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MEDICINE

Cancer, Other Ills Linked

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

► THE "EXCESSIVE OCCUR-
RENCE" 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 con-
genital defects and leukemia. He
pointed out that "environmentally in-
duced" 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 men-
tal retardation among those being car-
ried 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, sci-
entists from all over the world ex-
changed findings gathered since they
last met four years ago in Moscow.

Population studies are important in
the attempt to identify causes of can-
cer. This is especially true of alimen-
tary 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 as-
sumption 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 usu-
ally determined by an error in ma-
ternal 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 dis-
eases characterized by severe im-
munologic deficiency carry a greatly
increased risk of lymphoma and per-
haps 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 Can-
cer Institute.

More than two years ago, Dr. Bader

reported the role of DNA, or de-
oxyribonucleic 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 in-
hibited growth of RSV.

In his present report, Dr. Bader
said biochemical requirements for the
growth of RSV, which is a ribonu-
cleic acid (RNA) virus, had been ex-
amined using chick embryo cells and
ultraviolet light. A dose of ultraviolet
light was found to have profound ef-
fects on cellular synthesis of RNA
and DNA, but did not alter the ca-
pacity of cells to support growth of
another RNA virus, called vesicular
stomatitis 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 be-
fore or at any time after infection."
An intact cellular constituent was re-
quired 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 Na-
tional 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.