BIOCHEMISTRY

# Chemical "Brain" DNA

➤ THE CHEMICAL "brain" of a virus that orders the creation of more viruses has been isolated for the first time. It is not like a real brain, but is the chemical unit that gives instructions for formation of another virus.

The chemical is deoxyribonucleic acid, or DNA. It is a double-strand "brain," shaped like two intertwined corkscrews, and can be isolated from the virus and transplanted into a new host cell where it begins to function again.

The discovery gives scientists a system that they can control in their search for clues to the basic genetic code governing the production of living cells. It was reported to the Fifth International Congress on Biochemistry in Moscow.

Drs. Earl Evans Jr., Roy P. Mackal and Franz Meyer, all of the University of Chicago, have shown for the first time that DNA by itself can command a complete new cell. The "assistance" of proteins or ribonucleic acid is not necessary.

DNA is thus shown to be identical with the genetic matter of the cell. It was isolated from the virus known as lambda. Examination of the chemical properties of the lambda DNA shows that it resembles those of the DNA found in the genes of living cells in possessing double helical structure.

"This is the first time that a DNA having a double helical structure has been shown to be infectious," the biochemists said.

Before any major claims can be made for the code-breaking capability of the double-stranded lambda virus DNA, attempts must be made to do the "deciphering job," they said. Theoretically, with each variation that is made in the test tube in DNA's chemical structure, a similar change will result in the type of protein manufactured.

They said the laboratory work took advantage of the knowledge that the lambda virus "languishes inside an intestinal bacillus of man in another chemical form, called a 'provirus'."

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BIOCHEMISTRY

# Mitochondrion Explained

➤ A FULL ACCOUNT of an eight-year study of the mitochondrion—a key biochemical machine that is the principal energy provider of all oxygen-using cells—has been given by Dr. D. E. Green, University of Wisconsin professor.

When enlarged a million times, the mitochondrion looks like an enlongated cake in which large numbers of raisins are embedded in regular array, Dr. Green told the International Congress of Biochemistry in Moscow. The raisins are the elements that do the work of the mitochondrion, and the cake is the structural network in which the raisins are mounted and supported.

"Each such raisin," Prof. Green said, "is known as the elementary particle, which is the complete functional unit. There are some 17,000 such units in a single mitochondrion of beef heart."

These particles carry out the complete oxidation of pyruvic acid (an acid normally produced in the body during a stage in the breaking down of carbohydrates or proteins) to carbon dioxide and water. During this combustion process, energy of oxidation is converted to chemical energy that is stored in the chemical, adenosine triphosphate or ATP.

Prof. Green said that in the structural arrangements he described as raisins in a cake, the raisins differ from one biochemical machine to another but the cakes in which these particles are embedded are much the same in design and arrangement.

"Two elements make up the cake," he said, explaining that a special protein known as the structural protein, which is a huge polymer (a long molecule) is inextricably tied up with lipid. The biochemical raisins are imbedded within this matrix of structural protein and lipid, and the matrix serves to keep the functional elements in just the right shape and posture to do their work properly.

Prof. Green said "the elementary particle has a kind of bucket brigade for moving electrons from pyruvic acid to oxygen," which is a basic step in the oxidation of sugar. At least 11 different components are lined up in sequence to make up this chain.

"If we think of the oxidation of pyruvic acid as the transfer of electrons from pyruvic acid through the chain and finally to oxygen," he said, "then in the passage of a pair of electrons through this chain, three molecules of inorganic phosphate are converted to the terminal phosphate groups of ATP."

Some of the most important biochemicals have a place of honor on this chain, Prof. Green said. They include flavin, one of the B vitamins; heme, the active component of red blood cells; iron in a form other than heme iron; copper, and a newly discovered benzoquinone called coenzyme Q.

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PUBLIC HEALTH

## One-Sided Gum Chewers Get "Jaw-Joint" Earache

➤ IF YOU MUST chew gum, be sure to chew on both sides of the mouth. Otherwise you may get "jaw joint syndrome."

Dr. Robert D. Ralph, an ear doctor at Group Health Association, Inc., Washington, said people who chew gum to relieve tension (consciously or unconsciously) usually chew on one side only.

After two or three hours of doing so an earache results in the opposite ear, Dr. Ralph explained, "since the ear canal and the jaw joint receive their nerve supply from a common source."

The tenderness in the ear disappears quickly when patients start chewing their gum on both sides of the jaws. In the meantime, the otologist said, aspirin will relieve the earache.

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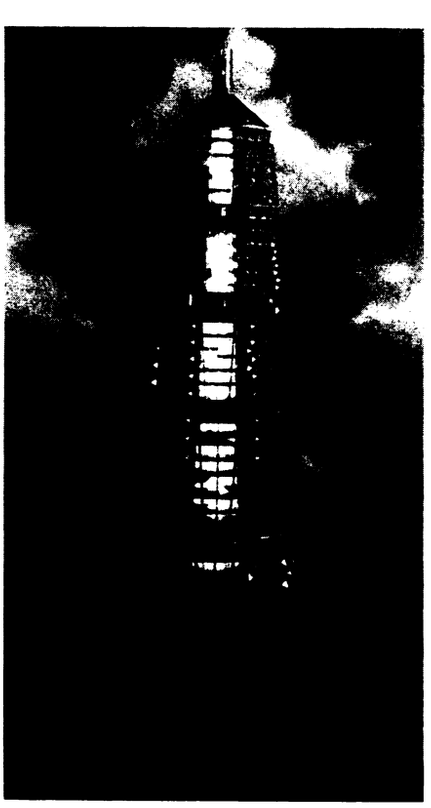

*CRYSTAL SHOW PLACE—A crystal palace containing five exhibit halls surrounding a core over 1,000 feet high is slated to become the showplace for British industry. The $30,000,000 project will have 1,000,000 feet of floor space.*

MEDICINE

## Computer System Seen for Hospitals

➤ A COMPUTER SYSTEM to replace expensive manual records was proposed at the International Conference on Medical Electronics in New York.

Dr. Mark S. Blumberg of Stanford Research Institute, Menlo Park, Calif., said that about five percent of a hospital's budget is spent on manual systems to be sure that nurses fill the doctors' orders, particularly those for medicine.

A Hospital Indicator for Physicians' Orders (HIPO) will soon be a necessity, Dr. Blumberg believes. Not only is the present system expensive, it allows opportunity for error.

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