HIV also kills developing white blood cells

It's bad enough that the AIDS virus attacks mature white blood cells, rendering them useless for the body's defenses. But now two research teams have discovered that HIV also destroys young immune-system cells before they have a chance to develop. Their reports in the June 24 NATURE support the notion that HIV does its dirtiest work in lymphoid tissues (SN: 3/27/93, p.196).

White blood cells called T cells mature and proliferate in the thymus, a small organ that sorts through these cells, destroying those that might attack the body's own tissues. To study whether HIV can infiltrate this T-cell nursery, the two groups implanted human fetal liver and thymus tissue into mice that lack the ability to mount any sort of immune response. In these SCID-hu mice, so called because of their severe combined immunodeficiency defect and their human tissue, the liver makes precursor cells that move to the thymus and develop much as they do in a person.

At the University of California, Los Angeles, School of Medicine, Grace M. Aldrovandi and her colleagues treated a dozen SCID-hu mice with either no virus, inactivated virus, HIV from children with AIDS, or HIV cultured in the laboratory. Seventeen days later, they analyzed the T cells in each thymus implant by staining and sorting through these cells.

In mice that got no active virus, 80 percent of the stained T cells showed both CD4 and CD8 receptors – indicating immature cells – while most of the rest of the cells took up only the CD4 stain. Mice with HIV from children had lost most of the doubly stained cells as well as most of the CD4 cells, the typical HIV targets, the UCLA group reports.

Next, the UCLA researchers injected a much lower dose of different viral strains into additional mice. The T cells disappeared more slowly, and it seems the immature cells were destroyed first, followed by CD4 cells, says Jerome A. Zack, who heads the UCLA group.

Analyses of viral genetic material in these different cell types revealed that the immature cells tended to harbor five to 10 times as much virus per cell as other cells, says Zack. Immature cells divide rapidly, thus providing a way for the virus to replicate rapidly, he adds.

Also, an infected thymus looks different from an uninfected organ, which contains clearly defined rim and core regions. Because so many cells had died in the infected tissue, the researchers had trouble distinguishing the two regions under a microscope, they note.

At SyStemix, Inc., in Palo Alto, Calif., Mark L. Bonyhadl and colleagues also observed that HIV infection spread through the thymus, wiping out most CD4 and immature cells within five weeks. Electron and light microscopy revealed that many cells seemed to undergo programmed cell death (SN: 11/21/92, p.344). HIV may subvert this normal process in the thymus by triggering destruction in cells that otherwise would have been spared, says immunologist Joseph M. McCune of SyStemix.

Both research teams caution that they do not know how well these results translate to AIDS in humans, but they expect the SCID-hu mouse will prove useful for studying HIV in living organisms and may help scientists understand how HIV harms the immune system. *– E. Pennisi*

Sleep-disorders quiz awakens interest

An easily learned interview technique may enable mental health clinicians and researchers to diagnose sleep disorders more accurately and to distinguish primary sleep problems from those brought on by other psychiatric conditions, according to a study in the June AMERICAN JOURNAL OF PSYCHIATRY.

A research team at Albert-Ludwigs University in Freiberg, Germany, developed the interview approach for sleep disorders based on the latest *Diagnostic and Statistical Manual of Mental Disorders* (DSM), published by the American Psychiatric Association. Clinicians currently lack a standard interview method for identifying sleep disorders.

"Development of a structured interview for sleep disorders fills a critical gap in our field," write psychiatrist Charles F. Reynolds III of the University of Pittsburgh School of Medicine and his colleagues in an accompanying editorial. "It is *potentially* a useful clinical instrument for the office-based screening of patients with sleep disorders, as well as for sleep research."

Much controversy surrounds the definition of sleep disorders. The DSM divides these conditions into two general categories: disturbances in the amount, quality, or timing of sleep, such as insomnia; and abnormal events that occur during sleep, such as repeated nightmares or sleepwalking. Many sleep-disorders specialists criticize DSM for ignoring physical ailments linked to sleep problems, and some prefer an alternative classification system that lists nearly 70 sleep disorders.

The German researchers, headed by psychologist Elisabeth Schramm, devised a 20- to 30-minute interview with questions covering physical health, drug use, mental health, and signs of sleep disorders adapted from DSM. Interviewers then fill out a symptom summary sheet.

A total of 68 people attending one of three sleep-disorders clinics participated in the study. Twelve clinicians, 10 of whom specialize in sleep disorders, conducted the interviews. Volunteers were interviewed twice over a four-day period, each time by a different clinician.

Clinicians almost always agreed on diagnoses of sleep disorders, as well as on which participants suffered from sleep difficulties related to mental disorders such as depression.

For 27 of 30 volunteers attending one clinic, the researchers confirmed diagnoses of sleep disorders with overnight observations in a sleep laboratory and physiological measures – including brain waves, respiration, and leg movements – obtained during sleep.

The German study contains several limitations, Reynolds and his coworkers assert. For instance, the ability of clinicians who do not specialize in sleep disorders to use the new interview successfully remains uncertain.

Moreover, the failure to gather physiological data on all participants raises the possibility that some were misdiagnosed and may have had an underlying, unrecognized problem, such as sleep apnea or leg twitching, the Pittsburgh scientists argue. *– B. Bower*

Clinton backs scaled-down space station

President Clinton last week endorsed a scaled-down, simplified version of Space Station Freedom. The proposed station will combine two of the cost-cutting alternative designs that NASA unveiled on June 8 after a three-month effort (SN: 6/19/93, p.389).

The President ruled out a third option, whose design differed most radically from the original Freedom.

In the next 90 days, NASA and its foreign partners in the space station program will determine the orbiting laboratory's final configuration. They will also decide whether NASA should park the station in a higher-inclination, "international" orbit to make it more accessible to other spacefaring nations, most notably Russia, according to administration officials.

At the same time, NASA will redesign itself: Clinton has directed the agency to implement internal cost-cutting measures, including a 30 percent reduction in the space station workforce. These cuts will affect NASA employees as well as private contractors involved in the space station program.

When completely assembled – sometime around the turn of the century – the