

BIOCHEMISTRY

Chemical Mystery Solved

Chemical studies of bacteria have explained one of the fundamental life processes, the mechanism by which food energy is converted into energy capable of supporting life.

► THE MYSTERY surrounding one of the most elementary chemical reactions basic to life has been unraveled. The solution may lead to a better understanding of cancer, a Yale University biochemist told chemists at the American Chemical Society meeting in New York.

The mechanism by which food energy is converted to energy forms that can be used by living tissue was reported by Dr. Gifford B. Pinchot. His explanation also clarifies the function of ribose nucleic acid, or RNA, in cells. Until now scientists have been at a loss to explain RNA's function in cells.

Scientists long have known that body energy is obtained from the step-by-step breakdown and oxidation of food. The way in which the breakdown takes place is well-understood. However, the scientists have faced a blank wall in trying to understand how the resulting energy is transformed into a type of energy that can support life, a process called oxidative phosphorylation.

The enzyme system responsible for the energy transformation earlier had been broken down into its components at Yale. Among the components, Dr. Pinchot found a fraction that did not appear to be an enzyme. A year of study proved it to be "a polynucleotide of the ribose nucleic acid type," a complex chemical compound oc-

curring in cell nuclei. Variation in RNA behavior is believed to be related to the occurrence of cancer.

"It has frequently been suggested that the primary difference between cancer and normal cells may consist in a disturbed energy metabolism in the malignant cells," Dr. Pinchot said, "and it is obvious that a thorough knowledge of the normal process is required before one can evaluate changes in the disease."

In seeking knowledge of the normal process, Dr. Pinchot has found that the RNA acts by binding the enzymes of the oxidative phosphorylation to each other. Thus the RNA functions as a coenzyme that binds energy-producing enzymes to the cell.

At the same meeting of biochemists, a Harvard University Medical School scientist, Dr. A. F. Brodie, described vitamin K, a fat-soluble vitamin necessary for growth, as a coenzyme "vital in respiration and conversion of food substances into energy."

Both scientists used bacteria as the life forms necessary in their studies of energy transfer. Dr. Brodie believes "an immediate application" of his work could be the development of compounds capable of destroying bacteria by blocking the energy transfer process.

► CHEMICAL compounds having strong activity against high blood pressure were also reported to the chemists.

The drugs, which have not yet been given trade names, are known as ganglionic-blocking agents and, because of their greater activity, may replace some hypotensive agents now available to physicians, Drs. Rex Pinson, D. E. Hutcheon and S. Y. P'an, Charles Pfizer & Company, Inc., Brooklyn, said.

The drugs are described as "chemical surgeons" because they accomplish an effect previously accomplished by surgery.

Ganglionic-blocking agents block the passage of nerve impulses through the junction points on the way to artery walls. These impulses, if allowed to proceed, would constrict the artery walls and cause higher blood pressure. For some years high blood pressure has been treated surgically, in some cases by cutting the nerves which cause the artery walls to contract.

Some of the new compounds, chemically known as bisquaternary benzylalkalenediamine derivatives, are said to be twice as potent as the most powerful blocking agents now available.

Dr. Pinson said that the most promising of the new compounds is now undergoing clinical trial.

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● RADIO

Sat., Sept. 28, 1957, 1:30-1:45 p.m., EDT. "Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Henry A. Imus, assistant to the director of the National Institute of Neurological Diseases and Blindness, National Institutes of Health, Bethesda, Md., will discuss "Neurological Diseases and Blindness."



SAFE LANDING—For the first time at low, or ground-level, altitude a pilot has safely used a new type ejection seat that promises to save hundreds of pilots' lives. In the composite photograph is shown the entire operation in which the pilot is "fired" by a catapult mechanism high enough into the air to provide time for three stages of parachutes to open for his descent to the ground. The test was performed from a Grumman F9F-8T Cougar, a two-seat jet fighter, flown down the runway at 120 knots, just off the ground. The demonstration was conducted jointly by the Navy and Grumman Aircraft, Bethpage, N. Y., the firm contracted to evaluate the ejection seat. Flight lieutenant Sydney Hughes, RAF, made the test at the Navy's Air Test Center, Patuxent, Md.