Eye, Skin Disorders May Mean HIV Infection

Certain eye lesions or skin conditions may be early physical signs that people are infected with the human immunodeficiency virus (HIV), according to reports released this week.

Although these indicators have been associated with fully developed AIDS for several years, the new reports are the first large-scale studies associating them with early stages of HIV infection, which eventually can lead to AIDS. The findings will help increase physician awareness, leading to earlier diagnosis and treatment, researchers say.

"This is just the tip of the iceberg. We've just begun to understand how HIV affects the nervous system, for example," says Alfred Saah, an associate professor of epidemiology at the Johns Hopkins School of Hygiene and Public Health in Baltimore.

In a study presented at the American Academy of Ophthalmology's meeting in Dallas, five patients with retinal disease, but who otherwise appeared healthy, were diagnosed with HIV infection, says William R. Freeman, an assistant professor of ophthalmology at the University of California at San Diego, who led the study.

Of those five, two had cytomegalovirus (CMV) retinitis, or inflammation of the retina, two had a bacterial infection of the retina and one had "cotton wool spots," which are small white areas of retinal thickening.

Freeman also studied 13 patients with ARC, or AIDS-related complex, which can develop into AIDS and which typically is characterized by fatigue, weight loss and swollen glands. He found that nine had CMV retinitis and four had cotton wool spots. Previously, researchers had thought that eye lesions, which are associated with about 75 percent of AIDS cases, developed only later in the disease. In fact, CMV retinitis is considered one of the various opportunistic infections defining the onset of fully developed AIDS.

This characterization may lead ophthalmologists to misdiagnose CMV retinitis in patients who seem otherwise healthy. They then may prescribe medication, such as steroids, and find that the infection only worsens. Meanwhile, the diagnosis of possible HIV infection may have been missed, Freeman told SCIENCE NEWS.

Freeman mentions another possible scenario: "If someone with weight loss or fatigue comes to a physician's office, the physician should check the eye for any lesions," Freeman says. Before considering the possibility of HIV infection, however, the physician should rule out diabetes, hypertension and other ailments that can cause eye lesions.

A similar process of elimination should be used by physicians dealing with certain skin disorders that may indicate HIV infection, says Sirkka-Liisa Valle, a dermatology researcher at Aurora Hospital in Helsinki, Finland. In a study involving 237 homosexual or bisexual men, to appear in the December JOURNAL OF THE AMERICAN ACADEMY OF DERMATOLOGY, Valle showed that three skin disorders were found in the 11 subjects with asymptomatic HIV infection and in the three subjects with ARC: an overgrowth of *Candida* yeast in the mouth, scaling of the face, scalp and skin, and drying of the skin. The severity depended upon the HIV infection's stage.

Says Marcus Conant, chairman of the California State Department of Health Task Force on AIDS and clinical professor of dermatology at the University of California Medical School at San Francisco: "We need to let dermatologists know that AIDS is spreading outside the high-risk groups and these disorders should make physicians think twice." — *S. Eisenberg*

New assay identifies southpaw DNA

Researchers have developed the first test capable of spotting oddly twisted, "left-handed" segments of DNA inside living cells. The technique may help settle some long-standing questions about the prevalence of such DNA in living cells and the roles it may play in triggering disease.

Robert D. Wells and his colleagues at the University of Alabama at Birmingham developed the assay to identify segments of genetic material that sport a backwards twist. Their research, which appears in the Nov. 6 SCIENCE, may provide new insights into the molecular basis of such genetically influenced ailments as heart disease and cancer.

The new assay comes 34 years after James Watson and Francis Crick discovered the molecular structure of DNA. Since then, the double-stranded helix has become a sort of international logo, recognized by scientists and lay people alike as the three-dimensional blueprint of everything genetic.

Despite the apparent consensus regarding DNA's structure, however, some scientists have for years argued that some DNA has a left-handed rather than the classical right-handed twist (SN: 6/9/84, p.362). In fact, researchers have observed left-handed DNA in the test tube, thus verifying that such a conformation is possible. But no method existed to test for it in a living cell.

"There have been several thousand papers in the last eight years about test tube evidence of Z-DNA," a particular variety of left-handed DNA, Wells says. However, he adds, it was important to see if it existed in living cells, because DNA that is twisted in reverse is "likely to be highly mutagenic."

In particular, the regions where left-handed and right-handed twists conjoin may be "hot spots" for mutation, since DNA's twin strands might tend to unravel a bit in order to accommodate the change of direction. "That junction is a really weird structure," Wells says.

In developing the assay, Wells relied upon previous test tube research that had shown how difficult it is to add a methyl group to left-handed segments of DNA. And without the addition of such a methyl group, he knew, certain enzymes would be unable to cleave the DNA into subunits.

With these rules in mind, the researchers incorporated into bacterial cells a variety of DNA sequences—some that had a known tendency to be left-handed, others that were right-handed. Later, they attempted to methylate, then cleave, the DNA in the cells, and looked for evidence of DNA subunits. A lack of subunits indicated that methylation-dependent cleavage had not occurred, demonstrating the presence of left-handed DNA.

The test, says Wells, is the first one to detect anything other than "the garden variety" of DNA in a living cell. "The next big thing will be to understand its function. Nobody thinks these unusual structures are inert in the cell."

It is likely, he says, that such unusual DNA conformations may impair transcription of the genetic code. Replication, recombination and cell repair may also be affected, and studies may someday show correlations between such unusual DNA structures and susceptibility to certain hereditary diseases.

Moreover, exposure to DNA-damaging forces, such as radiation, may either induce or exacerbate conformational changes that could then be inherited by offspring, he says. He notes that aflatoxin, a potent toxin found in some moldy foods, has been shown to prevent left-handed DNA from reverting to a right-handed form. — *R. Weiss*