

BIOLOGY

Life Created in Test Tube

The creation of life in a test tube from lifeless chemicals has been achieved simultaneously in two U. S. university laboratories, William E. Small reports.

► LIFE has been created in a test tube from inert chemicals.

An infective virus, a tiny organism in the class that causes much of the sickness and death in the world, has been manufactured from four chemical materials by large molecules taken from infected plant cells. Scientists in two university laboratories achieved this success at the same time, SCIENCE SERVICE learned.

The viruses live, grow, reproduce and infect just as "normal" viruses do.

Independent research by Drs. Samuel G. Wildman and Young Tai Kim of the University of California, Los Angeles, and Dr. George W. Cochran and his team at Utah State University, Logan, led to the creation of tobacco mosaic virus using identical chemicals and the same methods.

Dr. Cochran reported his experiments at the American Institute of Biological Sciences in Corvallis, Ore., on Aug. 27. Dr. Wildman reported his findings in Biochemical and Biophysical Research Communications, Aug. 7, 1962.

Viruses have always been linked with living cells, Dr. Cochran said in Washington, D. C. It has been thought for some

time the tobacco mosaic virus invades the cell nucleus of a tobacco leaf and uses nuclear DNA (deoxyribonucleic acid) as templates for turning out the virus RNA (ribonucleic acid).

The scientists have shown for the first time, however, that virus synthesis or creation can take place away from a living cell.

A leading expert on the tiny organisms, Dr. Wendell M. Stanley, Novelist and professor of biochemistry and virology at the University of California, Berkeley, told this reporter by telephone that he believes viruses are the simplest forms of life. It probably is the first such creation of living forms, he said.

Dr. Stanley separated and reformed viruses as early as 1955, but this was only partial synthesis.

The tobacco mosaic virus was created in the two laboratories using juice squeezed from infected tobacco plants. Large molecules, probably the nuclei of the cells, were placed in test tubes and four chemicals—adenosine, guanosine, cytidine and uridine triphosphates—were added.

The four chemicals were linked together to form a long, complex chain molecule

known as nucleic acid, the heart of a living, infectious virus.

The combination has worked, in repeated experiments in both laboratories, to produce more synthesizing molecules that make more virus. Only when put together in the proper sequence do the chemicals make the infective virus.

In the laboratory, more than 100 billion new virus units have been created in less than 30 minutes, the two teams reported. Virus formation begins as soon as the chemicals are added.

Radioactive adenosine triphosphate (ATP) has been used to check the experiment and prove the synthesizing molecules could continue to make viruses indefinitely, Dr. Cochran said. ATP was forced into the new viruses. These were then washed to clean off any additional ATP. The same molecules produced three additional batches of infective radioactive virus in quick succession.

The synthesizing molecules are apparently extracted from the nuclei of the plant cells. They can synthesize new virus more effectively when they are liberated from the nuclear structure.

The experiments open the doors to intensive research on the formation of the virus and how these tiny organisms produce disease.

Viruses may well be on their way to extinction, Dr. Cochran believes, since this major breakthrough answers the question of how viruses multiply. The actual biochemistry of virus formation can be studied without the complications of other cellular processes.

Test tube synthesis of viruses has long been a goal of scientists. Since to date all virus work is dependent on reproduction of virus in living cells, the ability to synthesize the virus in the test tube would speed up all work and lead to new approaches to control virus diseases.

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MARINE BIOLOGY

Oyster Parasites Attacked in Studies

► RESEARCH to help combat a fungus parasite that is killing oysters in the Gulf of Mexico and South Atlantic will be conducted by a marine biologist of Texas A & M College.

Dr. S. M. Ray will investigate the effects of antibiotics on fungus parasites in oysters with the help of a \$5,175 grant from the National Institutes of Health. Dr. Ray, an assistant professor of oceanography, will conduct his research at the A & M Marine Laboratory at Fort Crockett, Galveston.

The fungus parasite, *Dermocystidium marinum*, is the cause of considerable mortality to oysters in warm seasons in relatively high salinity ocean areas, Dr. Ray said. Oyster beds are being depleted drastically and the industry is failing.

He will conduct physiological and nutritional studies of oysters under laboratory conditions, testing all commercially available antifungal antibiotics for effects on the oyster fungus parasite.

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CREATION OF LIFE—An international team of scientists create life. Left to right: Calvin Lamborn, United States; M. H. Lee, Nationalist China; Dr. George W. Cochran, U.S., head of the research; B. K. Chandrasekhar, India; Dr. A. S. Dhaliwal, India; Mrs. Mikulska-Macheta, Poland; and Miss Helen Lu Sheng Wang and Andrew Hsu, Nationalist China. These workers put newly formed virus on bean leaves to prove the viruses are formed.