MEDICINE

Bright Future Foreseen

Advances in medical research concerned with anti-cancer drugs and virus diseases prompted scientists at the A.A.A.S. meeting to predict a bright future—By Ann Ewing

➤ IT WAS A HAPPY NEW YEAR that scientists concerned with research on anti-cancer drugs and virus diseases wished the world at the American Association for the Advancement of Science meeting in Cleveland.

Most of the good health wishes for 1964 were in the form of significant advances along many fronts in understanding how the body's cells, both normal and cancerous, react to specific drugs.

However, one significant advance is a new way to fight outbreaks of smallpox both in the United States and abroad. It is now ready for mass trial in the field. This method, although now discovered to be effective against certain virus diseases, is actually a valuable by-product of basic cancer research.

The drug that will be tested, probably this year in India if India and Pakistan complete their arrangement, is known as IUDR, short for 5-iodo-2'deoxyuridine.

IUDR is a known anti-cancer drug that is death-dealing when taken inside the body in doses high enough to kill the cancer.

IUDR is also the first drug known, when used in tiny amounts and applied outside the body, to be effective against a virus-caused disease, keratitis or conjunctivitis of the eye. Dilute IUDR is now used routinely by eye doctors for this treatment.

In trying to find some way to make IUDR effective against cancers without being lethal, Dr. Paul Calabresi and his co-workers at Yale University School of Medicine, New Haven, Conn., tested the effect of thymidine administered at the same time as IUDR.

Thymidine is an essential part of DNA or deoxyribonucleic acid, which is the genetic material carrying the codes by which all life is reproduced.

Because of IUDR's anti-viral action, vaccination tests were tried by Dr. Calabresi and his associates on cancer patients being treated with IUDR.

They found that patients who were under the double-barreled treatment of IUDR and thymidine and who had not been vaccinated in the past 20 or more years, had vaccinations that did not "take." However, if the same patients were vaccinated after the IUDR-thymidine treatments were stopped, the vaccinations did take.

This result showed such promise for treating the more deadly forms of smallpox, that Dr. Calabresi was alerted last year to try the method in New York after a South American with smallpox had landed there. He was not called then, but now is negotiating to fly to India and test IUDR there, where the death rate from smallpox runs from 50% to 90%.

Dr. Calabresi emphasized that the best way not to get smallpox is to have a vaccination. IUDR promises to be helpful only when a person already has a potent form of smallpox and it is too late for vaccination.

There are other cases of extremely rare virus diseases, such as simian B virus from a monkey bite, which is fatal to all, where treatment with IUDR would be justified.

The Yale workers are continuing their tests of the IUDR-thymidine combination as an anti-cancer treatment.

Another step to the understanding that will eventually result in a cancer cure was suggested by two scientists. Cancer cells can aid in their own destruction.

The action of the anti-cancer drug mitomycin must be triggered by enzymes carried by the malignant cells themselves.

Mitomycin is an antibiotic produced by streptomyces, a group of microorganisms that synthesize other "wonder drugs" such as streptomycin and the tetracyclines.

Mitomycin attacks DNA (deoxyribonucleic acid), the principal life-governing molecules in the cell, and fuses its two complementary strands. The DNA molecule thus becomes hopelessly tangled, losing its ability to reproduce.

By stopping the "replication" process, mitomycin checks the multiplication of cancer cells and the growth of the cancer.

Dr. Waclaw Szybalski of the University of Wisconsin Medical School, Madison, and Dr. V. N. Iyer of the Department of Agriculture, Ottawa, Canada, collaborated on this study, which clarifies the action mechanism of mitomycin.

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Al Danegger

REACTIONS PHOTOGRAPHED—A new hypodermic syringe enables chemists to "see" what happens in split-second chemical reactions by triggering a high-speed camera when it injects one solution into another. The syringe was developed by Richard Thompson, a graduate student at the University of Maryland, College Park, shown above with his invention, and his adviser, Dr. Gilbert Gordon.

GEOPHYSICS

Ocean Covers Four Seas

➤ FOUR OCEANS lie beneath the snows and ice of the Arctic Ocean.

Three submerged mountain ranges separate these oceans, Dr. Ned A. Ostenso of the University of Wisconsin, Madison, reported.

The mysterious geological structure of the top of the world is being studied by magnetic, gravity and seismic survey methods, he told the American Association for the Advancement of Science meeting in Cleveland.

Although geologists have closely figured out basic structures of the world's oceans, the Arctic Ocean has long remained a complex puzzle, he pointed out.

One submerged mountain system of the Arctic, the Lomonosov Ridge, rises 10,000 feet above the ocean floor and extends nearly 1,000 miles between the continental shelf near Ellesmere Island and the shelf north of the New Siberian Islands. Russians discovered this ridge in 1948-49.

Another mountain, the Alpha Ridge, rises 8,000 feet in the sea and closely parallels the Lomonosov.

The third mountain system, which may be a continuation of the Mid-Atlantic Ridge, reaches northward from Iceland across the Arctic Ocean.

The structure of the earth's crust beneath the oceans is quite different from that beneath the continents, Dr. Ostenso pointed out. The continents are composed of relatively light granite-like rocks, whereas the ocean basins are made of denser material.

Thus the lighter continents "float" above the general level of the ocean floors, and keep rising as wind, rain and other forces of erosion contantly wear them down.

If continents did not continue to "float" and slowly rise during the ages, they would be worn down, he said.

Approximately three to six feet of land are eroded away and washed to the sea every 5,000 to 10,000 years. A continent such as North America, for instance, could have been eroded down to sea level more than 800 times during the history of the earth.

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