

Emotion-Immunity Link in HIV Infection

Some of the same psychological factors associated with better survival among cancer patients are linked to stronger immune responses among homosexual men in the early stages of infection with the AIDS-causing virus (HIV), according to scientists at the American Psychological Association's annual meeting in Atlanta last week.

Preliminary data indicate that anger and a sense of vigor are associated with better immune function among these men, says psychologist Nancy T. Blaney of the University of Miami School of Medicine. Immunity is also stronger among those who openly vent their emotions and engage in denial concerning their condition.

Denial, as measured in the study, taps the quality of "getting on with life" despite having severe problems, notes Blaney. The more traditional notion of denial focuses on the repression of anxiety-provoking thoughts and feelings.

Studies of cancer patients suggest the best way to cope and survive is to maintain a "fighting spirit," says psychologist Gail Ironson of Stanford University Medical School. Denial of the type measured in the Miami study also predicts longer survival among cancer patients, she adds, although denial is often thought of as a maladaptive response to stress.

"These new findings suggest we need to reexamine the role of denial in illness and specify when it is helpful or harmful," says Ironson.

Blaney and her colleagues studied 49 homosexual men whose HIV infection was newly diagnosed. The men are part of a larger, five-year prospective investigation of 100 HIV-positive patients.

Both the activity of natural killer cells and the response of white blood cells to chemical stimulation were lower among subjects who reported more depression, anxiety and loneliness, says Blaney. Among men reporting more vigor, anger, venting of emotions and denial, the same measures increased and levels of immunoglobulins — which often are abnormally high in HIV infection — were lower.

While emotional states and coping strategies may predict immune function changes in the early stages of AIDS, the findings are still preliminary, cautions Blaney. As researchers collect more data from a larger sample over the next several years, the implications of the study will become clearer.

Unfortunately, a study conducted by researchers at the University of California, San Francisco, shows no evidence of increased immune function among HIV-infected men given stress management training and group support. However,

those who received this training significantly reduced their number of sexual partners.

"Clinically, the results are disappointing," says psychologist and study director Thomas J. Coates. "But from a public health viewpoint — that these men are practicing safer sex — we consider these results important."

Coates and his co-workers randomly assigned half of a group of 64 homosexual men infected with HIV to stress management training. HIV-positive diagnoses had been made within the previous year. Men in the experimental group attended eight two-hour weekly sessions and an all-day retreat to learn relaxation techniques (such as yoga and meditation), good health habits (including nutrition and exercise) and how to manage stress.

After the program, the researchers found little change in the number of T-helper cells or in the ratio of T-helper cells to T-suppressor cells, indicating no improvement in immune function. Comparable immune function was measured in the men who had not attended the stress reduction program.

But men who attended the sessions decreased their average number of sexual partners from 1.37 at the start of the program to 0.50 at the conclusion. Those who did not attend the sessions increased their average number of sexual partners from 1.09 to 2.29 during the same period.

The reasons for the drastic change in sexual behavior among men in the stress management program deserve close attention, says Ironson. "Stress management techniques may substitute for frequent sex as a way of reducing stress among these men," she suggests.

A promising approach to shoring up immunity and decreasing depression and anxiety in newly diagnosed cases of HIV infection is aerobic exercise, says psychologist Mary Ann Fletcher of the University of Miami. A preliminary study shows that newly diagnosed HIV-positive men who participate in a 10-week exercise group display moderate increases in immune measures — comparable, Fletcher says, to those observed in some studies of the AIDS drug zidovudine (AZT).
— B. Bower

Enzyme eats self and lives to tell tale

A few years ago, researchers found an exception to a long-held scientific rule. They discovered RNA molecules that act as enzymes, a task previously attributed only to proteins. Also surprising was what the RNA enzymes cut: themselves.

Now, a report in the Aug. 18 *NATURE* describes how to design, build and test RNA enzymes, or ribozymes, targeted against particular sites on RNA strands. The technique points to promising ways of manipulating RNA for genetic engineering and gene therapy, knowledge that is especially useful because scientists are only beginning to construct or modify protein enzymes, with their more complex structures.

In order to study the basic features of a ribozyme, Jim Haseloff and Wayne Gerlach of the CSIRO Division of Plant Industry in Canberra, Australia, examined RNA of tobacco ringspot virus, which George Bruening of the University of California, Davis, had previously identified as a self-cleaver. Using genetic methods, they separated the RNA into cleaver and cleavee. Previous work had shown that a ribozyme contains a horseshoe loop with two arms extending from the loop's open bottom end, and that the strand of RNA to be cleaved is straight and straddles the ribozyme.

With this rough structure in mind, the scientists examined their RNA fragments and came up with three requirements for cleavage of RNA by RNA.

First, the ribozyme's bottom end and three nucleotide bases — the building blocks of RNA — next to the cleavage site on the straight strand brush each other during cleavage. Second, the cutting end of the loop is the same in all ribozymes, but the end of the loop away from the cleavage site varies. Finally, the looped and straight sections both have long, flanking arms that bind together tightly during cleavage.

The scientists tested their model by building three ribozymes targeted at three sites on a strand of messenger RNA, an intermediary in the process of making protein from DNA. The model held true: Synthetic ribozymes worked as well as natural ones.

Haseloff and Gerlach say scientists may be able to use ribozymes to identify where gene transcripts lie on large fragments of RNA, and possibly even to fight disease. Ribozymes could act as "anti-genes," they explain, cleaving messenger RNA and thereby destroying the expression of unwanted genes. Says Bruening, "There are not many problems to be worked out before using this system for gene therapy." — M. Hendricks