

GENERAL SCIENCE

Cancer May Spread in Body By Fragments in the Blood

National Academy of Sciences Meets and Hears of New Hormone, Giant Cyclotron, and Medical Advances

A NEW picture of how cancer may spread by the blood from one part of the body to the other was presented by Drs. A. Gordon Ide and Stafford L. Warren of the University of Rochester and Strong Memorial Hospital at the meeting of the National Academy of Sciences in Rochester, N. Y.

Color moving pictures showed fragments of cancer apparently drifting into a blood vessel in a rabbit's ear. Such fragments of cancer, living and dead, probably drift into the blood in this way in far greater numbers than has previously been supposed, the Rochester scientists said.

The pictures possibly explain one method for the spread of cancer from one organ of the body to another. The blood travels to all parts of the body and is carried a good part of the way through a network of large, thin-walled veins. These thin walls are often broken by very slight injuries. Such a break in a vein as it traveled through a cancer would provide the chance for the cancer fragments to enter the blood and be carried to some distant organ.

Dreaded Feature

This spread of the disease, known medically as metastasis, is one of the most dreaded features of malignant tumors. It is the imperative reason behind the drive for early diagnosis and early treatment of cancer. The surgeon can cut out a single cancer or tumor, can even in some cases remove one entire organ that is cancerous. X-ray or radium treatment can in many cases destroy cancer of one region. When, however, the cancer has had a chance to spread to many organs or to indispensable ones, the outlook for the patient is hopeless.

The pictures which today showed one possible method of this dangerous spread of cancer were made through a transparent double window of cellulose acetate film placed in the rabbit's ear. A fragment of rabbit skin cancer was transplanted under the outer window. Through the window, with the aid of

microscopes, the scientists were able to see the tiny blood vessels grow up, around and into the growing cancer. Twice they observed a large blood vessel with an opening growing at the edge of the cancer. In addition they were able to obtain a color moving picture record of a fairly large blood vessel in such state that blood serum, red blood cells and, apparently, cancer fragments could wash in and out with ease.

Beginning stages of animal life have been successfully grown outside the body of the mother, in a circulating solution

of nutrients, simulating conditions of nature. This new kind of "bottle baby" was described by Prof. J. S. Nicholas of Yale University.

Rat embryos were the materials used in the experiments. Embryonic tissue has been grown in glass vessels many times, but without a circulating medium to bring it food and take away waste products, development is checked. In Prof. Nicholas's experiments the more favorable conditions made it possible for normal development to go on for the four most critical days in the life of an embryo, and at the same time permitted continuous observation by the scientist.

Early stages of life apparently do not demand exact duplication of natural conditions, Prof. Nicholas found. His cultures were not injured by gradual changes in temperatures between 70 and 110 degrees Fahrenheit; they could adapt themselves to changes in the acid-alkali balance of the solution and also to



SOLD—HOUSE AND LOT FOR \$1.75

This bargain was closed back in 1969 B.C., when a woman named Amtia bought a house and lot on a canal bank, in the city of Kish, Mesopotamia, for six and five-sixths shekels. A shekel contains 25 cents worth of silver, by present standards, but in those days it had higher buying power. Richard A. Martin, archaeologist of the Field Museum of Natural History, is shown holding the clay tablet on which the real estate contract was recorded, while he points out to the museum's auditor how Babylonians used to copy the contract also on the clay envelope—handy for filing.

changes in pressure over a comparatively wide range.

Prof. Ernest O. Lawrence, the University of California's renowned atom smasher and inventor of the cyclotron atom gun, who was awarded the Comstock Prize of the National Academy of Sciences, described to the Academy a bigger and better cyclotron.

He described an instrument that can produce as many and as powerful neutrons as would be produced if several hundred pounds of radium—hundreds of times the amount of refined radium actually in the possession of science—were used to bombard a large amount of beryllium, and revealed that electrical pressures as high as 7,000,000 volts can be built up in the machine.

Used for smashing one kind of atom with atomic bullets of another kind, the cyclotron sends charged atoms or ions winging on their way at tremendous speeds by whirling them around ever faster and faster before they are released. An ingenious combination of electrically charged poles serves as the propulsive force.

