BIOCHEMISTRY

DNA Pieces Synthesized

The deciphering of the genetic code of life has been brought closer to realization by the synthesis of small pieces of genetic material—By Faye Marley

➤ IMPROVEMENT of human heredity is at the tip of the biologist's fingers as researchers at the University of Wisconsin report new techniques that will probably lead to final steps in deciphering the genetic code.

Synthesis of small DNA (deoxyribonucleic acid) models after ten years of work by Dr. H. Gobind Khorana and his team has been achieved through variations of chemical methods.

Two approaches were developed, Dr. T. Mathai Jacob, a member of Dr. Khorana's research group, told a session of the 48th annual meeting of the Federation of American Societies for Experimental Biology in Chicago. One method adds code letters one at a time to a growing chain. The other uses a process called polymerization to run together preformed pairs of code letters.

Correct linkage between the four chemical "letters" was brought about by two chemicals—tools that now give the biologist a way to put together short chains of code letters in any desired sequence.

The first of the two chemicals used as coupling reagents was a compound called dicyclohexylcarbodiimide, developed by Dr. Khorana after several years of work. The other was easier. Mesitylene sulfonyl chloride was described as being "literally discovered off-the-shelf," as it is a relatively simple organic compound easily obtained. One or the other of these coupling agents is used in each step of a synthesis.

The reason the ability to prepare short model DNA chains is important is that it is likely that long chains can be prepared from these short ones through use of enzymes. Through the enzyme DNA polymerase, discovered by Dr. Albert Kornberg at Stanford University, long chains of DNA can be made from the short ones. Another enzyme, RNA (ribonucleic acid) polymerase, acts on synthetic DNA to form longer chains of RNA. Messenger RNA directs the making of proteins by ribosomes within the cells.

Both Dr. Khorana and Dr. Jacob were born in India.

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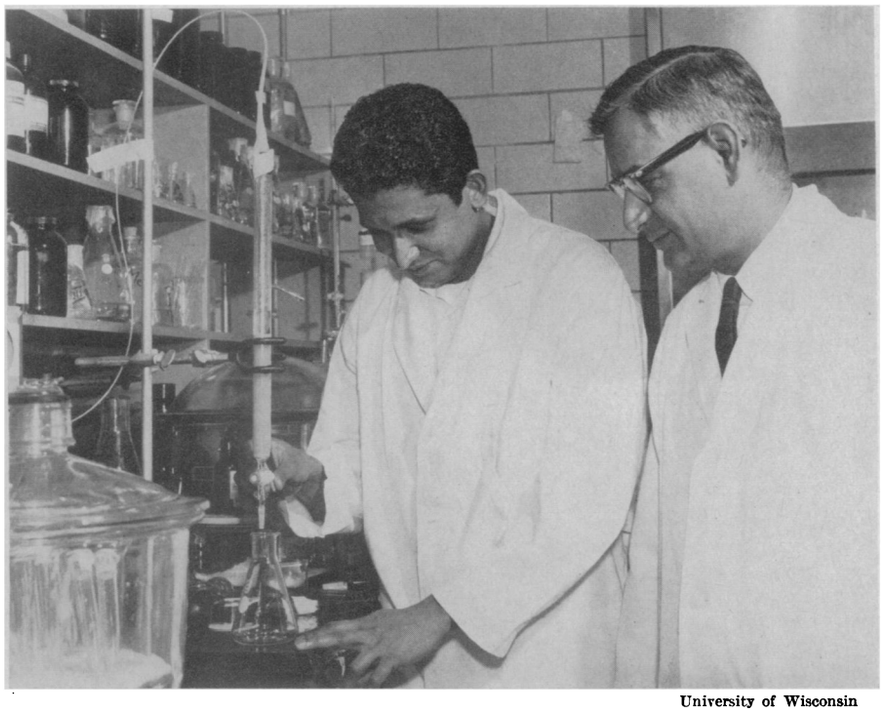

University of Wisconsin

SYNTHESIS ACCOMPLISHED—Dr. H. Gobind Khorana (right) and Dr. T. Mathai Jacob, one of his collaborators, are shown in their laboratory at the Institute for Enzyme Research at the University of Wisconsin, Madison, where they synthesized small pieces of DNA.

Heart Attack Causes

➤ THE FACT that women have fewer heart attacks than men cannot be explained on the grounds that female sex hormones protect them from hardening of the arteries, a team of medical researchers has concluded.

The sex hormone theory has been proposed by a number of researchers who applied it to women who had not yet passed the menopause.

Dr. Max Ratzenhofer of the University of Graz in Graz, Austria, reported results of autopsies on 40,000 women at the Pathological Institute, Graz.

He said at the Federation of American Societies for Experimental Biology in Chicago, that during World War II, deaths from tuberculosis and other infectious diseases occurred before individuals reached middle age when heart attacks are likely to occur. Most of the increase in male heart attacks has occurred in the last eight years because more men have survived infectious diseases due to treatment with antibiotics.

Dr. Broda O. Barnes of Colorado State University, Fort Collins, Colo., who cooperated in the report, pointed out that heart attacks did not become a problem in the U.S. until TB had been reduced to one-fourth its previous level.

Dr. Barnes believes that higher consumption of protein, largely meat, could cause men to have more heart attacks than women.

"The average American male eats about 120 grams of protein daily," Dr. Barnes said, "while the female consumes only about 80 grams."

She explained that a high protein diet in animals causes hardening of the arteries and also that such a diet requires more thyroid hormone for metabolism. Because the American female eats less protein she has more thyroid hormone for protection.

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Take Temperature in Ear

➤ BODY TEMPERATURES will be taken in the future by placing a tickling thermometer inside the ear, a Navy medical researcher predicts.

Dr. Theodore H. Benzinger of the Naval Research Institute, Bethesda, Md., told a session of the Federation of American Societies for Experimental Biology meeting in Chicago that the tickling comes from a feathery "bird," something like a badminton bird, that holds a tiny wire gently against the ear drum.

The new type of thermometer could have use in hospitals where numerous patients could be monitored electronically throughout the day. It also would be useful for astronauts. It is now used at the Institute in the field of temperature regulations and sweating.

The reason a person sweats, Dr. Benzinger has found, is that he is internally overheated. His skin becomes cooler because he sweats. Physiologists in the past, and some today, would not agree. The old idea is that a person sweats because of his skin temperature.

"It would have been a mistake of nature," Dr. Benzinger said, "to make the response of sweating originate from the skin." This would frustrate the vital function of the thermostatic system when it is most needed during acivity in a hot environment.

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