

AIDS vaccine revs up the attack on HIV

A very preliminary study hints that an experimental vaccine may slow the development of AIDS in people who have been infected with the virus but who show no symptoms of the disease. The investigators say their early data suggest that such post-infection treatment may boost the body's defense against the tricky virus, known as HIV. At the same time, they emphasize the need for more extensive testing to prove the efficacy and safety of this approach.

The body naturally responds to HIV infection by mounting a fierce immune defense, a battle that can sometimes ward off disease symptoms for years. In most patients, however, the virus eventually wins the struggle. As HIV decimates the immune system, it opens the door to a panoply of potentially deadly "opportunistic" infections, including an otherwise rare form of pneumonia.

With the World Health Organization estimating that HIV may infect about 40 million people by the year 2000, researchers are racing to find a vaccine. Earlier this year, scientists reported spurring an immune response in healthy, uninfected volunteers by injecting the experimental vaccine known as gp 160, a genetically engineered replica of a surface protein found on the AIDS virus. Other studies in chimps and humans have led researchers to suggest that such vaccines might also offer an effective treatment for individuals already infected with HIV.

Now, a team led by Robert R. Redfield of the Walter Reed Army Institute of Research in Rockville, Md., reports preliminary evidence that gp 160 may indeed help mitigate HIV's relentless attack on the immune system. The study, described in the June 13 *NEW ENGLAND JOURNAL OF MEDICINE*, involved 26 men and 4 women with asymptomatic HIV infection. Each volunteer received three to six intramuscular injections of gp 160 over a period of 120 to 180 days.

Ten months after the study's start, 19 of the 30 participants showed a more vigorous immune response to the virus, including HIV-specific antibodies not normally produced by people with the infection. In addition, these 19 showed signs of increased white-cell activity, and some produced specialized white cells that destroy HIV-infected cells.

During the study, the 19 vaccine responders showed no decline in blood levels of CD4 T-lymphocytes—white cells targeted by HIV and commonly used by researchers as a gauge of the infection's progression. In the 11 people who did not respond to the vaccine, CD4 blood levels dropped 7.3 percent—a decline similar to that seen in asymptomatic, HIV-infected people who don't get treatment, Redfield and his co-workers note.

The investigators admit they don't know whether these laboratory indicators of a more aggressive immune response will translate into a better quality of life for HIV-infected individuals. Nonetheless, study coauthor Franklin Volvovitz calls the new data "exciting." If further research confirms these findings, regular booster shots of gp 160 might help keep HIV-infected people free of opportunistic infections for years, says Volvovitz, president of MicroGeneSys, Inc., in Meriden, Conn., the firm that developed the vaccine.

Anthony S. Fauci, director of the National Institute of Allergy and Infectious Diseases (NIAID) in Bethesda, Md., cautions against jumping to conclusions regarding the vaccine's efficacy. "Certainly, there's a tantalizing suggestion that CD4 cells stabilized," he told *SCIENCE NEWS*. But, he adds, "it's still far too early in the

clinical trial stage to make any comment about whether this immune response in fact will turn out to ultimately be relevant."

Moreover, Redfield's team has yet to demonstrate the vaccine's long-term safety, Fauci says, noting concerns that such a treatment might somehow exacerbate the HIV infection over time. In the preliminary study, which focused on safety, most volunteers reported mild reactions localized in the skin around the injection site, but no serious vaccine-related effects. MicroGeneSys plans another study of gp 160, this one designed to test both efficacy and safety.

Other research teams have embarked on similar quests for post-infection vaccines that could hold off or even reverse HIV-induced damage to the immune system, says Wayne C. Koff of NIAID. In the meantime, Koff advises people with HIV infection to view all preliminary findings—including this week's report—with some skepticism. — K.A. Fackelmann

Conserving a coyote in wolf's clothing?

Conservationists who seek to preserve the North American red wolf as a unique species may be barking up the wrong tree. For decades, the red wolf has been nearly indistinguishable genetically from either the gray wolf or the coyote, report two population geneticists who have compared DNA "fingerprints" from captive red wolves with those from frozen blood samples and museum skins.