Elements can be made artificially radioactive in the new cyclotron, which has been in operation for two months, in amounts comparable to several grams of radium. The medical profession has kept an interested eye on this particular development as it may some day give rise to a cheap source of the radioactive rays used in treating cancer.

New Hormone

A new hormone which plays an important part in digestion was reported by Dr. E. S. Nasset of the University of Rochester. The hormone has the name enterocrinin.

It does its part in helping digestion by stimulating the production of digestive enzymes or ferments and digestive juices. Dr. Nasset has extracted it from the large intestines of animals, including man, and has obtained it in the form of a white powder which can be dissolved in water and which is powerful in small doses. It is carried in the blood and was discovered in the course of surgical transplantation experiments.

Insulin by Mouth Nearer

The longed-for day when diabetics can take their life-preserving insulin by mouth instead of by hypodermic injection seems materially closer as a result of research reported by Drs. John R. Murlin, Lawrence E. Young and William A. Phillips of the University of Rochester.

So far, insulin by mouth has not been effective in diabetes, although many efforts have been made to produce a form of insulin for oral dosage. The difficulty has been two-fold: when insulin is taken by mouth, it may be destroyed by the powerful digestive juices; even when protected from the digestive action, the very large insulin molecule cannot pass readily through the intestinal walls into the blood. As a result of one or both of these features, the patient who takes insulin by mouth does not get enough of it into his blood to affect the high sugar content which must be reduced to normal to make life possible for him.

The Rochester scientists have found measures for overcoming both of these difficulties, so far as laboratory studies indicate. Human trials have apparently not yet been made and so the day of patients taking insulin by mouth is not

yet here, though it seems much closer.

What has been done is to combine insulin with a weak soda solution and with a weak solution of pure hexylresorcinol. This combination, when given by mouth to some dogs, reduced the blood sugar in four-fifths of the trials. In other animals it reduced the sugar in only half the trials. This is encouraging but shows that more study is needed before the results can be applied in treating diabetes.

The weak soda serves to protect the insulin from digestive juices by cleaning the lining of the digestive tract of the mucin normally present. The hexylresorcinol hastens absorption of insulin by lowering the surface tension. Weak acid might have the same effect as the weak soda, it was pointed out, and bile salts and saponin might have the same effect as the hexylresorcinol.

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PUBLIC HEALTH

Forecast a Check in Rising Tide of Mental Diseases

Sanitation of Mental Environment Urged to Aid Health Of Mind as Physical Sanitation Has Reduced Typhoid

A CHECK in the 15-year-long increase in mental disease in this country and a decrease in cases was forecast by experts at the meeting of the American Public Health Association in New York.

The peak in the upward swing of mental disease may have already passed, Dr. C. M. Hincks, general director of the National Committee for Mental Hygiene, said. Figures for mental disease prevalence based on hospital admissions are unreliable, he explained. The tremendous improvement in facilities for treating mentally sick persons at hospitals has encouraged patients and their families to go to these hospitals in increasing numbers. But that does not mean, and there are no figures to show, Dr. Hincks said, that the total number of mental cases is increasing today.

In spite of this encouraging picture, Dr. Hincks said that 78,000 additional beds for the treatment of mental disease are required in the United States.

The outlook for decrease of mental disease is splendid, he said, because more and more physicians are being trained in psychiatry and more and more children's doctors are alive to the importance

of guarding against mental disease at early ages.

Further reduction of mental disease may be brought about by sanitation of the mental environment in which people live. This new method of attacking mental disease was stressed by Dr. Henry B. Elkind of Boston. A sanitary physical environment has reduced cases of disease such as typhoid fever by reducing the chances of exposure to typhoid germs in food and water. Cleaning up the mental and emotional environment by relieving the stresses and strains that lead to mental breakdown may accomplish the same conquest of mental disease. To do this, scientists must study mental disease in the mass, as epidemic diseases are studied. The locality of the majority of patients, their marital state, occupation and birthplace may give valuable clues to causes and means of preventing mental disease, Dr. Elkind explained. Health officers should study mental disease from these angles, just as they study the location of cases and the sanitary environment including food and water supplies in an epidemic of typhoid fever.

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