

MEDICINE

Use Skin for Cancer Test

Possible method of mass detection of dread disease in early stages foreseen by testing for changes in electrical resistance of skin.

► **FIRST STEPS** toward a skin test for detecting cancer have been taken by Dr. Curt P. Richter at Johns Hopkins Hospital and Medical School, Baltimore.

The test might become the long sought means of mass detection of early, unsuspected cancer in the population, but Dr. Richter says it is much too early to know about that. So far, he has used it mostly on cases of cancer that were well along. He is planning now for a trial on a large number of very early, suspected cancer cases.

Changes in electrical skin resistance will tell whether or not cancer is present in apparently healthy persons, if the test succeeds. Dr. Richter has already found very great changes in electrical skin resistance in patients known to have cancer of the lungs, stomach and breast.

To make the test, an electrode is fastened to the patient's ear. Another electrode on a roller wheel is run over the patient's skin while the doctor watches the galvanometer to see whether the skin's resistance to an electric current is higher or lower than normal.

In some cases Dr. Richter has studied the skin resistance was very high. These were cases of lung cancer in which the cancer was pressing on or had destroyed part of the sympathetic nervous system chain. The effect is the same as is seen when these nerves are cut surgically. The part of the skin supplied by them does not sweat and has very high electrical resistance.

So, in cancer testing by this method, if the roller electrode running over the patient's skin picks up an area of high resistance, it means pressure on or destruction of nerves supplying that area of skin. Since doctors know the path of nerves supplying various areas, they can tell where the pressure is and examine the patient further to see whether cancer or a non-cancerous tumor is causing it.

Very low electrical skin resistance, and sweating, will show up in areas where the cancer or tumor is causing pressure or destruction of certain other nerves. These are the ones operating the referred pain mechanism. By referred pain, doctors mean pain felt in the skin or at the surface of the body although the cause of it is located in one of the internal organs which may not even lie directly below the surface area that pains. Classic example is the pain of angina pectoris where the cause of the pain is in the heart but the pain is referred to and felt in the chest and a thin strip along the inner side of the upper arm.

Cancers of the digestive system might show up on the test by giving a low electrical skin resistance because the referred pain mechanism was affected. The referred pain mechanism is complicated and consequently the skin resistance test may not be practical for detecting all types of cancers.

Science News Letter, April 12, 1952

MEDICINE

Bathroom Sponge Grows Cancer Cells for Research

► **THE BATHROOM** sponge is now a tool for cancer research. Tiny slices of cellulose sponges are used for growing cancer cells outside the body.

This new technique, whereby cells can grow and change as they do inside the body, was announced at the National Cancer Institute by its inventor, Dr. Joseph Leighton, 30-year-old pathologist.

The sponge provides a sort of skeleton upon which the cells can grow and divide. In previous methods, when scientists put

cells into a culture, those cells multiplied, but the new cells were always like their parents. Now, with the sponge skeleton, new and different cells are formed from the first cells, just as in the human body.

By watching how the differences occur, scientists may get some clue as to how cancer cells, which are "different" from normal cells, develop.

The part of the body from which the cells were taken may now be discovered with this new method. Each organ in the body has its individual cell structure and the structure that grows in the sponge is therefore a clue. This may be useful when cancer from one organ has spread through the body and settled in other sites. Its structure will have the same characteristics as the place where the cancer originated.

Dr. Leighton also plans to put both normal and cancer cells from the same part of the body on the same sponge and watch the differences in their growth and division.

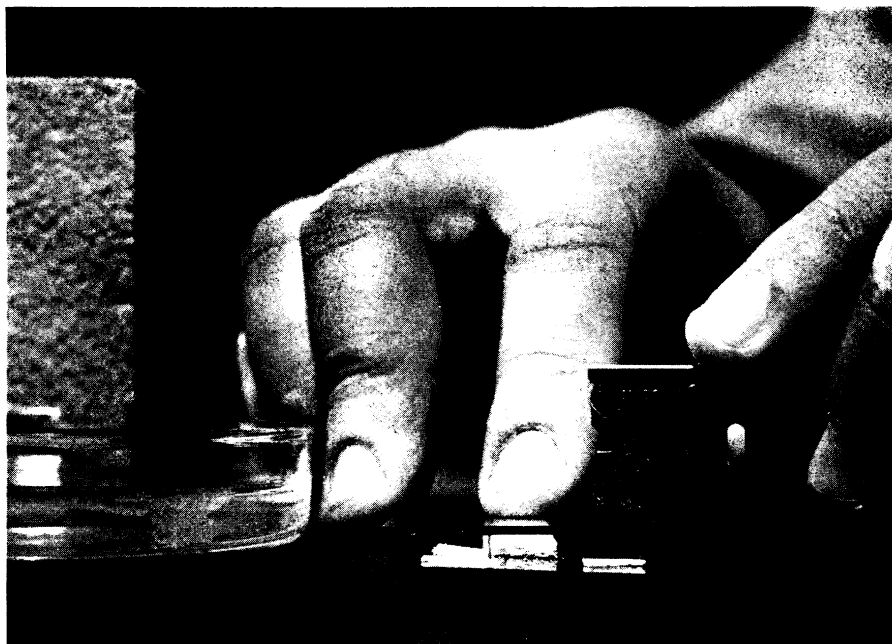
Science News Letter, April 12, 1952

BIOCHEMISTRY

Giant Molecules of Life Are Seen for First Time

► **SCIENTISTS HAVE** seen for the first time the giant chemical molecules that seem to play an important role in heredity and the changing of one disease into another.