The finding is expected to fuel the debate over whether the red wolf is a separate species—eligible for conservation under the Endangered Species Act—or a hybrid resulting from years of crossbreeding between overlapping populations of gray wolves and coyotes. In general, such hybrids are excluded from protection under the conservation law.

The red wolf became extinct in the wild in 1975, falling prey to systematic hunting and human encroachment into its habitat in the southeastern United States. But just before the last of the red wolves died off, ecologists rounded up several mating pairs and used them to found a captive breeding colony sponsored under the Endangered Species Act. The breeding program has released 25 of its 170 live red wolves into protected areas in North Carolina and on several southeastern coastal islands.

To probe the red wolf's ancestry, Robert K. Wayne of the University of California, Los Angeles, and Susan M. Jenks of the University of California, San Francisco, analyzed mitochondrial DNA samples from the captive colony. Because DNA in the mitochondria—the cell's energy-producing organelles—mutates more rapidly than DNA in the nucleus, Wayne and Jenks hoped it would provide a clearer picture of the animal's heritage.

The researchers chopped up mitochondrial DNA taken from the captive red wolves and sorted the pieces on a gel slab according to their size. The fragments formed a characteristic pattern, or DNA fingerprint, identical to that of coyote mitochondrial DNA.

"We were somewhat disappointed," says Wayne, now head of conservation biology for the Zoological Society of London. "We were hoping to find a unique red wolf [gene pattern]."

He and Jenks then turned to frozen samples of blood drawn from 32 wild red wolves before the extinction. More than 80 percent of the samples yielded mitochondrial DNA identical to that of coyotes, and the rest proved identical to gray wolves.

Finally, the researchers examined mitochondrial DNA extracted from six pelts collected from red wolves between 1905 and 1930. All the pelts' DNA fingerprints matched those of either gray wolves or coyotes.

Jenks (now at the University of California, Berkeley) and Wayne report in the June 13 *NATURE* that their results could support either of two conclusions: that the red wolf is a true hybrid, or that it picked up the genetic similarities sometime in the distant past when its diminishing numbers caused it to mate with gray wolves or coyotes out of desperation.

Either way, Wayne contends that the red wolf should continue to be conserved. "No matter what it was—hybrid or separate species—what is being bred today in the captive colony is representative of what was in the wild," he argues. "In that sense, we ought to preserve it."

Doug Inkley, an ecologist with the National Wildlife Federation in Washington,

D.C., points out that the red wolf, as a top predator, was important in maintaining the balance of species in the ecosystems in which it lived. The Endangered Species Act specifically provides protection for such key predators, he told SCIENCE NEWS, whether or not they are genetically distinct.

But in an editorial accompanying Wayne and Jenks' paper, zoologists John L. Gittleman and Stuart L. Pimm of the University of Tennessee in Knoxville suggest the red wolf may be getting more protection than it deserves. The reintroduction program, they contend, is not likely to benefit the red wolf because the animal's genetic identity will only be obscured once again by mating with coyotes. In addition, they argue that the important ecological role once performed by red wolves is now being filled by other predators. Gittleman and Pimm question whether "the red wolf's undeniable cuddliness is enough to warrant according it special attention."

The U.S. Fish and Wildlife Service is taking a wait-and-see attitude. "We're just getting a few bits and pieces of the puzzle," says Gary Henry, coordinator of the agency's red wolf conservation program in Asheville, N.C. "There needs to be a lot more work done before we'll ever finally sort this out." — C. Ezzell

Quasar quandary upsets cosmic status quo

In explaining the evolution of the universe, cosmologists face a formidable task. Although the cosmos apparently began as a highly uniform soup of matter and energy, it somehow congealed into the lumpy collection of stars and galaxies seen today. Standard theories portray a relatively gradual transition between these two cosmological snapshots — a time when the soupy material formed into identifiable structures. New observational studies, however, suggest the lumpiness began earlier in the universe than any current theory can easily explain.

These provocative findings emerge from the detection of extremely distant quasars — massive, highly luminous powerhouses thought to lie at the center of some galaxies. Finding just a couple of these objects, as reported last month (SN: 5/4/91, p.276), might not carry enough statistical significance to challenge theoretical models of how and when the universe developed its complex structure. But last week, astronomers announced they had detected another 27 distant quasars — a discovery that may provide the most compelling reason yet for modifying our notions about cosmic

evolution after the Big Bang.

