

Strong Support for Virus in Human Cancer

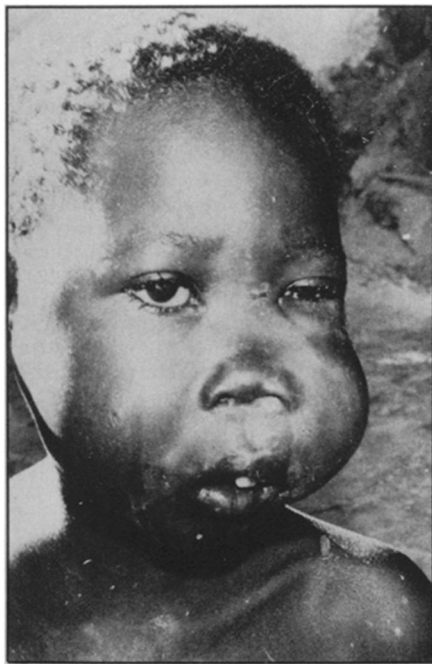
Circumstantial evidence has long pointed to a link between Epstein-Barr virus and the cancer of lymphoid organs called Burkitt's lymphoma. Strong, recent evidence that the virus causes the cancer is reported in the Aug. 24 *NATURE*. A project sponsored by the World Health Organization has been following 42,000 children in the West Nile District of Uganda since 1972 (SN: 11/8/75, p. 298). The results, while solidly implicating the virus, leave important puzzles. Researchers still are asking why the cancer is limited to only a small fraction of the children infected by the virus, and why the virus elsewhere in the world causes not Burkitt's lymphoma but nasopharyngeal carcinoma or mononucleosis.

The plan of the WHO study was to obtain blood samples from young children before onset of Burkitt's lymphoma. The investigators explained their purpose at local public meetings in the study area. A few days later the parents brought their children to a central point for the blood sampling. Then a team of investigators regularly visited all health centers to locate new cases of the cancer. In the four-year period from 1973 to 1977, 14 members of the sampled group were diagnosed as having Burkitt's lymphoma. Although the number of cases was smaller than the researchers had expected, they were able to draw strong conclusions.

Burkitt's lymphoma develops in children who have had a long and heavy exposure to the Epstein-Barr virus, according to the results. In most of the lymphoma cases, the child's blood had contained a sign of that viral infection years earlier. The sign is an unusually high level of antibody to a component of the outer coat of the virus. That antibody is stable in the blood, whereas other antibodies induced by the virus decline rapidly. The researchers suggest that high levels of coat antibodies may reflect the severity of the original infection, whereas lack of other antibodies indicates that the long-standing infection is not chronically active.

The data permit calculation of a striking risk factor attached to high antibody levels. A child with coat antibody levels higher than the mean of the general population has a risk of developing the cancer that is about 30 times higher.

According to M. A. Epstein, one of the discoverers of the virus, a climate-dependent factor seems essential for Burkitt's lymphoma, and a variety of observations indicate that the cofactor is hyperendemic malaria. For example, malaria may stimulate and maintain an unusual supply of lymphoid cells especially vulnerable to becoming malignant when they are infected by the Epstein-Barr



Ugandan child with Burkitt's lymphoma.

virus. Yet, he points out, only a rather small number of the children doubly infected with the virus and malaria develop Burkitt's lymphoma. Perhaps genetic predisposition or a particular sequence in timing of the infections is a yet undiscovered prerequisite.

Both Epstein and the WHO team believe that the conclusive evidence that Epstein-Barr virus causes lymphoma awaits a vaccination against the virus (and a subsequent decrease in tumor incidence). The present results should encourage attempts to produce such a vaccine.

The WHO study involved more than 70 scientists from Africa, Europe and the United States. Among the principal investigators were Guy de-Thé of the International Agency for Research on Cancer in Lyon, France, P. M. Tukei of the East African Virus Research Institute in Entebbe, Uganda, E. W. Williams of Arua, Uganda, G. W. Bornkamm of the University of Erlangen in West Germany, P. Feorino of the Center for Disease Control in Atlanta and Werner Henle of Children's Hospital in Philadelphia. □

Delinquency as a learning disability

A method of pinpointing certain potential delinquents by the third grade—early enough to prevent violent and antisocial behavior in many of them—has been reported by a University of Rhode Island psychologist. The key lies in early detection of neuropsychological problems, mainly in the form of previously unnoticed or untreated learning disabilities, says Allan Berman. Such subtle brain deficiencies are in many cases responsible for triggering delinquent behavior years later, Berman explained last week at the annual meeting of the American Psychological Association in Toronto.

This research is critical, he says, because the outlook for helping most delinquents after they have reached adolescence is extremely bleak. Those involved in the treatment of violent adolescents must face daily the discouraging fact that "the teenagers who come through our offices having committed violence will never function adequately again," Berman says. "Statistics as well as clinical experience suggest that once an adolescent has become violent or delinquent, his life expectancy is short, and what life expectancy he does have will be spent in and out of institutions...."

Berman initially studied 45 delinquent boys serving their first sentence at a Rhode Island correctional facility and compared them with a matched control

group from a Providence inner city public high school. "All subjects were administered the complete Halstead-Reitan Neuropsychological Battery, extensive interviewing, several associated tests, and were debriefed," Berman reports.

Berman and his colleagues found that "the level of performance and the patterning of abilities and deficits was markedly different for the two groups." Seventy percent of the delinquents showed "significant" deficits on the neuropsychological battery, Berman said in an interview. "Delinquents showed more extreme impairment in verbal, perceptual and nonverbal conceptual spheres," he said. The "typical" delinquent, according to Berman's results, is a youngster "who has had difficulty in conceptualizing or making sense out of the world that surrounds him. He usually lacks the verbal skills that are necessary to function effectively with people.... As a consequence, he has had difficulties in making the complex interpersonal solutions important in life."

Those results, combined with those of his ongoing follow up of youngsters who were in third grade three years ago, are impressive enough to Berman for him to say: "We think you can predict high risk children in the third grade." The ability to predict rests on four critical differences between potential delinquents and other youngsters at that age: