

CHEMISTRY

Coenzyme A Synthesized

Coenzyme A, believed to be related to the vitamin B complex, has been successfully synthesized more than ten years after the discovery of this vital material.

► THE CHEMICAL synthesis of a complex natural substance, needed by every cell of all living things, has been achieved.

Hailed as a significant advance in the quest for a complete understanding of life processes, the test tube production of coenzyme A was described by Drs. John Moffatt, and H. Gobind Khorans, University of British Columbia, at the American Chemical Society meeting in Boston.

A way to make coenzyme A has eluded chemists ever since the vital material was discovered in 1945. The British Columbia scientists had been working on the project for about seven years. The total synthesis has opened a whole new field of biochemical research into life processes.

Some scientists regard the availability of the coenzyme as having special significance for the important study of nucleic acids. These acids are the basic cell mate-

rials for every living thing, and determine the characteristics of the cell.

The chemical triumph has earned high praise from other outstanding scientists. The discoverer of coenzyme A, Nobel laureate Dr. Fritz Lipmann of the Rockefeller Institute for Medical Research, New York, observed:

"This feat is a beautiful piece of chemical artistry in putting together a most complex biochemical unit."

Although less complicated than the enzymes with which it works, coenzyme A is an elaborate arrangement of carbon, sulfur, nitrogen, phosphorus, oxygen and hydrogen atoms linked together. Part of the coenzyme A molecule is pantothenic acid, a growth factor which is part of the vitamin B complex. In fact, the coenzyme is thought to be the biologically active form of pantothenic acid.

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a "greater reduction of spontaneous activity of mice." Also anesthesia induced by these two drugs was effective for a longer time when nicotinamide was given. Drs. Robert M. Burton, Washington University School of Medicine, St. Louis, Nathan O. Kaplan, Brandeis University, Waltham, Mass., and Abraham Goldin, National Cancer Institute, Bethesda, Md., reported results of their research to scientists attending the American Chemical Society.

Previous research had shown that giving nicotinamide results in a large increase of the coenzyme diphosphopyridine nucleotide (DPN) in an animal's tissues.

DPN is involved in many of the body's reactions, the scientists said, and the high concentration obtained with nicotinamide may be related to the increased tranquilizing effect it causes.

The researchers found it was necessary to give the vitamin at the same time as the drug or four hours after to get maximum effects. Giving it four hours before did not increase DPN levels.

These studies may provide more information on how tranquilizers work, and result in tailor-made drugs.

"Since mental health is the chief medical problem today, the study of neurochemistry assumes considerable importance," the chemists pointed out.

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Discoveries in Chemistry

Chemists are continually adding to the number of drugs man has to combat disease and pests. Some of the new ones are adding to our knowledge of how the body functions.

► A LIVING insecticide which will not harm man, animals, or plants was announced at the American Chemical Society meeting in Boston, Mass. Called Thuricide, it is made from the living spores of the microorganism *Bacillus thuringiensis* Berliner.

Dr. Robert Fisher, Bioferm Corporation, Wasco, Calif., called volunteers for his clinical studies "pioneers," because no such previous experiments had been made. The U. S. Food and Drug Administration on Dec. 10, 1958, temporarily allowed the chemical to be tried on humans because scientific data showed "the proposed use as a pesticide is without hazard to health."

Thuricide is the first microbial insecticide to receive such a recognition of safety.

Muscle Relaxant

► A NATURAL PROTEIN-FREE substance has been found that causes muscles to relax.

The finding of this substance may help scientists to understand diseases where muscle relaxation is not normal, Drs. Charles J. Parker Jr. of Massachusetts General Hospital and John Gergely of Harvard University told the meeting.

The two biochemists had shown last year that the chemical system for relaxing muscles has three different components. Further studies have shown that when all three of these elements are together, the new-found substance can be extracted, and made to prevent the contraction of muscle threads.

The discovery is important for understanding the basic chemical mechanism by which muscles contract and relax, Dr. Gergely said. Muscle action can be either reflex or voluntary, he explained, but the chemical action within the cells is the same in either case, and the extracted substance seems to be the basic controlling factor.

It is known the extract is protein-free and has no tissue or cells, but it has not yet been named, and further studies must be made to determine its characteristics.

Tranquilizing Drugs

► NICOTINAMIDE, an essential vitamin used in the treatment of pellagra, increases the tranquilizing effects of certain drugs, three researchers reported.

Tests with laboratory animals showed that when the vitamin was given together with reserpine or chlorpromazine, there was



DEPRESSION DRUG—These crystals, seen through the microscope, show the fine structure of a new drug for overcoming severe mental depression. The new compound, called Niamid, was described to the American Chemical Society by a team of scientists at Chas. Pfizer and Co., Inc. The drug is more potent and much less toxic than others currently available to physicians, animal tests indicate. Extensive clinical trials of Niamid are now underway. However, the drug is not yet available for general use by the medical profession.