science news
OF THE WEEK

Virus now, cancer later

Viral expression early in life may spell your doom

The viruses known as C-type RNA viruses have been heavily implicated in cancer, particularly in leukemias and sarcomas. The viruses, or particles of them, have been recovered from 12 species, including humans. Most of the C-type material has been taken from animals and persons with naturally occurring tumors. But exactly how the presence of the C-type virus material relates to cancer has not been known.

Four cancer scientists now report they have found that expression of C-type material early in life invariably leads to cancer later in life. They were able to predict this connection with almost 100 percent accuracy in mice. The animals with early viral expression later came down with a leukemia, a sarcoma or some other kind of cancer.

Their findings are the first evidence in living organisms that latent viral information is switched on later in life to cause cancer. The work is reported in the May PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES by Hans Meier, Benjamin A. Taylor and Marianna Cherry of the Jackson Laboratory in Bar Harbor, Me., and Robert J. Huebner of the National Cancer Institute.

A number of questions, however, need to be answered. For example, what switches viral information on in the first place? In recent months cancer viral markers have been raised in animals and tissue cultures by hormones, radiation, DDT and other environmental factors (SN: 8/29/72, p. 68).

On the other hand, Meier and his colleagues have evidence that several genes regulate expression of C-type viral material in mice. Some other researchers, notably John R. Stephenson and Stuart A. Aaronson of the NCI, also have evidence that genes turn on C-type viruses.

How environmental regulators and genetic regulators interact, researchers don't know.

Might some of the genes that allow the expression of C-type viruses be, instead of regulatory genes, genes that actually make the viruses? The hypothesis that the genetic material of viruses is actually part of cells' genetic machinery is known as the oncogene theory.

Meier is convinced that the genes that make C-type viruses are oncogenic—part of cells' genes. Stuart and Aaronson's latest findings, reported in the May 25 SCIENCE, also suggest that some of the genes that allow C-type viral expression in cells are structural genes.

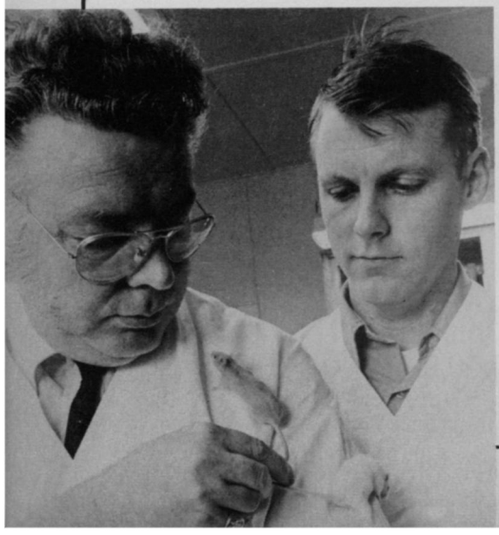
But some scientists disagree with the oncogene theory. They have evidence that although cells' genes may regulate the expression of C-type viruses, the viruses, and their structural genes, enter cells from the outside. This theory is called the provirus theory (SN: 1/27/73, p. 56).

Regardless whether a C-type virus is a natural outgrowth of a cell or a foreign object in the cell, how does it make a cell cancerous? The process is still, angonizingly, a mystery. Particularly nettling is the reverse transcriptase enzyme. At first researchers thought that the enzyme was a unique tool of cancer viruses. Now there is evidence that the enzyme might be a normal cell enzyme.

Might people be diagnosed early in life for C-type material to see whether they might get cancer later in life? Possibly, Meier says, but what is the point since there is no cancer cure?

Researchers push on to answer these and related questions. Even with millions of government dollars, the cancer conquest comes hard.

Meier, Taylor with mice subjects.
The Jackson Laboratory



Wide World Photos
Kerwin floats between compartments.

An eventful

The scene was stranger than fiction; the men, both heroic and human; the tools, down to earth. By the end of the astronauts' second day in space, Skylab director William C. Schneider was proclaiming the salvaging job on Skylab a success. The orange parasol draped over the space station's workshop was bringing down the seething temperatures inside the workshop. The effort to deploy the one remaining solar panel wing was not successful, but even then all was not lost. It could be done. With other tools or other men—later. By Monday noon the station was activated.

Astronauts Charles Conrad, Paul Weitz and Joseph P. Kerwin had gotten off to a hopeful start with a perfect launch May 25. Seven hours later they approached the damaged space station. A quick fly-around revealed what the launch had wrought. "As you suspected, solar wing two is gone, completely off the bird," Conrad reported. All that was left were some tubes and wiring sticking out. "Solar wing one is, in fact, partially deployed." The solar panel was seemingly trapped by pieces of the meteoroid shield that had ripped off during the launch. The astronauts soft-docked with the station, took a dinner break and planned their method of attack. They had a shepherd's crook and wire cutting tools and prongs. When ground control next tuned in to the men (communication is broken by widely dispersed ground stations), Weitz was hanging out of the command module's hatch poking and pulling at a stubborn piece of angle iron fastened to the solar panel's beam and fairing assembly. Kerwin was holding on to Weitz's knee, trying to give directions. Conrad was trying to fly the spacecraft, keeping it steady at a cautious distance from the station and working