

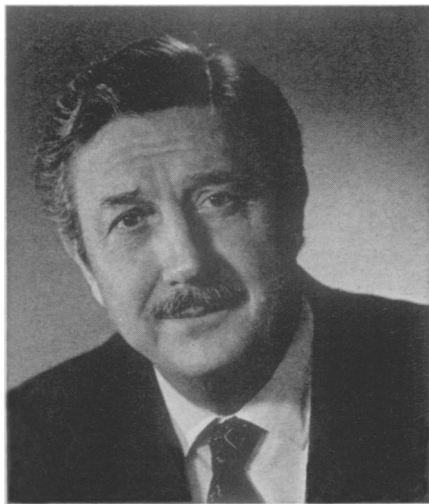
Cancer and viruses: Need for caution

Skepticism urged on tentative report of virus-like particles in Hodgkin's tissue . . .

Before scientists get the cancer moonshot off the ground they must, as aerospace engineers did, have a workable understanding of all the mechanisms involved. Before cancer can be successfully attacked, researchers must discover what causes it and what weapons to use against it. A major target has been the search for a human tumor virus because there is some evidence that such a virus might be implicated in tumor formation (for example, the Epstein Barr, herpes-type virus cultured in the 1960's).

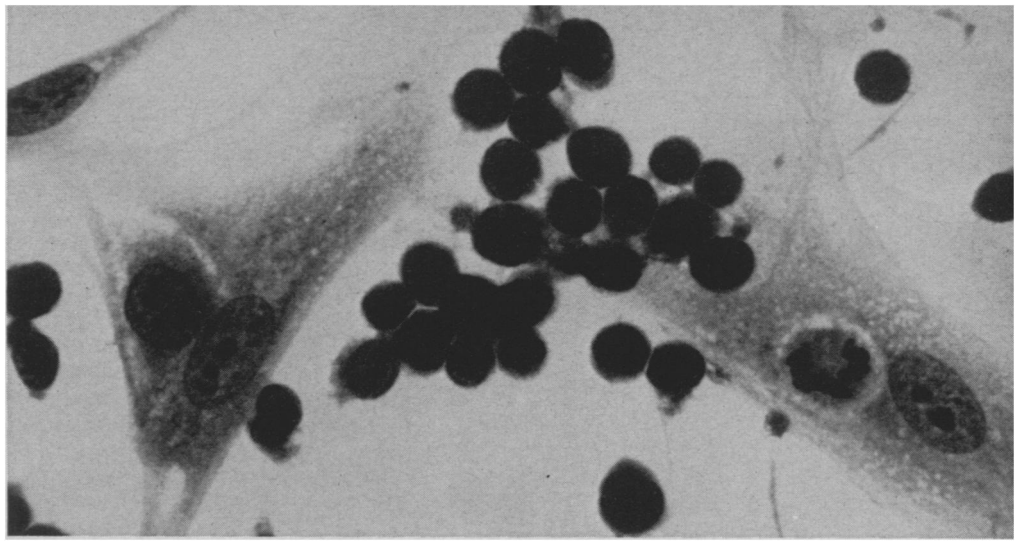
With this evidence to go on, and the possibility that Hodgkin's disease might be transmitted by a virus (SN: 6/19/71, p. 421), researchers at the Sloan-Kettering Institute for Cancer Research in New York grew cell cultures from lymph node material of Hodgkin's patients and searched for virus particles. Two virus-like particles have been tentatively identified, they believe. The Sloan-Kettering research is reported in the Sept. 10 NATURE by Magdalena Eisinger, Sylvia M. Fox, Etienne De Harven, June L. Biedler and F. Kingsley Sanders.

Previous efforts to culture Hodgkin's



NCI

Huebner: An unfortunate situation.



Sloan-Kettering

"Blastoid" cells magnified 480x, seen in and between Hodgkin's patient cells.

lymph node cells have failed because lymphocytes and macrophages, intermingled with the stationary cells of the nodes, died off in culture and probably released toxic products that were lethal to the larger attached cells. By growing the lymph node tissue on a grid that allowed the toxic cells to fall out, the scientists have been able to grow what they believe to be cancerous tissues for up to 50 generations (about 38 weeks).

This technological advance enabled the scientists to grow the cells in culture and begin the search for a virus, or "for material excreted by the cells which might have biophysical properties like those of a virus." Radioactively they detected virus-like RNA-containing material outside the growing cells. Tests showed that the RNA was not cell ribosomal RNA and was not being produced by a contaminating organism.

