two separate immune system proteins, presumably because pieces of the proteins' respective genes have fused.

The scientists use the polymerase chain reaction—a means of detecting tiny amounts of a specific piece of DNA—to determine when these two gene fragments link up. The test requires only a few drops of blood—whatever oozes from a typical finger-stick test, Kirsch says.

Such rearrangements should occur rarely between genes: in one in 5,000 to one in 50,000 cells, Kirsch says. But people with A-T have 100 times the number of these mix-ups, he reported in mid-May in Orlando, Fla., at the American Association for Cancer Research meeting. These people also run about 100 times the risk of developing cancer.

Kirsch and Vincent Garry of the University of Minnesota in Minneapolis have also tested a dozen midwestern farmers from regions with unusually high rates of leukemia and lymphoma. On average, the farmers had about four times the normal number of mix-ups in this DNA, they found. Furthermore, the farmers who bought and used the most pesticides also had the greatest genomic instability, says Kirsch. That instability increased in summer and declined in winter.

"If this [study] is confirmed, then [this test] seems to be detecting not just a genetic predisposition to genomic instability but a predisposition that is environmentally produced," Kirsch says.

Yet this predisposition does not necessarily lead to cancer. Tumors result when cells also lose their ability to repair DNA damage before they make more copies of their chromosomes or pass that genetic material on to daughter cells. At the Orlando meeting, researchers described how the tumor-suppressor gene p53 becomes active when DNA is damaged. This gene codes for a protein that keeps cells from making new DNA until the genes are repaired. With no p53 gene, cells keep dividing, so the mutated genes multiply rapidly, says Thea D. Tlsty of the University of North Carolina at Chapel Hill.

As a cell makes copies of faulty DNA, it creates more faults, which themselves cause more mix-ups to occur, accelerating the mutation rate, notes Meyn. Such mutations might lead to uncontrolled, malignant cell growth.

Tlsty has examined gene amplification, in which cells make multiple copies of a particular gene, and has observed that this process occurs in about one in a billion healthy cells but in as many as one in 100 tumor cells. Other evidence suggests that the p53 gene plays a role in suppressing amplification in healthy cells and that many types of cells start amplifying their genes in the absence of p53 genes, Tlsty says. *—E. Pennisi*

## Insect nest predates dinos


Dubiel, Hasiotis

*While hunting for traces of extinct freshwater crayfish in Arizona's Petrified National Forest, researchers found this fossilized insect burrow in 200-million-year-old sedimentary deposits. The finding pushes back by more than 100 million years the emergence of social behavior in insects, they say.*

*The preserved nest, excavated in sandstone by termites, is about 3 inches wide and 4 inches deep and contains a number of tiered chambers connected by spiral ramps, notes co-discoverer Russell F. Dubiel of the U.S. Geological Survey in Denver. Most significantly, says Dubiel, "the construction of the nest tells you about the behavior of the organism." Although the termites were not preserved along with their handiwork, the nest shows that the creatures lived a communal existence.*

*Termites, wasps, ants, and some bees work together for the survival of the group. Termites make the most complex nests of all social insects. Until now, the earliest such nests dated back 65 to 70 million years, near the end of the dinosaurs' reign.*

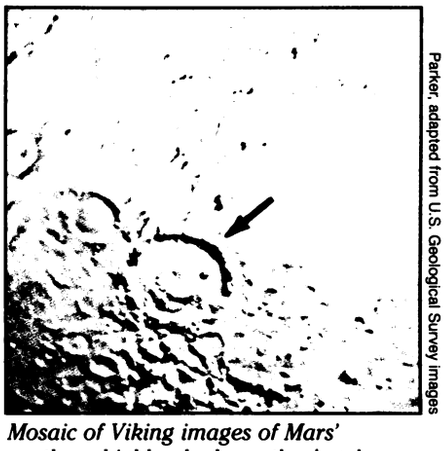
*Dubiel and Stephen Hasiotis, a doctoral student at the University of Colorado at Boulder, presented their findings to colleagues at a May 19-21 regional meeting of the Geological Society of America in Reno, Nev.*

# Martian highlands: Clues to a watery past?

For years, astronomers studying Mars have all but ignored the planet's southern highlands. This heavily cratered region, resembling the moon, lacks the allure of volcanoes and other geologic scars that mark the planet's northern face. But in reexamining images of a giant impact basin—a gaping 2-kilometer-deep hole—in the southern highlands, two researchers say they have found new evidence that liquid water once flowed on Mars.

Their study of images made by the Viking spacecraft more than a decade ago reveals that Argyle Planitia, the second-largest impact basin in the highlands, contains layers of material that could be sediment from a huge body of water held by the basin millions of years ago. In addition, three networks of channels appear to lead into the basin from the south. Other channels slope northward out of the basin, which has a diameter of some 1,200 kilometers.

Timothy J. Parker and Donn S. Gorsline of the University of Southern California in Los Angeles conjecture that Mars' atmospheric pressure was once high enough and the planet's southern polar ice cap once large enough to allow water to form and flow into Argyle Planitia. This would have created an icy lake in the basin, they suggest. Eventually, the water would have spilled over the side of Argyle Planitia, carving channels that would carry water



Parker, adapted from U.S. Geological Survey images

*Mosaic of Viking images of Mars' southern highlands shows the Argyle Planitia impact basin (arrow). Researchers speculate that this basin may once have held a huge body of water.*

northward.

"The [channels] are the smoking gun—or squirting gun—to support the contention that there had been standing water in the basin," says Parker, who reported the work last week at a meeting of the American Geophysical Union in Baltimore. He notes that the study supports the oft-debated idea that Mars once had lakes or planet-wide seas. But Parker adds that previous evidence for a watery Mars has come primarily from studies of the planet's northern hemisphere.

Even if current speculation about Argyle Planitia does hold water, Parker says, it's unclear whether the basin contained a windy lake or a still, ice-covered reservoir. He notes that the basin may be a prime site to look for organic material—the possible precursor of primitive life—on the Red Planet.

The Mars Observer spacecraft, which will begin studying the planet in November, could shed further light on the history of the basin, Parker notes. A Russian craft, Mars 94, set for launch next year and scheduled to arrive at Mars in 1995, may also have a chance to photograph the basin. *—R. Cowen*