University of Minnesota in Minneapolis present an answer in the April 3 NATURE. The two paleoclimatologists used the types of plants found in fossil pack-rat middens — massive piles of plant fragments and debris collected by the rats and preserved for thousands of years by mummification — to verify a National Center for Atmospheric Research computer model. This model, which has been used primarily to study global climate, is now being applied to continental and smaller scales by a few research groups.

From the model, the researchers conclude that the deserts stayed wet because of Milankovitch forcing, periodic changes in the earth's orbit, which increased solar radiation reaching the surface and intensified the monsoons. Spaulding says scientists have long recognized a Milankovitch wet spell starting about 11,000 years ago in African and Indian deserts; this wet spell stood out because it was preceded by a period that, due to existing weather patterns, was very dry. No one had recognized Milankovitch forcing at work in the southwestern deserts, he says, because this wet spell came right on the tail of the moist period brought on by the North American ice sheet.