

MEDICINE

All Cancer Tied to DNA

Change in genetic DNA appears to be the common denominator of various cancer causes, the Sloan-Kettering Institute for Cancer Research reports.

► ALL CANCER causes have as a common denominator a change in genetic DNA (deoxyribonucleic acid), according to Dr. Frank L. Horsfall Jr., director of the Sloan-Kettering Institute for Cancer Research in New York.

DNA is the chemical substance that plays a key role in both heredity and vital functions of the cell. The arrangement of DNA subcomponents forms a code in which all the heritable information needed by the cell is stored. Apparently cancer is caused, Dr. Horsfall said, by a particular, although as yet undefined, change in DNA structure that alters this information code.

Dr. Horsfall's statement appeared in the seventh biennial report of the Sloan-Kettering Institute. Among specific advances described in the two-year report are these:

1. A virus isolated from transplantable human tumors was found to cause a deformity in immature bone when injected into new-born hamsters.

2. Toxic drugs are showing some success in stopping tumor growth while normal tissues of the patient are protected by an antidote.

3. Methods have been developed for isolating DNA from the cancer-inducing polyoma virus. There is a program underway for "labeling" DNA with tritium (radioactive hydrogen) so the DNA may be traced as it penetrates cells.

4. Studies of the growth pattern of ten tumors removed from mammals and transplanted into the fertilized egg indicate that each cancer has its individualized rate of growth.

5. A virus-like agent has been identified in animals bearing transplantable cancers.

6. An unsuspected interrelationship of endocrine functions, shown in an extensive study on the influence of the thyroid gland, is probably implicated in a wide variety of diseases.

7. Patients with cancer of the blood-forming tissues, because of their weakened immunological responses, are more likely to accept foreign tissue transplants than normal persons.

8. A virus called Egypt 101 was found in cancer cells of 14 patients. In certain cases, some stopping of the tumor was noted.

9. A virus-like agent was recovered from cells that took on cancerous properties after growing continuously in tissue culture. Preliminary observations suggest that when the agent is introduced into test tube cultures of "normal" cells, they begin to show malignant characteristics.

10. Actinomycin D, either alone or with X-rays, appears useful in treating several types of cancer in children.

11. A possibility that an unusual virus protects hamsters against cancer is under investigation. No tumors developed in a colony of 1,500 animals, now one to two years of age, and all were infected by the virus isolated from transplantable human tumors.

12. A new isotope scanner for high energy gamma rays was designed and built that can measure within the patient's body concentrations of high energy isotopes such as calcium-47 and strontium-85.

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TOP HONORS were awarded to Carroll H. Weiss of New York by the Biological Photographic Association for this "Cast of Cardiac Blood Vessels." The photo shows a research technique in which blood vessels are injected with plastic, the heart excised and placed in acid to dissolve away cardiac tissue, leaving a cast of the blood vessels supplying the heart.

cells. This makes the location of the placenta a simple matter since it contains more blood than any other organ in the body with the exception of the heart and liver. Twenty minutes after the injection, a portable pulse height scintillation (Geiger) counter is used to outline the precise location of the placenta on the surface of the abdomen. The counter also can be adapted for vaginal probe so that the internal position of the placenta can be determined. The physician can then decide whether a delivery by Caesarean section before the mother goes into labor is necessary or whether the mother may be allowed to go into normal labor.

The important advantages in using chromium-51 are that it can be done at the bedside, and a blood volume determination can be done simultaneously. In addition, there is no harmful radiation transferred from the placenta to the baby as sometimes resulted from radioisotopes previously used.

Using radioactive iodine-131 as a tracer requires 24 hours to block the thyroid of the mother against harmful uptake of the isotope, a known cause of thyroid cancer. Transfer of the isotope to the unborn infant cannot be prevented. The thyroid of the infant is 19 times more susceptible to radioactive iodine than an adult's. The use of radioactive sodium, also commonly used, often results in harmful retention of fluids.

Chromium-51, in addition to being absorbed quickly by the red blood cells, is eliminated almost completely in the urine.

These applications of chromium-51 were demonstrated for the first time by artificial models at the 29th annual scientific assembly of the Medical Society of the District of Columbia.

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Childbirth Dangers Cut

► A MAJOR ADVANCE in atomic medicine that will reduce the hazards of childbirth has been made at the Washington Hospital Center, Washington, D.C.

Drs. Samuel N. Dodek, E. E. Gahres, John Paul Jr., and W. D. Terrell Jr. of the department of obstetrics and Dr. Salamon N. Albert of the department of anesthesiology have found that radioactive chromium-51, injected into the blood stream of a pregnant woman, is a safe, quick and accurate tracer for locating the site of the placenta, the organ that supplies nourishment to the infant until it is born. The radioisotope also can be used to obtain blood level measurements before and after delivery more accurately than the usual routine blood tests.

"Rapid determination of the site of the

placenta can mean the difference between life and death for both mother and child if excessive bleeding occurs either during labor or in the latter weeks of pregnancy," Dr. Dodek explained in an exclusive interview with SCIENCE SERVICE. Such bleeding often occurs when the placenta is detached or abnormally located.

"An accurate measurement of blood volume preoperatively in a patient with a history of anemia is vital in assessing the need for blood replacement after delivery," Dr. Dodek said. "Measurements with chromium-51 are exact to within four percent. In cases of severe anemia, such accuracy effectively reduces the incidence of postdelivery morbidity."

Chromium-51 tends to concentrate within minutes after injection into the red blood