

## MEDICINE

# Progress in Cancer Fight

**Breakthrough in the cancer fight is seen from two avenues of approach, the virus theory and the development of chemicals that inhibit growth or destroy cancer cells**

**See Front Cover**

**By ANN EWING**

► **PROGRESS** in the fight against cancer is slow but sure.

The laboratory war to beat this silent invader of the body is being waged along two main avenues of attack.

One is on the theory that a virus or viruses cause cancer. If confirmed, this could lead to a vaccine protection somewhat like vaccines against the polio virus. Some virus-like particles have actually been found in and around cells taken from cancer patients.

The other is aimed at finding chemical compounds that will inhibit the growth of cancer cells or destroy them completely.

The photograph on the cover of this week's *SCIENCE NEWS LETTER* shows a section of a model of the important molecule, DNA, which is believed to be basic to all life. Construction of the model is significant since it indicates that the chemical components and their arrangement are known.

Some experts foresee a breakthrough in research within ten, or possibly, five years, and thus an eventual cure for one or more kinds of cancer not now curable. Others believe that progress will be much slower.

But virtually everyone agrees that each year more and more persons will join the 800,000 Americans who have been cured of the disease.

## Half Might Be Saved

Cancer is the second leading cause of death, now claiming about 250,000 lives annually. Unless new treatments and cures are found, one out of every four Americans now living will have some form of cancer during his lifetime.

This tragic waste could be reduced. Specialists estimate that one-half the patients with cancer could be alive and free of disease five years after treatment if the most modern methods of early diagnosis and proper care were available to everyone. The other 50% could not be cured by available methods and it is for this group that the most urgent attempts are being made to devise or discover effective chemical treatments.

The organizations most active in supporting this and other cancer research include the National Cancer Institute of the National Institutes of Health, the American Cancer Society, the Damon Runyon Memorial Fund for Cancer Research, the Sloan-Kettering Institute for Cancer Re-

search in New York and the Children's Hospital in Boston.

One of the most frequently asked questions today is, "Does smoking cause cancer?" Although a definite "Yes" or "No" answer still cannot be given, statisticians working for the American Cancer Society, who have studied death rates and smoking habits, suggest that there is a causal relationship. Among 187,783 men whose medical history was traced for an average of 44 months, the risk of developing lung cancer was at least ten times as great among smokers as non-smokers.

The men who smoked two or more packs of cigarettes per day had an age standardized death rate for lung cancer higher than the age standardized death rate in non-smokers for all forms of cancer combined. The statistics also showed that the death rate due to coronary artery disease increased directly with the number of cigarettes smoked.

Tobacco companies do not agree. They hold that statistics do not prove a causal relationship between smoking and cancer,

that the positive association shown might be expected to appear because of the manner in which the studies are made.

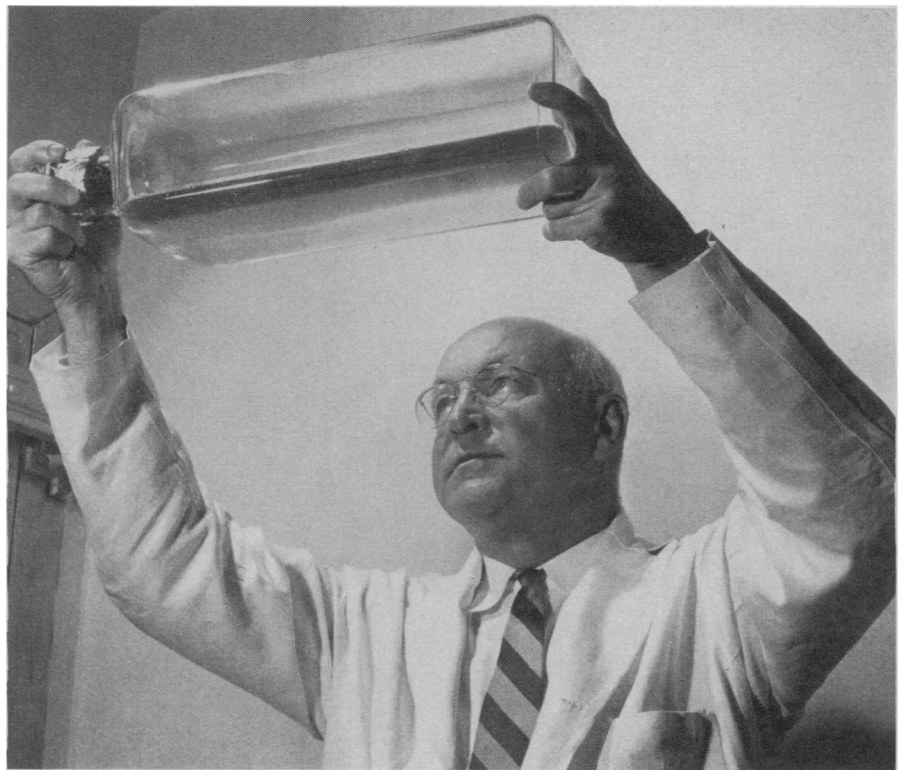
It has been demonstrated, however, that condensed cigarette tar obtained in a manner simulating human smoking habits can produce skin cancer in mice when painted on their skins. Most of the cancer-causing compounds are contained in a small percentage of the total tar.

