existed. (A smaller number of unidentified civilian researchers and support personnel also took part in these tests.) Smoky, a 44-kiloton bomb, was detonated Aug. 31, 1957, atop a 210-meter tower near the Smoky foothills of Nevada. The 3,224 persons included in the CDC study have all been confirmed by Defense Department or Energy Department documents as having participated in Smoky exercises.

Comparing the general age- and sex-specific U.S. incidence rates for the four types of observed leukemias (acute myelocytic, chronic myelocytic, hairy-cell and acute lymphocytic) with the ages of identified Smoky participants, the CDC team predicted that only three individuals should have developed the cancer. In fact, bone marrow examination confirmed leukemia in nine Smoky test participants (all but one of whom are now dead).

Hairy-cell leukemia may be related to chronic lymphocytic leukemia, a type not associated with radiation exposures. However, seven of the nine leukemia cases —those involving myelocytic types—"are clearly" of the type that can be caused by radiation, the CDC team claims. Even if the hairy-cell case is excluded, the increase of observed leukemia over the incidence expected in the Smoky group "remains statistically significant," the CDC researchers conclude. □

Light on the pineal gland

Both artificial and natural light are known to affect animals by suppressing secretion of the hormone melatonin from the pineal gland in the brain. Now it has been shown that light also affects the human pineal gland, via the retina of the eye. Alfred Lewy conducted experiments with six volunteers at the National Institute of Mental Health and proved that humans respond to light with melatonin suppression, just as animals do.

There is a catch, however. Perhaps humans have adapted to artificial light over the years, so it no longer affects them, Lewy told the 12th Congress of the Collegium Neuro-Psychopharmacologicum in Gothenburg, Sweden. So what humans need now, for melatonin suppression, is light of an intensity equaling that of indirect sunlight, rather than ordinary room light.

With his six normal volunteers, Lewy found that he needed to expose them to light of about 2,500 lux in intensity in order to completely halt melatonin output. That's about the same amount of light a person would experience sitting close to a window, looking out, on a sunny day. Lewy woke the volunteers at 2 a.m., and then kept them up for two hours, while exposing them to varying intensities of light. He found that with 500 lux, which is a bit brighter than ordinary room light, the melatonin secretion, which ordinarily goes on in the dark of night, did not change. As determined by blood samples during a two-hour period, however, he found that 2,500 lux suppressed melatonin completely, while 1,500 lux illumination cut it by 50 percent.

What does all this mean in humans? There are some interesting possibilities. One is that the pineal gland may affect human fertility as it does animal fertility. When bears hibernate in winter, for instance, their gonads actually shrink. And studies in Finland, the land of the midnight sun, suggest a similar light effect on human fertility, as demonstrated by a seasonal variation in births.

Another small bit of evidence is abnormality in melatonin secretion in some blind persons, along with anecdotal reports of excess infertility in the blind.

Melatonin secretion could also be related to mental illness. Preliminary data from four manic depressive patients indicate that they may be abnormally sensitive to light. An NIMH study showed that only 500 lux suppressed their melatonin secretion by 50 percent, although this amount of light had no effect at all in six normal volunteers. □

Treatment found for liver cancer

Johns Hopkins

CAT scans (top) show cancerous liver before treatment (left) and after immunoglobulin therapy. Black area is tumor. Schematic representations (below) show dramatic tumor reduction.

A treatment that significantly extends the life span of persons with inoperable liver cancer was announced earlier this week by researchers at the Johns Hopkins Medical Institutions in Baltimore, Md. The procedure, called immunoglobulin therapy, uses an antibody against a tumor-secreted protein to carry lethal radioactive iodine directly to the cancer cells. Survival rate has been stretched from three to four months following initial diagnosis and treatment to an average of 11½ months, according to Stanley Order, one of nine researchers who have been developing the treatment over the past 12 years.

Ferritin, a protein secreted by tumor cells as well as by normal cells, is injected into rabbits, and the antibodies against it are collected. The anti-ferritin is then linked to radioactive iodine and injected into the patient. For a reason Order doesn't yet understand, the radioactive complex concentrates in the tumor (but not in normal cells), delivering a high, continuous dose of radiation. The tumor remains radioactive for 20 to 25 days.

Of 11 patients treated thus far, eight have shown some benefit. One patient lived more than two years. A tumor that occupied 70 percent of one patient's liver shrank to 18 percent; another shrank from 50 percent to 5 percent. It is too early to tell with the other three, says Order. Patients are injected with a lead-lined syringe and remain behind inch-thick, six-foot-high lead walls for about a week so that they don't contaminate anyone. They're instructed to take their own temperatures and pulse rates, measure their own liquid intake and excretion, and flush the toilet twice.

Patients receive between 100 rads and 150 rads, but Order notes this dose is given over a long period of time, and no serious side effects have been seen. "There's no immediate danger from the radioactivity compared to what their life expectancies are," he says. "The main side effect the patients complain about is boredom."

The investigators are working to purify the antisera, to decrease the total amount of radiation to the body. They are also trying the same procedure in four patients with lung cancer, multiple myeloma and neuroblastoma, other cancers that synthesize and secrete ferritin.

"It will take us a number of years before we see how far we can go with this," says Order. "It will take a big effort to apply, but I do not believe the program will be restricted to this tumor." □