Drs. John W. Rowen, Murray Eden and Herbert Kahler of the National Cancer In-



SPONGE FOR CANCER CELLS—The first step in the sponge method for tissue culture developed at the National Cancer Institute is pictured above. Using an ordinary razor blade, narrow strips are cut from the cellulose sponge. These are washed and sterilized before being placed in test tubes to receive implantations of tissue.

stitute, Bethesda, Md., announced to the American Chemical Society in Milwaukee that by the use of the electron microscope they had seen for the first time a single nucleic acid molecule.

This kind of macromolecule is found in large quantities in the hearts of living matter, particularly in the chromosomes and genes of all cells that carry on the biological stream of life.

These nucleic acid molecules are also the major constituents of viruses. The desoxyribose nucleic acid extracted from such bacteria as the pneumococci, staphylococci and colon bacillus has the extraordinary property of transforming one type of bacteria into another type. This transformation, known as mutation, takes place only when the nucleic acid molecule is present as a giant molecule.

The single molecule was found to be approximately one ten-millionth of an inch in diameter and approximately three 100-thousandths of an inch long.

Science News Letter, April 12, 1952

INVENTION

Half Life Measurement Made More Accurately

➤ MEASURING THE half life of radioactive materials when the half life is as short as one-thousandth of a second can be accurately done with a new method which received a patent recently.

Clyde E. Wiegand, Oakland, Calif., is the inventor and he has assigned his patent, number 2,590,057, to the Atomic Energy Commission.

Previous methods, such as impressing the radioactive pulse of the material on an oscilloscope, were inefficient for the short-lived materials, the inventor says. The present method feeds the pulses from a radioactive detector through a discriminator and a height-varying circuit to a multichannel differential pulse discriminator.

Science News Letter, April 12, 1952

PSYCHOLOGY

Frustration Is Killing

➤ FRUSTRATION can be killing.

Many a person, frustrated in a situation where he cannot release his pent-up feelings, has probably felt that this might be true. Now a scientist has shown that it is true, at least for mice. And the mouse studies, he believes, may provide a clue to some human breakdowns when there has been a cumulative effect of emotional inactivity, or frustration, on the patient's endurance.

The scientist is Dr. Peter Rabe of Jackson Memorial Laboratory, Bar Harbor, Me. The mice were frustrated by physical restraint. The greater the restraint, the greater was the frustration.

The mice were the kind that have convulsive seizures when exposed to the ringing of a bell. In Dr. Rabe's experiments, some of these mice were allowed to run freely in a large washtub while another group was penned in a small wire cage in the tub.

Ordinarily these mice begin to run when the bell starts to ring. Those in the wire cage did not have room to run. The animals free to run in the washtub showed only a 25% death rate. The animals unable to run because of confinement in the small cage showed an 85% death rate.

Dr. Rabe believes the prevention of the discharge of energy, inability to "work it off" when emotionally aroused by the ringing bell, made the difference because it caused a more violent frustration.

Dr. Rabe's findings with mice corroborate those of Dr. David Levy, New York child psychiatrist, that physical restraint and consequent frustration lead to abnormal behavior.

Dr. Rabe does not agree with the definition of frustration which says that frustration occurs when a desired object cannot be obtained. This, he says, is only a de-

scription of a situation which may lead to frustration. A better definition, in his opinion, is that frustration is a state of interruption or blockage in the organism's natural tendency toward tension adjustment, or toward keeping a balance between stimuli from the environment and reaction to the stimuli.

Science News Letter, April 12, 1952

SCIENCE NEWS LETTER

VOL. 61 APRIL 12, 1952 No. 15

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc. 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs. \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Copyright, 1952, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service. Science Service also publishes CHEMISTRY (monthly) and THINGS of Science (monthly).

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to periodical literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566 and 360 N. Michigan Ave., Chicago. STATE 2-4822.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Edwin G. Conklin, Princeton University; Karl Lark-Horowitz, Purdue University; Kirtley F. Mather, Harvard University. Nominated by the National Academy of Science: Harlow Shapley, Harvard College Observatory; R. A. Millikan, California Institute of Technology; L. A. Maynard, Cornell University. Nominated by the National Research Council: Ross G. Harrison, Yale University; Alexander Wetmore, Secretary, Smithsonian Institution; Rene J. Dubos, Rockefeller Institute for Medical Research. Nominated by the Journalistic Profession: A. H. Kirchofer, Buffalo Evening News; Neil H. Swanson, Baltimore Sun Papers; O. W. Riegel, Washington and Lee School of Journalism. Nominated by the E. W. Scripps Estate: Frank R. Ford, San Francisco News; John T. O'Rourke, Washington Daily News.

Officers—President: Harlow Shapley; Vice President and chairman of Executive Committee: Alexander Wetmore; Treasurer: O. W. Riegel; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Jane Stafford, A. C. Monahan, Marjorie Van de Water, Martha G. Morrow, Ann Ewing, Weddsworth Likely. Science Clubs of America: Joseph H. Kraus, Margaret E. Patterson. Photography: Fremont Davis. Sales and Advertising: Hallie Jenkins. Production: Priscilla Howe. In London: J. G. Feinberg.

Question Box

BIOCHEMISTRY

What chemical speeds the healing of wounds? p. 231.

What chemical will aid the fight against drug addiction? p. 237.

BIOPHYSICS

How will ultraviolet TV aid biologists? p. 232.

MEDICINE

What are the three tried and proven methods of curing cancer? p. 239.

Photographs: Cover, George Smith; p. 227, National Institutes of Health; p. 229, American Museum of Natural History; p. 231, U. S. Army; p. 234, U. S. Coast Guard.

OCEANOGRAPHY

Approximately how many icebergs break off from West Greenland each year? p. 235.

PHYSICS

What is a photo-slubber? p. 229.

PSYCHOLOGY

How did Harvard men place their bets against a pinball machine? p. 232.

RADIO

How can reception in far off places be tested? p. 236.