

GENERAL SCIENCE

Virus Destroys Cancer

Human cancer given to rat completely obliterated by injection of Coxsackie virus, National Academy of Sciences autumn meeting told.

► COMPLETE OBLITERATION of a human cancer by a virus has been achieved, scientists of the National Institutes of Health, Bethesda, Md., reported at the National Academy of Sciences meeting held at the Institutes.

The cancer had been taken from a patient, cultivated in flasks in the laboratory and then put into a rat. There it grew to large size. Then Coxsackie virus was injected.

At first there was very little change in the cancer, but when the virus was extracted from this cancer and injected into the human cancer in another rat, and this was repeated five or six times, the virus was able to wipe out completely the growing human cancer in the rat.

This enhanced virus has not yet been tried on human cancers in human patients. The scientists hope to try this next.

Coxsackie virus causes mild sickness in humans. The sickness has sometimes been confused with non-paralytic polio. It may make the cancer patients sick, with a headache and pain in the chest, for a few days, if and when it is given them.

However, this "calculated risk" is considered worth taking in the hope of wiping out the cancer. Except for newborn infants, no deaths have been reported due to Coxsackie virus.

Scientists who reported the work with Coxsackie virus against cancer are Drs. R. J. Huebner, R. R. Smith, W. P. Rowe, R. G. Suskind and R. Love.

Previously they had reported that one of the adenoviruses, which cause illness like severe colds after growing on human cancer cells outside the body, could destroy cancers in patients.

"Definite, sometimes extensive local destruction" of the cancer tissue was achieved in 40 patients. No destruction of normal tissue could be seen and there were minimal side effects.

The effects, however, were not complete, as they were with the Coxsackie virus against the human cancer in rats. In no case were the results with the adenovirus "curative."

Deep Earth "Minerals"

► NEW "MINERALS" that may exist under pressures of a million pounds per square inch and high temperatures more than a hundred miles beneath the surface of the earth have been made at the Geophysical Laboratory of the Carnegie Institution of Washington.

Dr. F. R. Boyd, Carnegie Institution physi-

cal chemist, told the meeting how the rigorous conditions deep beneath the earth are imitated in his laboratory.

Unless in the future it is possible to drill to such great depths as more than a hundred miles, man will never see these silicates if they are formed in nature under high pressure.

Three or four new high-pressure phases, as the man-made rock compounds are called, have been discovered in these investigations. The term "mineral" is reserved for chemical compounds occurring naturally in the earth's crust.

Dr. Boyd suggested that changes in the transmission of earthquake waves in the earth's crust, which are called discontinuities, such as occur at the base of the earth's crust and in the upper part of the earth's mantle, may be explained by transitions from one mineral phase to another.

Cells Live Minus Nuclei

► HUMAN CELLS can continue to live and carry on many functions, even after their nuclei have been removed surgically.

The first demonstration of this ability was reported by Drs. T. Timothy Crocker, Lester Goldstein and Relda Cailleau of the University of California Medical Center, San Francisco.

In earlier experiments, larger and more primitive cells, such as amoeba and sea-urchin eggs, were kept alive for some time after removal of their nuclei, but this had not been achieved in the much smaller, specialized cells of mammalian tissue.

Human HeLa cancer cells were used. They are only about one-thousandth of an inch in diameter, and are believed to be the smallest cells yet subjected to microsurgical techniques.

The "operation," performed under a microscope, with microscopic-sized knives and manipulators, actually consisted of cutting the dumbbell-shaped cells in two.

One part contained the nucleus, which governs reproduction, heredity and other important cell activity. The other part contained only cytoplasm, material that forms the main body of the cell, assimilates food and carries out activities directed by the nucleus.

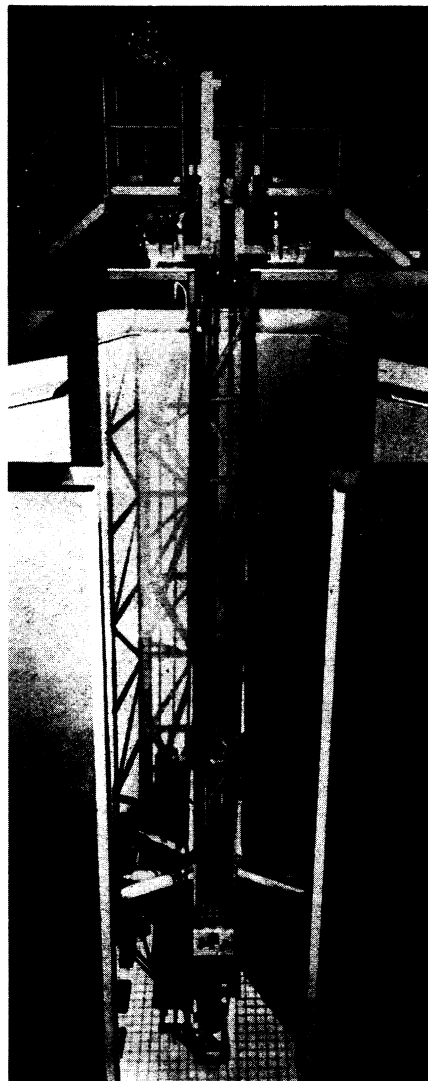
Time-lapse motion pictures showed the cell parts without nuclei healed at the point of cut, retained apparently normal cytoplasmic structure, and survived for as much as 40 hours.

