

Growth Hormone Mapped

Human growth hormone has been successfully analyzed marking a major advance toward understanding how the substance works

► **DISCOVERY** of the complete chemical structure of the human growth hormone has been reported by a group of scientists in the Hormone Research Laboratory at the University of California.

The discovery marks a major advance toward understanding how the powerful growth-promoting substance works and increases the chances for its eventual synthesis in the laboratory.

The new achievement reveals the exact sequence of 188 amino acid units, the basic chemical units of all protein substances, that make up each molecule of the hormone.

The human growth hormone (HGH) is the largest and most complex hormonal molecule that has yielded to complete chemical analysis.

The discovery may have many implications in future laboratory and clinical studies, which have been hampered by a severe shortage of the natural hormone.

In its primary role, HGH functions directly to regulate body growth processes, and it has been used successfully since 1956 in treatment of pituitary dwarfism in children and more recently in cases of genetic dwarfism. Too much growth hormone can cause

gigantism in children and acromegaly (enlargement of various body parts) in adults.

HGH in addition acts as a lactogenic agent in humans to induce mammary gland development and to stimulate milk secretion.

Studies with animal growth hormones also suggest that the substance can influence resistance to infection by promoting production of antibodies and can enhance the effect of sex hormones and prevent wastage of muscle tissue.

Further evidence from animal studies indicates that growth hormones may be closely involved in processes that lead to the development of cancer.

Growth hormone and adrenal-stimulating ACTH (used in arthritis therapy) are among the five hormones secreted by the anterior lobe of the human pituitary gland—all of them first identified and isolated at the Hormone Research Laboratory in Berkeley. The pea-sized pituitary is located at the base of the brain.

Authors are Dr. C. H. Li, director of the Hormone Research Laboratory and professor of biochemistry and experimental endocrinology, Dr. Wan-Kyng Liu, now at the Chil-

dren's Cancer Research Foundation at Harvard Medical Center Boston, and Dr. Jonathan S. Dixon, assistant research biochemist.

The research has been supported in part by grants from the American Cancer Society.

Dr. Li and co-workers isolated the first animal growth hormone (from cattle glands) in 1944, and obtained HGH for the first time in 1956. Research on the chemical structure of HGH began soon after the hormone was isolated.

Some 5,000 fresh human pituitary glands were required to achieve the results reported from the Berkeley studies today. Yet the chemically pure hormone available from these glands amounted to only five grams, or about one-sixth of an ounce.

The scientists used different enzymes to break the HGH chain into much smaller fragments of five to ten amino acids each. These enzymes, trypsin, chymotrypsin and pepsin, each attack different amino acids and thus yield different protein fragments. These fragments could then be put together like pieces of a jigsaw puzzle into several possible amino acid sequences. The correct sequence was established by using a chemical, cyanogen bromide, that split the protein into four fragments. Identification of their sequences proved the structure of the hormone chain.

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MEDICINE

Flu Vaccine for Babies Has No Toxic Effects

► **A NEW POTENT** vaccine against influenza can be given to newborn babies safely, two University of Michigan doctors reported.

Pediatricians do not usually recommend standard influenza vaccines because they generally have a toxic effect on children under three years of age. The new vaccine has been tried on 100 infants who showed none of the flu-like symptoms of fever and pain often noted by adults after vaccination.

Drs. F. M. Davenport and A. V. Hennessy of the university's School of Public Health reported development of the vaccine at the annual meeting of the American Society for Microbiology in Los Angeles.

It has taken more than five years to perfect the vaccine. In 1961 the Michigan epidemiologists learned to split the influenza virus and to salvage that part, roughly one-tenth of the whole, containing the active protein material that goes into the vaccine.

All other viral vaccines use the whole virus, and the scientists said this is the first case of using only an active fraction.

The new split vaccine is several times stronger than the standard type.

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Merck Sharp and Dohme

MEASLES VACCINE—Embryos from eggs from a special, disease-free flock of chickens are extracted to provide the living cells in which a measles virus is grown. The cells are infected with virus and kept alive in a bath of nutrients from which the material will be harvested as vaccine 24 days after the tissue culture was first exposed to the virus.