Chemicals produced by gasoline combustion and by some industrial processes are also suspected as a contributing factor in lung cancer. (See *SNL*, July 26, p. 54.)

Research to confirm the theory that a virus or viruses cause cancer or are influential in its development is underway at many laboratories around the world. Not only have particles resembling viruses been found in cells of cancer patients, but a strain of mouse leukemia produced by a viral agent has been developed.

In other studies, cell-free filtrates from the brains of acute leukemia victims have been found to contain a substance that accelerated the development of leukemia in a strain of mice inclined to develop this disease. Identification of this accelerating factor may be a clue to the cause of leukemia in man.

The paradox that many chemicals or other factors that seem to start cancer will



**MILLIONS OF CELLS**—At the Bio-Chemical Virus Laboratory of the University of California, Dr. Wendell M. Stanley, head of the lab and 1936 Nobel Prize winner in chemistry, holds a culture bottle containing more than 10,000,000 living cells.

sometimes have a remissive effect on growing tumors seems to apply to viruses. Some viruses under certain conditions, for instance, will halt or prevent cancer growth.

That the body possesses some natural defenses against cancer was shown by a series of investigations made with volunteers from Ohio State Penitentiary who received injections of live cancer cells. (See SNL, July 26, p. 62.)

The intensive search for chemical agents of value against cancer has led to several classes of drugs that have some temporary growth-restraining action on some types of cancer in man.

One group is related to the nitrogen mustards, and more than 40 compounds of this type have been tested in man.

Another group is the antimetabolites, which can be divided into several categories. The antifolics, the purine analogues such as 6-mercaptopurine and the glutamine antagonists such as azaserine each have a distinctive method of action, and one type may work when the other is no longer effective.

Sex hormones, including the female hormones, or estrogens, and the male hormones, or androgens, and the adrenal steroids such as cortisone, have also been found effective in controlling or regressing cancer growth.

Among the other miscellaneous compounds that have been found effective are antibiotics such as actinomycin, and other drugs such as colchicine and urethane that do not fit into an established category.

Even with new drugs, however, the best way to treat cancer is likely always to be by catching it at the earliest possible moment, before it has had a chance to spread.

Projects to develop the application of the cytologic test (by which cancer is spotted from examination of the cells normally discarded by the body) for the diagnosis of cancer in other parts of the body are being supported by the National Cancer Institute.

An antigen, or substance that causes the formation of antibodies, has been isolated and purified, and was found to be a common component of many types of cancer. If this proves to be a consistent point of immunological difference between normal and cancer cells, the way could be opened for development of a general cancer diagnostic test.

There is now considerable evidence that during surgical removal of a localized cancer, malignant cells may spill into the blood vessels or lymphatic system. This is known as metastasis. The scattered cells may set up secondary growths, thus frustrating the successful removal of the local tumor.

On the basis of animal studies, it has been proposed to treat patients immediately after surgery with injections of nitrogen mustard or one of its relatives in an effort to destroy any scattered cells before they become firmly established as resistant secondary growths.

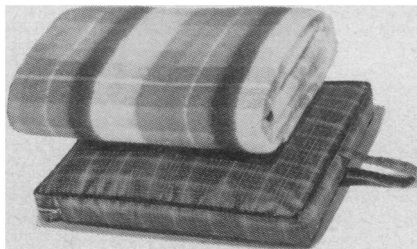
Radiation therapy for the treatment of cancer more and more involves the use of super-voltages, since in some instances results superior to those obtained with lower voltage X-ray therapy are obtained.

Radioactive isotopes are also widely used in cancer therapy.

Science News Letter, November 8, 1958

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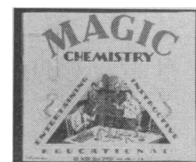
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