# Biomedicine

## Mixed results on AZT's survival payoff

The antiviral drug zidovudine (AZT) can prolong the lives of AIDS patients if treatment begins before AIDS symptoms emerge, according to a retrospective study of men infected with the AIDS-causing HIV virus.

But this new finding, reported in the April 16 NEW ENGLAND JOURNAL OF MEDICINE, runs counter to the results of a prospective study published earlier this year (SN: 2/15/92, p.100). The authors of the earlier study concluded that although early zidovudine treatment could delay the onset of AIDS symptoms, there was no evidence that such treatment could actually lengthen AIDS patients' lives.

In the latest study, epidemiologist Neil M.H. Graham of Johns Hopkins University in Baltimore and 34 colleagues analyzed the health records of 2,568 HIV-infected men who lived in Baltimore, Chicago, Pittsburgh, Los Angeles and Washington, D.C. The men were participants in the Multicenter AIDS Cohort Study, which began in 1984.

Graham's team found that men who received early zidovudine treatment were one-third less likely to die within two years than a second group of infected men who never took the drug or who took it only after developing AIDS symptoms. Those who took zidovudine early lived even longer if they also received the drug pentamidine to prevent pneumonia.

"Our results support the hypothesis that treatment before the development of AIDS increases an HIV-infected person's survival time," says Graham.

But John D. Hamilton, a principal author of the earlier report, contends that the new study is flawed. "Theirs is a comparison of early treatment versus essentially no treatment," he asserts. In that case, he says, "it is absolutely no surprise to show that early treatment is better."

Hamilton, an infectious-disease specialist at the Veterans Administration Medical Center in Durham, N.C., adds that even though his group's study used a smaller sample — 338 HIV-infected men — it directly compared patients receiving early treatment with those who received zidovudine only after developing AIDS symptoms. He and his colleagues remain "quite confident that early AZT does not provide a survival benefit versus late AZT," he says.

## Gene flaw found in uncommon diabetes

Between 100,000 and 500,000 people in the United States suffer from maturity-onset diabetes of the young (MODY), an uncommon form of Type II diabetes that develops before age 25. Although most people with MODY do not have to take insulin injections, they run an increased risk of heart disease, blindness and kidney failure.

Researchers at the University of Chicago and several institutions in France have now discovered a gene defect that could underlie 80 percent of MODY cases. The group, led in the United States by Graeme I. Bell, found a flaw in the gene for the enzyme glucokinase in a French family with 15 MODY patients. The scientists present their findings in the April 23 NATURE.

Bell's team asserts that the defect causes MODY patients to produce insufficient amounts of glucokinase, which they believe is required for pancreatic cells to detect sugar concentrations in the blood. Accordingly, the researchers hypothesize, the pancreas fails to secrete the proper amount of insulin.

Bell told SCIENCE NEWS his group has recently detected a defective form of the same gene in a family with conventional non-insulin-dependent diabetes, which affects roughly 13 million people in the United States. Most of these patients develop the disease as they age or if they become obese.

Richard Kahn, a physician at the American Diabetes Association, terms the finding "an important piece of work in regard to understanding the genetics of diabetes altogether."

# Technology

*Janet Raloff reports from Sandia National Laboratories in Albuquerque, N.M.*

## Robots to retire nuclear bombs

Sandia

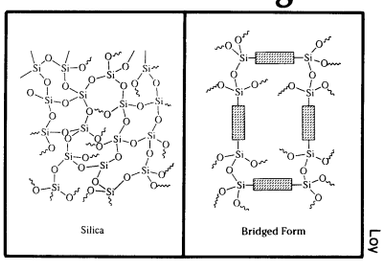
*Warhead-dissecting robot*

The U.S. government has retired a growing number of nuclear weapons since the dawn of the Atomic Age. But if Uncle Sam's emissaries conclude nuclear-arms-reduction accords with the former Soviet Union, the Department of Energy (DOE) will have to prepare for a torrent of retirees at its Pantex plant in Amarillo, Texas — the facility where most of the weapons were initially assembled. Because each weapon is taken apart by hand, stepping up the bomb-dismantling rate could dramatically increase radiation exposures for plant workers. "So there's a big push at DOE to automate the process," says Patrick J. Eicker, director of Sandia's Intelligent Systems and Robotics Center. By the end of the year, his lab plans to deliver a robot system to Pantex to give workers a hand with the "dirtiest" jobs.

Initial stages of taking a bomb apart — picking it up, placing it on a work surface and removing its outer casings — pose little risk of radiation. Workers will continue these tasks, Eicker says. But then Sandia's robot will step in. After removing a layer of high explosives that surrounds the heart of the bomb, the robot will carefully lift out an enclosed ball of plutonium or uranium and seal it inside a shielded canister.

Working with mock-ups, Eicker's group is testing the one-armed robot on each dismantling stage. Though the precise activities the robot's interchangeable, tool-bearing hands will tackle are classified, Eicker says they'll include unscrewing, ungluing, lifting apart and repackaging. Because bomb designs differ so widely, Eicker's team is designing its automaton to be very flexible — and to carry a big tool kit.

## Building microholes into metal-oxide gels




Loy

Inexpensive and easy to build, silica gels serve as the basis of many industrial absorbents, chromatographic-separation agents, bulk fillers and catalyst supports. But their amorphous metal-oxide structure is riddled with holes of various sizes (left diagram). If the holes were the same size — and very small, on the order of one-billionth of a meter across — they might usher in a new class of strong, molecular sieves.

In hopes of engineering such filters, Sandia's Douglas A. Loy and his co-workers at the University of California, Irvine, are reformulating the recipes for silica aerogels (SN: 11/17/90, p.316). They substitute small bridging structures (rectangles in right diagram) made from an organic chemical — such as acetylene (C:C) or a phenyl group ($C_6H_4$) — for some oxygen atoms. After anchoring a mat of these new silicon-based molecules together, Loy's team removes the bridges. The goal: a thin film with the structural advantages of molecular sieves — rigidity, high surface areas and thermal stability to 400° or 500° C — but with tailored, nearly uniform pores.

Acetylene bridges will wash out with an aqueous acid, Loy's team finds. For phenyls and many other organics, Loy now burns his bridges with a room-temperature plasma of atomic oxygen.