cell and bring about the cell's cancerous transformation. To determine whether AIDS patients showed signs of infection by HTLV the Gallo group looked for viral DNA in the patients' T cells.

They detected the viral DNA in the cells of two of 33 patients, but did not find it in T cells from any of 25 healthy homosexual males. They were able to isolate infectious HTLV particles from the T cells of one of the two individuals who were positive for viral DNA and also from two additional patients. This is from a total of about 20 patients whose T cells were used in attempts to isolate HTLV. In addition, a French group, under the direction of Luc Montagnier of the Pasteur Institute in Paris, has isolated a related virus from the T cells of a homosexual male with lymphadenopathy, a condition that may be a mild form of AIDS or a forerunner of the full-blown disease.

There is more than one type of HTLV. About 35 isolates of the virus have been made throughout the world. Roughly 25 of these have been characterized and most are of the type designated HTLV-I, which was originally isolated by the Gallo group. A second type of the virus, which is designated HTLV-II, has been isolated from the cells of a patient with hairy cell leukemia.

The NCI workers have characterized one of their three HTLV isolates from AIDS patients and it is HTLV-I. The virus isolated by the French group is neither HTLV-I nor -II, but represents a third variant of the virus. Although the members of the HTLV family are distinguished on the basis of structural variations in one of the internal proteins of the viral particle, they have other features in common, including their preference for infecting T cells and the rather unusual properties of their enzyme for copying RNA into DNA.

Gallo suggests that logistical problems might explain why viral DNA could be detected in the cells of so few AIDS patients. "If infection leads to a decline in the population of infected cells, you may not be able to find them by the time you get frank disease," he explains. In fact, the NCI workers could not detect integrated viral DNA in T cells from blood samples taken at a later date from the two patients who had earlier given positive results. The same problem might affect attempts to isolate the virus itself. Lymphocytes from the spleen or lymph nodes might be a better source of virus than the peripheral blood cells used for the NCI studies. The French workers isolated their virus from lymph node cells.

Early Climate Data Questioned

Some geochemists are questioning whether paleoceanographers have convincingly verified the fidelity of their climate record for the time between the demise of the dinosaurs 65 million years ago and the first appearance of a major ice cap on Antarctica about 15 million years ago. The oxygen isotope composition of marine microfossils, especially the calcium carbonate shells of the amoeba-like Foraminifera, has been used for 25 years to estimate ancient seawater temperatures and the amount of glacial ice in the world. There have been complications, but nevertheless most paleoceanographers concluded that surface waters have cooled during the past 65 million years, mainly near the poles, and bottom waters have gradually if somewhat jerkily cooled to present near-freezing temperatures.

John Killingley, a geochemist at Scripps Institution of Oceanography, has recently questioned how much of these isotopically determined temperature trends is due to climate change and how much could have been caused by chemical alteration of the sediment during its burial beneath the sea floor. Even before carbonate sediments turn into limestone under the pressure and heat of burial, forams can gradually dissolve and recrystallize, exchanging oxygen isotopes with the pore water in the sediment as they do.

Killingley simulated this recrystallization process in a mathematical model, his critical assumption being that recrystallization would be 80 percent complete after 60 million years. He took this figure from a recent study of sediment alteration by Paul Baker of Duke University, Joris Gieskes of Scripps, and Harry Elderfield of Leeds University. The model duplicated the direction of observed isotopic trends, which was no surprise, but the assumed 80 percent recrystallization also produced the same size isotopic shifts as observed or ones of similar size. "I don't believe it explains all of the observed trends," says Killingley, "but the model is so similar, we have to be careful. It's a warning flag."

Paleoceanographers generally believe that the warning is unnecessary. Visual inspection of forams and the consistent results obtained from sediments of the same age buried at varying depths has reassured them that they have avoided recrystallization extensive enough to affect their results significantly. In addition, recrystallization should also produce similar trends in the carbon isotopic composition of forams, says Samuel Savin of Case Western Reserve University, but no such trend has been found. While paleoceanographers have been careful to choose the best preserved forams, others argue, geochemists have studied bulk sediment properties.

Baker, for one, sees potential problems with all of these checks on the extent of recrystallization. Intersite comparisons could be flawed if recrystallization is more dependent on time than temperature, a question not yet fully resolved, he says. The carbon isotopes could be misleading, he adds, because unlike the case of oxygen, most of the carbon in sediment is in the carbonate and little is in the pore water. And at the one spot, Deep-Sea Drilling site 289 in the equatorial Pacific, where geochemists analyzed selected forams they found more alteration than had been assumed.

Paleoceanographers had selected the site 289 sediment core to study changes in glacial ice during the past 20 million years, in part because of its well-preserved forams. Comparing strontium isotope ratios of carbonate, pore water, and ancient seawater, Elderfield, Gieskes, and their colleagues concluded that alteration was minimal in 15-million-year-old sediments, but 20-million-year-old sediments were about 60 percent recrystallized. Savin responds that new, more accurate strontium isotope values for ancient seawater render the geochemists' arguments inconclusive.

A resolution of these differences may be in the offing. Some paleoceanographers want to take a serious geochemical look at sediments older than 60 million years, and some geochemists are now applying their techniques to the same samples being studied by paleoceanographers.—**Richard A. Kerr**

Additional Readings

1. P. A. Baker, J. M. Gieskes, H. Elderfield, *J. Sediment. Petrol.* **52**, 71 (1982).
2. J. S. Killingley, *Nature (London)* **301**, 594 (1983).
3. H. Elderfield *et al.*, *Geochim. Cosmochim. Acta* **46**, 2259 (1982).