An analysis of images from the U.K. Schmidt Telescope at Epping, Australia, reveals that the most distant luminous quasars ever observed have the same density as those closer to Earth, report Richard McMahon and Michael Irwin of the University of Cambridge in England. Since viewing distant objects is essentially the same as peering back through time, this finding suggests that the universe contained about as much lumpiness when it was just 7 percent of its current age — the first billion or so years of its existence — as at later times.

"The present generation of theories can't explain this," McMahon says.

As recently as a decade ago, astronomers had found no extremely distant quasars — those with spectra shifted strongly to the red — and most didn't believe the objects existed, McMahon notes. But by using a computer scanning technique and special color criteria to analyze millions of images on photographic plates, McMahon and his collaborators found 20 quasars that rank among the most distant objects known.

All of the 20 quasars have a redshift between 4 and 5, which means they lie an estimated 10 to 12 billion light-years from Earth. McMahon and Irwin described these findings — which increase the number of known objects in this high-redshift range to about 33 — at a quasar workshop last week in Victoria, British Columbia.

Another seven quasar discoveries emerged from a project in which McMahon compared radio sources found by the Very Large Array in Socorro, N.M., with corresponding visible-light images from a sky survey conducted at Mount Palomar in California. He identified 11 radio-loud quasars with redshifts between 3 and 4. The seven new ones, he says, include the most distant radio quasar ever detected — lying more than 10 billion light-years from Earth.

McMahon says the relatively large number of high-redshift radio quasars he detected further supports the notion that the density of bright quasars doesn't diminish at far distances. At the same workshop, Maarten Schmidt of Caltech in Pasadena reported data suggesting that the density of less luminous quasars may decline beyond distances corresponding to a redshift of 3.

Theorists have yet to come to terms with "these improbable monsters," observes cosmologist Edward L. Turner of Princeton (N.J.) University. And this mother lode of distant quasars may represent just the first of many such challenges. Looming ahead, notes McMahon, are radio surveys that will search for quasars so distant and so highly redshifted that they would not appear on photographic plates. — R. Cowen

Space station gains full House reprieve

The House of Representatives last week rescued, at least temporarily, NASA's proposed Space Station Freedom. It reversed a decision by its appropriations committee to delete all but \$100 million for the orbiting platform — a move that would have effectively canceled the project (SN: 5/25/91, p.324).

A vote by the full House restored \$1.9 billion in funds for the controversial structure. But to free up the needed money, House members froze NASA's budget at 1991 levels. This could delay planned shuttle improvements and the development of new, unmanned launching rockets, and could perhaps kill some smaller programs such as the Comet Rendezvous Asteroid Flyby, a mission that would send a probe into a comet.

Rep. George E. Brown Jr. (D-Calif.), chairman of the House Science, Space and Technology Committee, called last week's House vote "satisfying, but a satisfaction that is mixed with considerable pain since we had to freeze at '91 levels."

Intensive lobbying from NASA and the administration (the President had threatened to veto the appropriations bill unless it included the space station), plus pressure from partner nations who had already spent more than \$2 billion on the project, apparently persuaded the House. Since the money

came from eliminating budget increases for NASA, representatives were not forced to make a politically difficult choice between the space station and the veterans and housing programs.

The space station's future remains uncertain. A similar battle is expected in the Senate, whose appropriations committee budgeted only \$50 million for the project. Brown predicts the Senate will save the project.

The recent showdown caught NASA, the aerospace industry and the White House by surprise. Yet it seemed inevitable in light of the budget deficit. NASA must compete for money with other independent federal agencies, such as the departments of Veteran Affairs and Housing and Urban Development, not just with other federal science agencies. This sets the stage for budget battles in the years to come.

"[NASA] is certainly no match for the veteran and housing lobbies," contends Rep. Dick Zimmer (R-N.J.), who opposes the space station.

Brown says his staff is investigating other methods of funding NASA. Some change appears necessary to ensure NASA's fiscal stability and to mollify foreign partners, who now wonder if they can trust the U.S. commitment to cooperative "big science" projects, he says. — J. Travis