Biomedicine

Blood screens may need a finer mesh

Current screening methods for donated blood in the United States may miss fragments of a virus that is linked to a form of leukemia, new research shows.

Blood from donors is routinely screened for antibodies that signal the presence of human T cell lymphotropic virus (HTLV), which can cause T cell leukemia. Researchers at New York University Medical Center have now found, however, that some people who do not have such antibodies may nevertheless harbor fragments of HTLV.

The team tested blood samples from 81 former intravenous drug users who were HIV-negative. Drug users have high HTLV infection rates, so the researchers figured they would need relatively few blood samples to compare techniques. Routine tests used to screen donated blood revealed that 18 of the volunteers had antibodies to HTLV. Specialized tests that are sensitive to the presence of the virus itself showed that 39 had partial sequences of HTLV DNA. In all, 42 volunteers tested positive for HTLV in one or both analyses.

Thus, HTLV may be more widespread than currently believed, report Dorothea Zucker-Franklin and her colleagues in the June 10 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES. Although rates of infection would be much lower in the general population than they are among former drug users, the research raises troubling questions, she says.

Scientists don't know whether just having these fragments in the blood can lead to infection by HTLV, Zucker-Franklin says. The researchers became curious about these viral fragments after finding them in people who have mycosis fungoides—a rare skin cancer resulting from a T cell lymphoma. In this disease, malignant cells apparently reach the skin by circulating in the blood. Standard blood tests show that people with mycosis fungoides usually do not carry antibodies to HTLV.

The researchers wondered whether healthy people without the cancer might also carry viral fragments that could slip through the screen. They tested the blood of healthy individuals who were related to people with mycosis fungoides, using both routine and specialized screenings. Standard blood screening found no HTLV antibodies in the group, but in further testing six of the eight relatives tested positive for HTLV fragments. Apparently, people can carry fragments of the virus without developing mycosis fungoides or leukemia, says Zucker-Franklin.

The Food and Drug Administration is now considering whether to require tests for both HTLV fragments and antibodies. —*N.S.*

Inhaled steroids linked to cataracts

There's troubling news for the 14 million asthmatics in the United States. An Australian study of 370 older people who have used corticosteroid inhalers, the standard inhaler to ward off asthma attacks, finds that these patients have a significantly heightened risk of developing cataracts, opaque spots in the eye.

Past studies have linked the appearance of cataracts to use of oral steroids, but research on inhalers has been less clear. In a 1995 study, none of 96 children who had used inhalers for an average of 5 years had cataracts. A 1996 study of young people found no link between use of inhalers and posterior subcapsular cataracts, the most common type needing surgery.

The Australian study reaches a different conclusion. It shows that these serious cataracts are three times more prevalent in people age 49 to 97 who use inhalers than in nonusers. People who use inhalers are also more likely to develop the less serious, but more common, nuclear cataracts, which cloud the central part of the lens, Robert Cumming of the University of Sydney and his colleagues report in the July 3 NEW ENGLAND JOURNAL OF MEDICINE. The biology underpinning how corticosteroids cause cataracts remains unclear. —*N.S.*

Earth Science

The San Andreas' secret helpers

Residents of the East Coast and Midwest who view Los Angeles as a foreign land can find geologic support for their bias. The westernmost section of California is attached to the Pacific Ocean floor and moves in a completely different direction from the rest of North America. For 30 years, researchers have puzzled over what happens at the border, where the Pacific territory scrapes against North America.

Now, a team of geologists has an answer.

From the earliest days of plate tectonic theory, geophysicists have realized that the famous San Andreas fault forms the junction between the Pacific tectonic plate and the North American plate. The two great blocks slide by each other like passing trains, carrying the Los Angeles side of the fault northwest, while the North American side moves southeast. Since the birth of the San Andreas fault 16 million years ago, the two sides have shifted 315 kilometers.

Although that may seem a substantial journey, it's too short for geologists. Over that same 16 million years, the Pacific plate as a whole has moved 737 km relative to North America. How can the two plates have shifted more than twice as far as the two sides of the San Andreas fault? Geologists have proposed several mechanisms, but none has explained the entire discrepancy.

Until now. In the July GEOLOGY, William R. Dickinson of the University of Arizona in Tucson and Brian P. Wernicke of the California Institute of Technology in Pasadena show that a broad swath of North America has warped enough to account for the missing motion between the two plates.

Part of the answer lies in California's east-west mountain ranges, such as the Santa Monica and Santa Ynez Mountains. Over the past 16 million years, these ranges have rotated their orientation from almost north-south to east-west, serving as giant gears between the Pacific plate and North America.

The other half of the missing plate motion has disappeared in the Basin and Range geologic province east of the San Andreas, the geologists say. Faults there helped shift all of California northwest relative to the rest of North America.

The rotating mountains, the extending Basin and Range, and the observed San Andreas motion together explain the entire motion between the Pacific and North American plates. "There has always been some uncertainty as to whether the plate tectonic paradigm would explain what is going on. We're pleased to see it all shake out," says Dickinson. —*R.M.*

Volcano dumps ash on Mexico City

A restless Mexican volcano roared to life early this month with its largest eruption in more than 50 years, sending ash raining down on the 22 million people living in and around Mexico City. A layer of gritty debris coated the capital area and forced the temporary shutdown of the international airport there.

"It was a small amount of ashfall, but many people were very surprised because they had never seen it before," says Servando de la Cruz-Reyna, a volcanologist at the National Center for Disaster Prevention in Mexico City.

The volcano, called Popocatépetl, or El Popo for short, sits 60 kilometers southeast of the Mexican capital. Since 1994, the 5,465-meter-tall mountain has produced a series of small eruptions, none of which has caused serious damage.

A major eruption would threaten 100,000 people living within roughly 10 km of the volcano. To forecast such an event, scientists are monitoring El Popo 24 hours a day with 11 automatic seismic stations and three tiltmeters. Crews regularly measure the mountain's deformation, the chemistry of ash and water, and the gases billowing from the top. Their instruments gave hints of the recent minor eruption several days in advance, says de la Cruz-Reyna. —*R.M.*