MEDICINE

New Cancer Weapon Seen

A new powerful antibiotic, actinomycin X2, that acts on the basic chemical machinery of cancer cells growing in test tubes has been discovered, Faye Marley reports.

➤ CANCER CELLS growing in test tubes have been disrupted by a powerful antibiotic striking at the basic chemical machinery of the cell—the genes and chemicals that produce protein.

One of the 16 forms of actinomycins—actinomycin X2—has been found to be far more potent than any of the other 15. Even actinomycin D, which has been helpful against cancers of the kidney in children and some other sites, was only one-half as potent as X2, the American Cancer Society announced in New York.

But more important than its potency is the molecular mechanism by which actinomycin X2 acts. Two University of Chicago scientists, Drs. Irving H. Goldberg and M. Rabinowitz, with Dr. E. Reich of Rockefeller Institute, New York, all working at the University's Argonne Cancer Research Hospital, discovered this mechanism.

The researchers found that the actinomycins, especially X2, stuck to guanine, one of the paired segments of DNA (deoxyribonucleic acid), which is found in the nucleus of cells controlling transmission of heredity traits. The DNA could not function when the guanine component was inhibited.

DNA directly or indirectly manufactures ribonucleic acid (RNA), which normally manufactures protein. With DNA not functioning, no RNA was made and consequently no new protein was produced.

The paired segments of DNA are guanine-cystosine and adeninethymine. Different combinations of these four segments made available to actinomycin-poisoned cells are expected to undo some of the damage and make possible a logical approach to the production of anti-cancer and anti-bacterial drugs.

Whether actinomycin X2 will now be tested against cancers growing in laboratory animals and, if it proves effective and safe, against human cancers, is up to other scientists concerned with the treatment of cancer.

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MEDICINE

Mental Deficiency Drugs

➤ INJECTION of drugs in the future may help control mental deficiency, especially the kind that runs in families, a University of Oregon professor has predicted.

The prediction is based on the fact that rats injected with tiny amounts of strychnine, a poisonous alkaloid, learn tasks more quickly and make fewer errors in learning them than untreated animals, Dr. James L. McGaugh, associate professor of psychology, said in the scientific journal Psychopharmacologia.

"When enough is known about this behavior," Dr. McGaugh said, "it might be possible for pharmacologists and neurophysiologists to develop similar, but less toxic, drugs which might be of help in controlling mental deficiency, especially of the familial type."

Dr. McGaugh's work involves the revival of a theory of learning and laboratory observations of the late K. S. Lashley, a pioneer research psychologist, who reported the stimulating effect of strychnine on the learning of maze running by rats in 1917. The findings were largely ignored until the late 1950's when Dr. McGaugh and his former collaborator, Dr. Lewis Petrinovich, now at San Francisco State College, repeated the Lashley experiments and then expanded them.

This learning theory proposes that, following the practice of a new task, there is some kind of biochemical or electrical activity in the central nervous system that consolidates the memory of the task so it can be recalled at a later time. Any interference in this consolidation period will result in slow learning or loss of memory.

The experimental theory has been supported clinically by amnesia of the type frequently suffered by persons with head injuries in which they cannot recall the events immediately preceding the injuries.

Dr. McGaugh and other scientists have shown the same blackout of memory in rats by subjecting the animals to electro-convulsive shocks immediately following practice of a new task. The longer the time after the task that the shock is administered, the less the memory loss, indicating that some memory consolidation may take place in the time interval before the shock, Dr. McGaugh reported.

Dr. McGaugh has just returned from a year as a National Academy of Sciences-National Research Council postdoctoral fellow in Rome, where he worked with Dr. Daniel Bovet, who won the 1957 Nobel Prize in Medicine and Physiology for the development of antihistamines.

Dr. McGaugh will continue his studies of memory and learning, using a variety of other drugs. He is working under a grant from the Institute of Mental Health of the U.S. Public Health Service.

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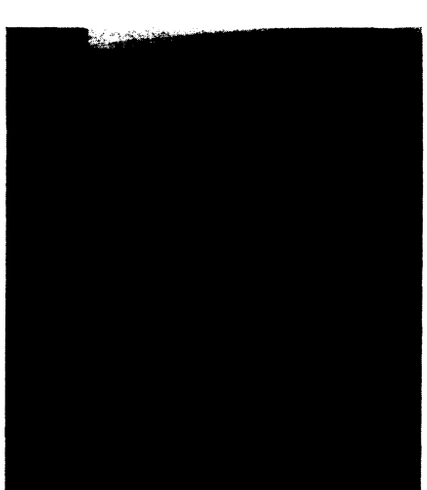

General Dynamics

REACTOR MOSAIC—A large mosaic portraying the tremendous energy and scope of the peaceful atom mounted on the new TRIGA nuclear research reactor at Kansas State University is the creation of students there. The mosaic contains nearly 10,000 pieces of colored glass. At the lower left are "hands of supplication."

MEDICINE

New Jaundice Test Shows Children-Adult Difference

➤ A SIMPLE CHEMICAL test which requires a drop of blood will help doctors diagnose jaundice before it is visible in patients.

In working out the test, it was learned that there is a basic difference in child and adult jaundice patients, Dr. Sam J. Piliero, New York Medical College, said.

Children with jaundice have a higher bilirubin (reddish bile pigment) count in the blood than do adults. This is caused by the affinity of elastic tissues, such as blood vessels, for the jaundice-causing bilirubin. Tissues in children absorb bilirubin with greater ease because they are more elastic.

Because the new test requires minute amounts of blood in comparison with older methods, it will be especially useful with very young children, in screening blood banks, diagnosing emergency night cases when a doctor is unsure about starting treatment and in following the progress of a jaundice cure.

The old jaundice bilirubin serum test demands large quantities of blood. With the new method a single drop is placed in a tiny tube containing potassium dichromate acidified with sulfuric acid. Each tube is centrifuged and its contents compared, with the aid of a hand lens, to a normal plasma. By means of a scale based on standard plasma samples of minute amounts of blood, a jaundice case can be diagnosed.

Dr. Raymond L. Casella, also of New York Medical College, collaborated with Dr. Piliero in developing the test.

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