

BIOLOGY

Virus Has "New" DNA

A single strand of DNA, or deoxyribose nucleic acid, has been found in a dwarf virus, a discovery that may revolutionize current concepts in the mechanisms of heredity.

► THE BASIC, simple hereditary chemical found in all living things, DNA, has been further simplified.

A dwarf virus known to infect and destroy sewage bacteria may be causing a profound change in our ideas on the mechanism of heredity.

A biochemist at the California Institute of Technology reported that he has found this dwarf virus with only one strand, not two, of DNA. In this respect the virus might be described as a simpler form of life, Dr. Robert L. Sinsheimer explained.

It consists of a single strand of DNA, or deoxyribose nucleic acid, wrapped in a skin of protein. An additional simplification is that its DNA strand is composed of only one molecule compared with as many as ten molecules for some other viruses.

A new problem raised by this discovery is how does the virus duplicate itself or reproduce?

Until now it has been believed that when a living cell divides, the two intertwined DNA strands pull apart, each serving as a kind of template or mold upon which a complementary strand is assembled. When

a virus invades a cell, it was thought, each strand "picks up" chemical compounds, nucleotides, from the cell fluid which then go into making new identical strands of DNA.

Now, Dr. Sinsheimer reported, it appears that a single strand is enough for the virus to multiply. Twenty minutes after the dwarf virus, Phi X, invades a cell, it forces the cell to manufacture about 300 Phi X viruses, each capable of infecting a new cell.

It is not known if the dwarf virus is unique or if other organisms have only one DNA strand. About two dozen kinds of DNA have been analyzed and all are in the double-strand form. The single strand, however, appears to be built on the same pattern as the usual double strand DNA. It is made up of "beads" of nucleotides.

Dr. Sinsheimer's research is supported by the U. S. Public Health Service and the American Cancer Society. It is possible that an altered DNA may be responsible for the formation of cancer cells from normal cells that have been genetically changed.

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The study was conducted by Dr. Ernst Epstein of Marshfield, Wis., and appears in the *Journal of the American Medical Association* (March 7).

His study was conducted in 1958 while he was serving as a captain in the Army medical corps in Korea.

A treatment failure rate of 20% is unusual and unsatisfactory in view of the fact that the failure rate has been between one and five per cent, he points out. In addition, ten times as much penicillin was used on the group in this study as was used on the low failure rate groups.

Dr. Epstein cited earlier reports from Great Britain that indicated a growing resistance to penicillin by strains of gonorrhoea.

Gonorrhoea can no longer be considered lightheartedly as a disease with a certain cure and that affects the body to a lesser degree than the common cold. It is probably only a matter of time until resistance to penicillin will become a world-wide problem, he said.

In all likelihood, various types of "provocative" tests will again have to be performed to ascertain a cure.

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MEDICINE

FM "Broadcasts" Warn Of Heart Troubles

► ADVANCE WARNING of heart troubles to come may be foretold some day by FM "broadcasts" of sounds inaudible to the human ear.

This is the promise of research being carried out by Dr. Clarence M. Agress and Louis G. Fields of the University of California at Los Angeles Medical School and the Los Angeles Veterans Administration.

A new method of analyzing heart sounds in a broad range of frequencies has been developed. A special microphone placed over the heart picks up the many vibrations made by the heart. Electronic "ears" sensitive to particular frequencies help sort the various vibrations for recording on a multi-channel FM tape system.

Emphasis is on heretofore little studied low-frequency vibrations. These reflect activity of the heart muscle itself as well as valve sounds which dominate the usual audible range of the stethoscope and standard phonocardiogram.

Preliminary experiments have demonstrated subtle changes in heart vibration waves (spectrosonograms) induced by smoking or decreased oxygen supply, not apparent in electrocardiograms. Minute heart damage in experimental animals, also not reflected in the electrocardiogram, was detected by the new method.

Preliminary indications are that the new method may be a promising approach to much earlier diagnosis of heart problems and in estimating the functional status of the heart.

Instrumentation used in the study is being designed for inclusion in a "package" for physiologically monitoring space travelers.

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PHOTOGRAPHY

Photogrammetry Aids Art

► EXACT reproductions of cultural-historical objects can now be made by photogrammetric charting methods.

In a demonstration at the Ethnological Museum, Stockholm, Sweden, by a research team from the Royal College of Technology headed by Prof. Bertil Hallert, various objects were presented in their original and copied forms, which showed how quickly, cheaply and simply the reproductions could be made.

For example, a dummy in historical costume, borrowed from the Nordic museum, had been photogrammetrically copied and later reproduced on a smaller scale. An African copper rooster from Nigeria had been reproduced in a metal alloy to full scale by the same technique.

In an exterior sketch of the Swedish Rosendal Castle, precise measurements of the roof were made possible by aerial photography, which could not have been done even by climbing up on the roof and measuring it.

Prof. Hallert said that the human visage may be charted by stereo-photography with contours, just as is done in charting a field sector. A mask can later be modeled from these contours.

Cultural-historical researchers and students will be admitted to photogrammetric training courses at the college's Institute of

Photogrammetry. Such technical training will be invaluable in making surveys of rural communities or reproducing ethnological costumes and objects.

It is high time, not least because of the present political tension in the world, Prof. Hallert emphasized, that adequate measures be taken to chart cultural-historical objects by this new photogrammetric method, and to store the material in bombproof archives.

Continuous control of the stored material's photographic quality would be necessary. We must not only plan ten or 100 years ahead, Prof. Hallert said, but we must plan in time units of thousands of years.

Science News Letter, March 21, 1959

MEDICINE

Gonorrhoea Stages Rally As Penicillin Fails

► THE BELIEF that the gonorrhoea bacterium is adapting itself to outfox penicillin has received additional support.

A study of 146 servicemen infected with gonorrhoea and treated with a series of five daily injections of penicillin showed that there was a 20% failure to cure the disease, indicating that this venereal disease strain may be staging a comeback.