Biomedicine

On the AIDS front

• In the Aug. 8 SCIENCE, researchers from the National Institutes of Health in Bethesda, Md., Washington University in St. Louis and Biotech Research Laboratories in Rockville, Md., describe two remodeled AIDS viruses. In one, they used enzymes that snip DNA at specific locations to omit sections of genes that produce an enveloping protein and a protein whose function has yet to be determined. The second variant lacks only the gene for the mystery protein. The virus without the two genes can reproduce in culture without killing T cells, unlike the intact AIDS virus. The virus lacking just the unknown gene does kill T cells. The findings, the researchers report, indicate that cell killing isn't necessary for the virus's survival, and that the mystery gene and its protein need not be present for the virus to infect and kill cells. But before the nonlethal strain can be used as a vaccine, much more work needs to be done, they caution.

• Shyh-Ching Lo of the Armed Forces Institute of Pathology in Washington, D.C., reports in the July AMERICAN JOURNAL OF TROPICAL MEDICINE AND HYGIENE that he has isolated a previously unrecognized virus from the blood of two people with AIDS. The virus is not the AIDS virus, which was recently designated HIV (also known as HTLV-III, LAV-I or ARV-I). He was unable to culture the new virus from normal human cells. Lo also found evidence of infection with the new virus in 23 of 24 AIDS patients but did not report doing tests on blood from healthy people for comparison. The new virus could be, among other things, a laboratory contaminant, a virus harbored by everyone, an opportunistic organism that establishes itself in AIDS or a cofactor necessary for establishment of the disease.

Racial difference in heart risks

The biological bias that results in a higher heart-attack rate in white men compared with white women, black men and black women is evident at an early age, according to a study of blood samples from 2,854 children in Bogalusa, La., between the ages of 5 and 17.

Researchers at Louisiana State University Medical Center in New Orleans measured apolipoprotein A-1, a component of a cholesterol-collecting particle that is associated with a *lowered* risk of heart disease. They report in the August PEDIATRICS that black boys had higher apo A-1 levels than did white boys. There were no racial differences in the girls' levels, which fell between the white boys' and black boys' levels.

While previous studies have shown a link between high cholesterol levels in children and early atherosclerosis, cholesterol levels can be influenced by diet. The apo A-1 levels, says Louisiana's Gerald S. Berenson, are more closely determined by genetics.

Smelling smells

For the scent of a flower to get from the blossom to your brain, a volatile chemical from the flower has to enter your nose and get through a thin layer of mucus to tiny, hairlike cilia. The odor-detecting cilia are connected to nerves that carry the message to the brain. In a search for the molecule on cilia that recognizes the odorant, Jonathan Pevsner, Pamela B. Sklar and Solomon H. Snyder of Johns Hopkins University in Baltimore came up instead with a protein molecule that binds to the odorant in the mucus.

The protein, they report in the July PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Vol. 83, No. 13), binds to several different odorants. The researchers suggest it may play an important role in the sense of smell, bringing odorants through the mucus layer to the cilia or clearing out the odorants after they have been smelled.

Earth Sciences

Ancient traces of plate tectonics?

One of the best places for geologists to study ancient seafloor is the mountains. When continents collide and close up ocean basins, slivers of oceanic crust, called ophiolites, are sometimes thrust up into mountain belts. Because complete ophiolites have not been found in Archean-aged rocks (2.4 billion to 4 billion years ago), some scientists have speculated that the opening and closing of ocean basins, integral to plate tectonics today, did not operate during the earth's earliest geologic eon.

Now, in the July GEOLOGY, a group of geologists reports finding what they believe is a remnant of Archean oceanic crust that may provide the first evidence of seafloor spreading and basin closure during the Archean.

From top to bottom, modern seafloor consists of a layer of sediment, "pillow" lavas that have spilt onto the seafloor, dikes through which magma has risen and a layer of magma that had crystallized in the magma chamber beneath a spreading ridge. In Archean rocks, scientists had previously found only sediments and pillow lavas, leading some to suggest that these rocks were created not by seafloor spreading in deep oceans but in the shallow seas that formed over *continents* as they were rifted apart.

Now Herwart Helmstaedt at Queen's University in Kingston, Ontario, and his colleagues have discovered a layer of dikes as well in 2.7-billion-year-old rocks in Yellowknife, Northwest Territories. The structure of this dike complex, say the researchers, suggests that the Yellowknife rocks "evolved in a basin floored by oceanic [rather than continental] crust."

"This discovery extends the plate tectonics model backwards in time to the Archean and suggests that something resembling modern seafloor was being incorporated into mountain belts then," comments Dugald Carmichael at Queen's University. "It's really an exciting finding."

Probing the earth's crust, deeply

At least 24 research projects will begin with the drilling this fall of a 5-kilometer-deep, 15-centimeter-wide hole at Cajon Pass in southern California, scientists announced recently. Building upon previous investigations into shallower holes, the Cajon Pass hole is part of a trend in geological research to probe deeper into the earth's crust.

Geologists participating in the project will retrieve core samples and use in-hole sensors to examine the physical and chemical nature of rock formations, measure the stress on the rock, trace the relationship between pore pressure and earthquakes, investigate shifts in the earth's magnetic polarity and determine the temperature of the rock and fluid found in the hole. Their findings, they say, will contribute to earthquake prediction models, a greater understanding of crustal plate movement, the search for hidden mineral resources and the effort to find sites appropriate for nuclear waste disposal in the earth's crust. The project brings together researchers from several universities and is coordinated by Deep Observation and Sampling of the Earth's Continental Crust, Inc. (DOSECC), in Washington, D.C.

Ultra-deep holes—holes deeper than 6 kilometers—are now in the planning stage in the United States and several European nations and promise deeper probing of interactions between the crust and the mantle lying beneath it. Two ultra-deep holes in the Soviet Union already exist, but Soviet scientists have released no news about the deepest hole — 12.6 kilometers — since early this year, says DOSECC president G. Arthur Barber. He says the silence "makes one suspicious" and has led to speculation that the pipe inside the hole may have sheared off. If so, the broken pipe remaining inside the hole is blocking any further drilling and will have to be "fished out."