The possible discovery of the RNA material was followed by a surprising development. After two to three weeks some of the cultures stopped reproducing and tiny clumps of rounded, or "blastoid," cells began to appear. They were found floating in the medium, and, the report states, "practically every attached cell could be seen to have one or more round cells within it." In five out of ten patients the same rounded transformation took place. The scientists then tested for RNA with the blastoid cells growing in a suspension of nutrient and found evidence of its production. Using the same technique, Drs. Sanders and Eisinger found strong evidence for the presence of DNA of about the same density. This led Dr. De Harven to check by microscope for herpes-type virus particles (which contain DNA) and he found them. But tests of the Hodgkin's transformed cells for agents associated with the Epstein Barr virus (thought to be linked to Hodgkin's disease) were negative. It appears that the blastoid cells were releasing both an RNA and a DNA agent into the medium. The immunologists are now trying to ascertain whether the DNA

agent is a known animal or human virus.

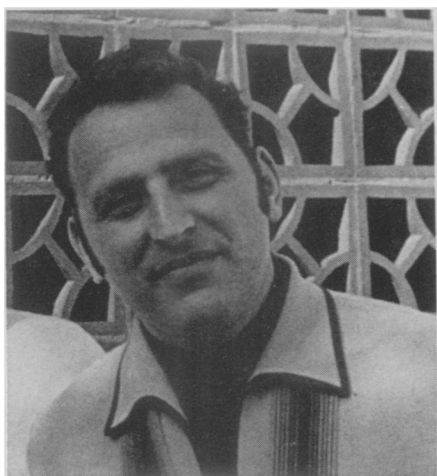
The Sloan-Kettering scientists may have developed a method of culturing the cells but they remain tentative and cautious in their statements: "We suspect [the cultures] may contain the malignant elements," and they "seem to release an RNA-containing agent." They further state that the "relationship of these agents [RNA and DNA] to either the etiology or the pathological development of Hodgkin's disease is by no means clear."

Also cautious about these findings is the respected virologist, Dr. Robert J. Huebner of the National Cancer Institute. He says that these results "tend to fit our theories about how DNA virus works" but the evidence is very tenuous.

. . . Controversy over Houston group's report of a virus in human cancer tissue

Scientific reports with this sort of tenuous evidence, as intriguing as they may be, will probably be published with increasing frequency. This is unfortunate, says Dr. Huebner, because controversy arising from them may discredit the whole cancer-cure effort. The economic dip and the current public and political interest in cancer research have created a situation in which greater portions of the available money for research are being given to cancer scientists. Many persons have moved into the cancer field and competition is becoming stiff. Good evidence of this competition and the perils of the rush to publish can be seen in the controversy brought out by another report in the same Sept. 10 NATURE.

In July, Drs. Elizabeth Priori and Leon Dmochowski of the University of Texas and the M.D. Anderson Hospital and Tumor Institute in Houston reported that they had isolated and cultured



Flow Labs.

Gilden: We are reasonably sure.

a virus from a human cancer tumor (SN: 7/10/71, p. 21). They did not claim they had cultured a human virus, but their evidence pointed that way. Now Drs. Raymond V. Gilden of Flow Laboratories in Rockville, Md., and Drs. Huebner, Wade P. Parks and George J. Todaro of the National Cancer Institute report in *NATURE* that the Houston agent is not a human virus but probably a mouse virus, presumably a contaminant.

Drs. Priori and Dmochowski sent samples of their cell line to the NCI team for verification, but that is not what they got. The particular viruses in question can be identified for either mouse, hamster, rat or cat because in each case they carry species-specific determinants that can be immunologically tested for. "We are reasonably sure that the virus is of mouse origin," says Dr. Gilden.

Drs. Priori and Dmochowski were attending a leukemia symposium in Padua, Italy, this week, but one of their colleagues, Dr. James M. Bowen, assistant professor of virology at the University of Texas, said they were aware of the new data but they interpret it quite differently. They have a steadily increasing volume of data that supports their original conclusions, he says, some of which has been accepted for publication and should appear in *NATURE NEW BIOLOGY* within the next few weeks. Dr. Bowen also claimed that under the conditions the culture was established and handled "the possibility of accidental contamination is extremely remote."

