

BIOCHEMISTRY

Shortened ACTH Molecule

A peptide molecule that may lead to synthetic medical products has been synthesized. Clinical tests of its biological activity in humans are now being made.

► A BIOLOGICALLY active peptide molecule that is identical to the first 19 amino acids of the ACTH molecule (a natural hormone used in treating arthritis) has been synthesized.

The achievement may lead to a series of synthetic medical products, each having only one of the many biological effects of natural ACTH. Undesirable side effects of the hormone may be eliminated by this modification technique.

Synthesis of the new molecule was reported in the *Journal of the American Chemical Society* by a research team from the University of California School of Medicine's Hormone Research Laboratory. Dr. C. H. Li, director of the laboratory, heads the team.

Probably the largest polypeptide ever synthesized, the new molecule has been found, in experimental animals, to have one-third the potency of natural ACTH obtained from the anterior lobe of the pituitary gland. Clinical tests are now being made of its biological activity in humans.

The first isolation and structural identification of ACTH from sheep and cattle pituitary glands was achieved several years ago by Dr. Li and his co-workers. The

entire ACTH molecule consists of 39 amino acids in the form of a straight chain.

Since ACTH was first shown to be clinically effective against such diseases as rheumatoid arthritis, there have been indications that not all 39 amino acids are necessary to the biological activity of the protein hormone. Much recent work has been aimed at reducing the complete molecule to the basic structure or core that is responsible for its biological activity.

The new synthetic molecule is identical in every respect to the corresponding portion of the natural ACTH peptide. This means that each of the 19 functional groups appears in its free state and is not modified by other chemical groups.

This is probably the most difficult feature of the synthesis of natural molecules, since in the process of joining structural groups together, it is necessary to render a large number of structural "sites" chemically inert so that undesired reactions do not take place.

Finally, for the synthetic molecules to appear in the free state, all the protected functional groups must be unblocked, so that they once again appear as they do in the natural molecule, ready to react with various chemical agents.

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ABOVE THE SNOWS OF KILIMANJARO—The British Royal Air Force's newest aerobatic team of Hawker Hunter aircraft goes into a loop at dawn over 19,265-foot Kilimanjaro, Africa's highest mountain. The team is based near Nairobi, capital of Kenya.

BIOLOGY

Living Organisms Recovered From Space

► LIVING ORGANISMS have been recovered from the Discoverer XVII satellite after orbiting the earth 31 times.

Algae, human tissue culture, and a radiation photographic plate sped through space at altitudes as high as 615 miles from earth. The biopack was cushioned in a three-pound aluminum capsule built by Lockheed for the Air Force School of Aviation Medicine, Brooks Air Force Base, San Antonio, Texas. It was included in the Discoverer on a "space available" basis.

The biological experiment is part of a continuing study of the effect of space environment on living organisms that have been planned for the Discoverer series. Such experiments had been included in previous Discoverer shots, but this was the first to be recovered.

The sliver of human tissue in the culture medium and the algae will be examined by researchers at the School of Aviation Medicine to see what effects weightlessness, cosmic radiation, and launch and recovery may have produced. The radiation photographic plate is part of the study by the Cambridge Research Center to measure and identify radiation in a space cabin environment.

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METEOROLOGY

Lag in Weather Research

► WEATHER RESEARCH on the earth's surface is falling behind satellite weather research.

Albert K. Showalter, chief of the U. S. Weather Bureau's observations and station facility division, reported that more investigations of the lower layers of the atmosphere should be made and correlated with information available from such weather satellites as Tiros.

He said that there is now more information about the higher layers of the atmosphere from satellites than about the lower layers near the earth from ground observations.

The Tiros II satellite just launched is expected to supply cloud cover pictures by television for experimental daily weather forecasts.

Teams of meteorologists will study cloud distribution and try to spot storm centers and weather fronts. Information gathered by the teams will be sent to the national weather center in Washington, D. C.

When the planned Nimbus weather satellite is launched, the weather data from the higher layers of the atmosphere will increase even more rapidly.

It is now necessary to expand the network for weather information on earth to keep pace with the information gathered by satellites and calculated very rapidly by computers, Mr. Showalter said.

He recommended that meteorologists work out a plan to expand the data-gathering network and make it more effective, considering both economic aspects and what is useful information.

Two ways to improve the data network are to increase the number of weather stations and to select air samples so that no useless or repetitive information is taken.

At the present time, the Weather Bureau has stations about 200 miles apart. To increase them so they are only 100 miles apart would require four times as many stations, Mr. Showalter said.

Most air samplings are now taken over the continents and far more are made in the Northern than in the Southern Hemisphere.

Weather information from over the oceans is necessary to get earth's complete weather picture. Mr. Showalter urged that air samplings over the oceans be increased.

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