# HIV accelerates in 'closeted' homosexuals

The cloak of secrecy that some men throw around their homosexuality does not suit their physical health once they contract the human immunodeficiency virus (HIV), a new study finds. In a 9-year study of gay men infected with HIV, those who reported striving to keep their sexual orientation hidden from the public developed AIDS and died markedly sooner than those who made no or few efforts to conceal their homosexuality.

"We don't know why this difference occurred," says study director Steve W. Cole, a psychologist at the University of California, Los Angeles. "We suspect that an inhibited personality style caused some of the men both to conceal their homosexuality and to suffer decreased immune function after HIV infection."

Men who took the most drastic steps to stay "in the closet" experienced serious losses of critical immune cells and received a diagnosis of AIDS from 1.5 to 2 years sooner than men who were relatively open about their sexual orientation. A similar disparity characterized the time between diagnosis and death from AIDS for closeted versus openly gay men, Cole and his colleagues contend in the May-June PSYCHOSOMATIC MEDICINE.

The accelerated course of HIV infection in men who concealed their gay status did not result from differences in age, disease progression at the start of the study, ensuing medical treatment, sexual practices, alcohol and illicit drug use, cigarette smoking, exercise, sleep problems, anxiety, depression, or social support, Cole's group holds.

Participants consisted of 80 homosexual men contacted in the earliest stages of HIV infection and assessed every 6 months for 9 years. The volunteers, who were predominantly white and relatively affluent, identified themselves as "definitely in the closet, in the closet most of the time, half in and half out, out of the closet most of the time, or completely out of the closet."

Infection progressed most rapidly among men who said they were in the closet half of the time or more, Cole argues.

A related 9-year study of 222 HIV-negative gay men, directed by Cole and accepted for publication in HEALTH PSYCHOLOGY, finds that infectious diseases and cancers of all types occur more often as concealment intensifies.

Both sets of findings are consistent with previous investigations linking an unwillingness to disclose emotional experiences to weakened immune responses, Cole contends. Psychological inhibition, characterized by sensitivity to social rejection, may cause some men to hide their homosexuality, to develop a surplus of infectious ailments, and to suffer more severe symptoms once an infection hits, he theorizes.

The results do not suggest that men who conceal their homosexuality would improve their health by coming out of the closet, Cole cautions. An inhibited temperament is usually an ingrained facet of personality, he notes.

"Many [inhibited] men would probably experience so much stress after coming out of the closet that it would be a counterproductive strategy for them," he remarks.

Cole's team did an "admirable job" of controlling for a myriad of influences on the condition of HIV-infected men, asserts Margaret A. Chesney, a psychologist at the University of California, San Francisco. However, she adds, it is hard to know whether the men who concealed their homosexuality saw inexperienced AIDS physicians more often or failed to take necessary medications regularly, especially if coworkers might have seen them.

Those tendencies, acting in conjuction with psychological inhibition, may have hastened the advance of HIV infection, Chesney says.

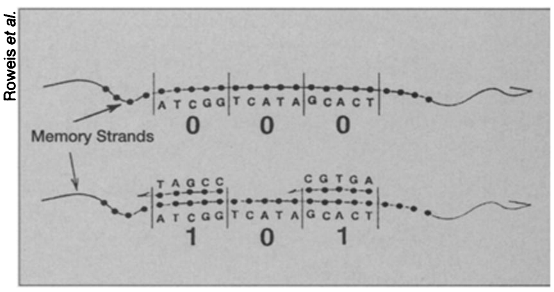
"We'll have a tough time teasing out the influence of each of those factors in controlled studies," she maintains.

*— B. Bower*

# Test-tube stickers for DNA-based computers

A vial holding a teaspoonful of DNA molecules looks tiny next to the most powerful of today's supercomputers. To some computer scientists, however, the $10^{20}$ or so strands of DNA contained in the vial represent the possibility of processing information at rates 1,000 times faster than those of any electronic computer presently available—if researchers can find a way of tapping the information-handling capability of individual DNA molecules.

Roweis *et al.*




*DNA stickers affixed to selected segments of a memory strand represent different strings of 1s and 0s.*

In 1994, computer scientist Leonard M. Adleman of the University of Southern California in Los Angeles demonstrated for the first time that standard test-tube manipulations of DNA can be used to solve a genuine, though simple, mathematical problem (SN: 11/12/94, p. 308). His method involved joining small DNA segments together to create longer molecules that represented possible solutions of his problem, then filtering out the one type of strand giving the correct answer.

Now, Adleman and his collaborators have developed, in theory, an alternative method of DNA-based computation. Unlike previously proposed methods, their so-called sticker model offers a way of storing and manipulating data, encoded as strings of 0s and 1s, using DNA molecules of fixed length and identity.

"It's a new model of computation—a new way of representing information using DNA," says graduate student Sam T. Roweis of the California Institute of Technology in Pasadena. Roweis described the sticker model of computation at a meeting on DNA-based computers, held last week at Princeton University.

A DNA molecule consists of two intertwined chains, each one a sequence of four simpler molecules, or bases, known as adenine, thymine, guanine, and cytosine. The four bases, designated by the letters A, T, G, and C, constitute complementary pairs: A sticks to T, and G sticks to C. These pairings hold two chains of bases together, creating the characteristic double helix of DNA.

As the basis of their proposed molecular computer, Roweis and his coworkers use two different types of single-stranded DNA. Memory strands consist of long sequences of bases subdivided into segments of a standard length that represent individual memory units. Sticker strands are shorter—the same length as the memory units—and each sticker consists of a sequence of bases complementary to that of one of the memory regions.

When a sticker is "glued" to its complementary memory segment, the bit corresponding to that segment is on, representing 1. The absence of a sticker means that the corresponding bit is off, representing 0. A memory strand together with its stickers therefore represents a unique string of 1s and 0s. This is known as a bit string.

To solve mathematical problems, the researchers defined four different ways of manipulating these DNA bit strings, based on biochemical processes feasible in the laboratory. One fundamental operation combines two sets of bit strings. Another separates a combined set into its component sets. A third operation turns on a particular bit in a string, and a fourth turns off a certain bit.

Appropriately combined, these operations can solve a variety of mathematical problems, Roweis says. However, he admits, "we've not actually got any of this to work in the lab yet." *— I. Peterson*