The edges continued to show the slight, rhythmic motions characteristic of feeding, and the cytoplasm continued to move about

in the tissue culture medium like intact cells. The cytoplasm fragments abruptly shriveled and became immobile after varying periods of survival. There was no reproduction among the fragments. This is a function of the nucleus.

The work is important in understanding the function of individual cells, the basic units of life. It may ultimately be important in understanding cancer and other biological problems.

The scientists now want to know what mechanisms enable the cytoplasm to survive without a nucleus, and what independ-



TALL TOWER—The core of the reactor Battelle Memorial Institute now operates is located at the bottom of this suspension tower. When sufficient fuel elements are in their proper positions, fission produces gamma rays and neutrons for use in research. Tubes entering from the sides of the pool have samples for irradiation inside them when the reactor is operating.

ent functions the cytoplasm may have. They think the cytoplasm receives some necessary materials from the nucleus before it is removed, but what they are and how they are transmitted is unknown.

The research was done in the University's Cancer Research Institute with support from the California division of the American Cancer Society, the National Cancer Institute, and special University cancer research funds.

All Brain Areas Active

► EVERY AREA of the brain produces a movement of some part of the body when the brain area is stimulated. There are no "silent" areas.

Every small area acts both to receive sensation and to cause movement, rather than being either one of sensation or one of movement.

Evidence for this, which is contrary to the classical idea of the brain, was presented by Dr. John C. Lilly of the National Institute of Mental Health at the meeting.

The findings were made on monkeys that were not anesthetized. Tiny electrodes had been implanted in the animals' brains. Electrical stimuli were given through these. The brains suffered no injury as a result.

When stimulus was given to the classical sensory region of the brain, that is a region for receiving sensation, movements to direct the sense organ were produced. For example, stimulus of the acoustic area caused detailed ear movements. Stimulus of the visual area of the brain brought on eye and head movements.

The only brain area from which general excitement of the whole animal could be produced by stimulus was the spinal column area.

Life Materials Made

► LIGHTNING DISCHARGES in the early days of the earth, some three billion years ago, could have produced from atmospheric gases the materials out of which life arose.

Using relatively simple spark coil discharges, Dr. Philip H. Abelson of the Carnegie Institution of Washington's Geophysical Laboratory has manufactured amino acids, building blocks of protein, out of carbon dioxide, nitrogen, hydrogen, water and ammonia in various combinations.

This imitation of possible happenings in the primitive air of our earth when young is part of an attempt to reach back into history and see what could have happened then.

Dr. Abelson also told the meeting there is evidence that the earth's atmosphere half a billion years ago was not much different from what it is today.

One school of scientific inquiry has suggested the earth came alive from the original envelope of gases that survived from the earth's formation out of the primordial matter of the universe.

Dr. Harold C. Urey of the University of Chicago upholds this view and his ex-

periments with Dr. Stanley C. Miller showed that basic materials for living matter could be made from hydrogen, methane and ammonia in a highly reducing atmosphere.

On the other hand, Dr. William W. Rubey of the U. S. Geological Survey has looked into the geological evidence of the origin of the atmosphere and oceans. He suggests that the water, carbon dioxide and nitrogen of our air and seas came out of volcanoes. He finds no evidence for the reducing atmosphere theory.

Dr. Abelson produced such amino acids as alanine, betaalanine, glycine and sarcosine from mixtures of gases, such as carbon dioxide, nitrogen, hydrogen and water; carbon monoxide, nitrogen, hydrogen and water; carbon dioxide, ammonia, hydrogen and water.

He confirmed the earlier work by Dr. Miller, now of Columbia University, obtaining amino acids from a mixture of methane, ammonia and water.

Science News Letter, November 17, 1956

BIOCHEMISTRY

Chemicals for Speedy Blood Clot Dissolving

► FEVER - PRODUCING CHEMICALS and an activator, or enzyme, from urine are being tried as speedy agents for dissolving dangerous blood clots inside blood vessels.

"Very encouraging" results in treatment of more than 50 patients with the fever-producing chemicals have been obtained by Dr. Kurt N. von Kaulla of the University of Colorado Medical Center, Denver, the American Heart Association reports in New York.

A blood clot inside an artery can cause a heart attack or a "stroke," as most persons today know. Anticlotting medicines help control the condition, so that there is less likelihood of further clots forming.

Needed now is a method for more prompt and effective dissolving of clots already formed. Ordinarily, it may take days or even weeks for a sizable clot to be dissolved.

Meanwhile, the body is simultaneously carrying out another repair process that involves the laying down of scar tissue. This is ordinarily a protective mechanism, but it may harm the inside of a blood vessel by narrowing and distorting the inner surface.

Doctors would like to dissolve clots quickly and completely to help restore normal circulation as fast as possible.

The fever-inducing medicines of bacterial origin, called pyrogens, seem to promise an answer for this problem. They act in humans but not in animals or test tubes. Or the activator, called urokinase, may solve the problem.

Science News Letter, November 17, 1956

The average farm in 1954 consisted of 242 acres, the highest average size shown in any farm census.

VETERINARY MEDICINE

Little Value in Giving Thyroprotein to Cows

► THYROPROTEIN, containing thyroid gland extract, may stimulate cows to produce more milk for a time, but it has little practical value for most dairy herds, the U. S. Department of Agriculture and Montana scientists find.

The reason is that there is no way to avoid a sharp decline in milk production following removal of the drug from the cows.

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