MEDICINE

Cancer, Other Ills Linked

Even Hiroshima "environmental cancer" victims showed conditions that may "predisposed" to cancer

➤ THE "EXCESSIVE OCCURRENCE" of malignancy with other diseases may lead to new approaches to the cause of cancer, a National Cancer Institute scientist said.

Dr. Robert W. Miller, one of 28 NCI staff members participating in the programs of the ninth International Cancer Congress, Tokyo, linked congenital defects and leukemia. He pointed out that "environmentally induced" cancer and congenital defects were found together in Hiroshima.

Following the explosion of the atom bomb, he said, there was an excess of microcephaly (small head) and mental retardation among those being carried in the womb at the time of the bomb, and an excess of leukemia among those exposed at any age.

In Japan where the only atom bombs ever used as weapons fell, scientists from all over the world exchanged findings gathered since they last met four years ago in Moscow.

Population studies are important in the attempt to identify causes of cancer. This is especially true of alimentary tract cancer.

Dr. Harold L. Stewart, also of NCI, said that studies of the "geographic pathology" of alimentary tract cancer in man, observed along with work on animals, experimentally support the assumption that the cause of cancer in each segment of the tract may be different and are in all probability highly specific.

It was less than 10 years ago, Dr. Miller said, that the risk of leukemia among persons with mongolism, or Down's syndrome, was found to be 20 or more times greater than usual.

"In these cases at least," he said, "the predisposition to leukemia arose before conception of the child, for that is when Down's syndrome is usually determined by an error in maternal chromosomal division."

There are two genetic diseases with an increased risk of leukemia, Dr. Miller said. In both, the chromosomes of the lymphocytes break very easily on tissue culture. Several genetic diseases characterized by severe immunologic deficiency carry a greatly increased risk of lymphoma and perhaps also of acute lymphatic leukemia.

Rous sarcoma virus (RSV), which originated with Dr. Peyton Rous, one of this year's co-winners of the Nobel Prize in Physiology or Medicine, was discussed by Dr. John P. Bader of the chemistry branch of the National Cancer Institute.

More than two years ago, Dr. Bader reported the role of DNA, or deoxyribonucleic acid, in the synthesis of RSV, utilizing actinomycin and BUDR, or 5-bromodeoxyuridine. Actinomycin D suppressed synthesis of RSV in chick embryo cells within four hours after addition, and BUDR also inhibited growth of RSV.

In his present report, Dr. Bader said biochemical requirements for the growth of RSV, which is a ribonucleic acid (RNA) virus, had been examined using chick embryo cells and ultraviolet light. A dose of ultraviolet light was found to have profound effects on cellular synthesis of RNA and DNA, but did not alter the capacity of cells to support growth of another RNA virus, called vesicular stamatitus virus.

"Experiments measuring total virus yields or infectious centers showed that the inactivation of ultraviolet light rates of the capacity of cells to support RSV-growth are identical before or at any time after infection." An intact cellular constituent was required continuously for the growth of RSV, and this cellular constituent was demonstrated to be DNA.

Dr. Bader did his preliminary work on the role of DNA in the synthesis of Rous sarcoma virus at the California Institute of Technology, Pasadena, Calif., during a period in which he held a Postdoctoral Fellowship from the National Cancer Institute.

TECHNOLOGY

Coal-Dust Explosions To Drive Water Pump

➤ COAL dust's tendency to explode—a property that has cost the lives of thousands of miners in underground disasters—may also prove the key to a new market for coal as the power source for a simple and effective water pump.

Harnessing the explosive force of coal dust to pump water has already been demonstrated by the Bureau of Mines, Washington, D.C.

In the pump, a mixture of coal dust and air is ignited electrically to produce a controlled explosion. Small-scale test-models have driven nearly five and a half gallons of water per cycle to a height of over 30 feet.

The pump might provide a low-cost energy source for pumping water at irrigation projects, an official said, or for removing water that hampers many underground mining operations.