When asked about this, Dr. Huebner said: "Any claim that this is a human virus requires more than a human cell line with a virus in it. They are entitled to their opinion but they cannot disprove our findings. We are using positive proof for a mouse virus and they are using negative proof to say that it is not a mouse virus. We are interpreting things differently." □

SENSITIVE TO CHANGES

Sea life's chemical senses

For fish and other underwater life, a sensitivity to chemicals plays the same role as the sense of smell does for land animals. Natural chemicals, either released from other organisms or present in the water, play vital roles in attraction to food, attraction of male to female, recognition of predators by prey and recognition of home-stream territory by migrating fish (SN: 8/7/71, p. 98).

Dr. David B. Boylan and two other colleagues from the Woods Hole Oceanographic Institution, Drs. John H. Todd and Jelle Atema, have been studying the subtle ways this delicate fish-communication system can be disrupted by pollutants. They reported on their work this week at the national meeting of the American Chemical Society in Washington.

One study examined the effects of kerosene pollution on the behavior of lobsters. Asbestos strips treated with 20 microliters of kerosene were introduced into 180-gallon tanks containing three lobsters each. The researchers had listed 65 behavioral components to describe the reaction of the lobsters to the kerosene.

They found that the kerosene disrupted the normal behavior of the lobsters, causing increases in stress reactions, grooming activity and aggression toward other lobsters. Most of the behavior changes seemed to be due to the water-soluble component of kerosene that consists predominantly of aromatic hydrocarbons (SN: 3/14/70, p. 263). The lobsters also did something that surprised the scientists—they ate the kerosene-soaked asbestos strips. "Kerosene seems a pretty unlikely food," observes Dr. Boylan, but the action indicates that animals living in the vicinity of oil pollution may become contaminated with the oil and become unfit as a source of food.

The experiments demonstrate that chemical communication interference takes place at extremely low dilutions, Dr. Boylan concludes. "Such subtle, nonlethal effects could easily lead to disruption of a natural community."

In another approach to the problem, the researchers are studying the actual mechanisms of chemical stimulation. Like salmon, alewives migrate periodically to the stream where they were born. They apparently recognize their home stream by its unique chemical composition. The scientists placed alewives at the base of a Y-maze. Water from the fish's home stream was introduced into one arm of the Y and water from a different, adjacent stream into the other. The fish were able to distinguish their home streams, even when

the chemical differences between the two streams were slight.

Since fish can return to the same stream year after year, Dr. Boylan says, the chemical composition of a stream must be fairly constant, and any change in the identifying chemical markers would confuse returning fish and effectively reduce the number of spawning sites for the fish. He and his associates hope that further study of the chemical nature of the stream markers will give a better idea of what type of pollution would be most likely to interfere with the chemical fingerprint of a stream. □

CITES CUTS BY OMB

NSF aide resigns over budget

The Federal budget process is a year-long struggle. While many agencies have yet to receive their 1972 fiscal year appropriations from Congress, the Office of Management and Budget (OMB) is setting guidelines for the 1973 budget and battles rage on both fronts.

Last week, Dr. Lloyd G. Humphreys, assistant director of education for the National Science Foundation, resigned after only 15 months on the job since President Nixon appointed him. It was over the budget.

"We have had substantial cuts in funds to science education over the last two years" (SN: 7/24/71, p. 55), Dr. Humphreys told *SCIENCE NEWS*. "And the preliminary evidence for the 1972-73 budget show we are in for still another cut."

The crowning blow, says Dr. Humphreys, was the OMB apportionment of the 1972 budget that NSF received last week. OMB withheld approval to spend \$30 million appropriated by Congress for institutional programs of NSF for science. Of the \$622 million appropriated by Congress, OMB said NSF could spend only \$592 million. NSF will thus have \$98.1 million instead of \$128.1 million for its science education programs.

The resignation, says Dr. Humphreys, is the result of a general and growing frustration over the continuing budget cuts and the resulting inability to initiate significant programs.

The Nixon policy of withholding funds—or refusing to apportion all of the money appropriated by Congress to the various Federal programs—has been the focal point for many angry partisan debates during the past year. Congress doubts the constitutionality of such a practice, since, according to the Constitution, Congress has the money powers for the nation. From the Administration's viewpoint, however, the Constitution gives the President the responsibility of the day-to-day management of the Government; thus,