

AIDS optimism high despite therapy cost

With 21 million people locked in its global grip—750,000 of them in the United States alone—HIV, the AIDS virus, shows no sign of letting go. But researchers at the 11th International Conference on AIDS in Vancouver say they can loosen that grasp—though temporarily and at great expense.

Basing their claim on new drugs, the scientists seem surprised by their success. Peter Piot, head of the United Nations' AIDS program, called the pandemic "huge, unstable, and mainly invisible" in his opening address on June 7 but then waxed enthusiastic: "Nobody can call AIDS an inevitably fatal and incurable disease anymore."

Yet such optimism prompted Eric Sawyer, cofounder of the protest group ACT UP, to retort, "We are no closer to a cure for AIDS than we were 10 years ago."

Both views contain elements of truth. Researchers can reduce the amount of HIV in the blood with drugs that short-circuit the virus' ability to replicate itself. But the drugs are complicated to use, produce serious side effects, and are so expensive that very few patients can afford them. The cost rules out not only many people in the United States, but also the vast majority of the 14 million afflicted people in sub-Saharan Africa and the 5 million in Asia.

Nevertheless, the results of numerous

studies seem to justify the hope that relief for some is on the way. Two advances outpace the others: drugs that attack protease, an enzyme critical to HIV replication, and new tests that detect HIV activity in the blood and may thus enable doctors to measure disease progression, gauge the effects of therapy, and predict survival.

So far, three protease inhibitors have been approved by the U.S. Food and Drug Administration: saquinovir (trade-named Invirase), indinovir (Crixivan), and zidovudine (AZT). Two more, nelfinavir and VX-748, also show promise. All of them work best in combination with other drugs, including AZT (zidovudine), ddC (HIVID), and 3TC (Epivir), which cripple a different viral enzyme.

Studies of the first human trials reported in Washington, D.C., in February (SN: 3/23/96, p. 184) showed that the new drugs, either singly or in combination with other drugs, could reduce HIV in the blood to undetectable amounts for 24 weeks after therapy began. Extensions of these trials reported this week show the effect may last even longer.

Roy Steigbigel of the State University of New York in Stony Brook found that indinovir reduced HIV to undetectable amounts in 70 volunteers for almost a year. Miklos Salgos of Hoffman-La Roche in Nutley, N.J., reported that saquinovir

and ddC together reduce the amount of HIV and restore the body's infection-fighting capability—as measured by a rise in the number of the white blood cells known as CD4 lymphocytes—more effectively than either drug alone. His study of almost 1,000 patients ran for nearly a year.

Scientists believe the new drug combinations may confound HIV's ability to rapidly mutate resistant strains. "Prevention of resistance is achievable by potent virus suppression," asserts Scott M. Hammer of Harvard Medical School in Boston. To survive, the virus would have to develop eight separate mutations, a feat researchers consider highly unlikely.

Hammer says HIV nevertheless remains a wily adversary. Although the new drugs may clear the virus from the blood, it may lurk elsewhere, perhaps behind the blood-brain barrier, a particularly impenetrable barricade. Nonetheless, Hammer continues, recent progress suggests that HIV can be eradicated from the body, a notion that "6 months ago would have been deemed . . . ludicrous."

Eradication of the virus will only occur, however, if patients can afford therapy and can follow a complicated drug regimen of 20 to 30 pills a day. Margaret Fischl of the University of Miami notes that treating the 2,500 patients at one hospital with three drugs and monitoring their HIV activity would cost \$22 million a year. —S. Sternberg

Warming reaps earlier spring growth

Forests and grasslands across the Northern Hemisphere are now waking from winter's slumber a full week earlier than they did just 20 years ago, according to long-term measurements of carbon dioxide in the atmosphere. These results provide the first hint that rising temperatures in recent decades have lengthened the growing season across at least half of the globe.

This perspective on plant growth comes from carbon dioxide measurements made over the last 30 years on top of Mauna Loa, Hawaii, and at Point Barrow, Alaska. Concentrations of the gas fall and rise naturally throughout the year, reflecting carbon dioxide uptake by northern plants during spring and summer and then increased release of the gas by soil microbes during winter.

While analyzing the gas records, Charles D. Keeling of the Scripps Institution of Oceanography in La Jolla, Calif., and his colleagues found that the seasonal swings in concentration have grown 20 percent larger at Mauna Loa and 40 percent larger at Point Barrow since the early 1960s. On top of that, the spring decline in carbon dioxide val-

ues has shifted. It now occurs about 7 days earlier than it did during the mid-1970s, the scientists report in the July 11 NATURE.

"The drawdown in carbon dioxide is earlier than it was before, and that's probably the key to the whole picture, because it looks like the growing season has lengthened," says Keeling.

He suggests that rising temperatures, particularly in winter and springtime, have stimulated northern plants to grow earlier and longer. The more vigorous plant growth could explain the increased swing in the seasonal carbon dioxide cycle.

"Suppose you are up in the Canadian forest in April, for example, and the sun is up, but it's cold. So plants can't leaf out, or if they're conifers, they can't start photosynthesizing yet. But suppose it warms up. The plants really benefit. They have plenty of soil moisture and get going. They get bigger and grow longer before the season ends."

In support of the temperature link, Keeling and his colleagues note that the biggest jumps in carbon dioxide's seasonal swings followed the extremely high global temperatures during

1981 and 1990.

The new results close the loop in a feedback cycle long suspected but never demonstrated. According to theory, rising concentrations of carbon dioxide from fossil fuel burning should warm the climate, which influences vegetation and microbes and eventually affects carbon dioxide concentrations. The observations by Keeling's group indicate that climate change is indeed altering Earth's carbon dioxide cycle, although the exact cause of the recent temperature increase remains uncertain.

"When you look in your backyard, it's obvious that changes in climate would affect the biosphere. What [Keeling] has done is put that in a global perspective. He's confirming everything that we have wanted to see and that we have had no evidence for," says Inez Fung, a climate researcher at the University of Victoria in British Columbia.

Others caution that the subtle changes detected by Keeling's group must be verified by other studies. "It's a provocative suggestion, but it needs reexamination," says ecologist David Schimel of the National Center for Atmospheric Research in Boulder, Colo.

—R. Monastersky