BIOCHEMISTRY

Slow Labor Speeded

New drugs based on two pituitary hormones similar in chemical structure, one used to induce childbirth, the other to raise blood pressure, are expected—By Faye Marley

➤ WOMEN IN CHILDBIRTH will be grateful to Dr. Vincent du Vigneaud of Cornell University Medical College, New York, for continuing the work that in 1955 won him the Nobel Prize in Chemistry.

By isolating and synthesizing the hormone oxytocin from the pituitary gland at the base of the brain, he made the drug more generally available for speeding up slow labor.

Dr. du Vigneaud also isolated vasopressin from the pituitary gland. This anti-diuretic blood-pressure-raising hormone is of prime importance in the treatment of *diabetes insipidus*.

Dr. du Vigneaud told SCIENCE SERVICE at the Sixth International Congress of Biochemistry that his original work whetted his intellectual appetite to find out why the specific structure of the two pituitary hormones should affect human tissues as they do. For example, how did his present work affect the manufacturing process for the drug composed of the hormone oxytocin that is being given to women, under a variety of trade names, to aid them in the birth process?

Eventually drug producers should be able to simplify the structure of material put into the crude hormone mixture that makes up synthetic oxytocin, Dr. du Vigneaud said.

Originally, the pharmaceutical technicians used the hormone oxytocin obtained from hog and beef glands. When Dr. du Vigneaud synthesized the hormone, many changed their procedures to use this more available form.

Since 1953, when Dr. du Vigneaud and his co-workers first published their findings on the synthesis of oxytocin, many other laboratories have worked on the structure of synthetic oxytocin.

Bulky chemical groups have been added that block the hormone's action. Dr. du Vigneaud's new work, however, has included the addition of a tiny hydrogen bond that does not get in the way of the whole protein structure. By making the chemical groups smaller he has come closer to an answer to the question of how the hormone works on human tissue. Whereas the bulky structure now contains only nine amino acids, many proteins have hundreds or thousands.

Oxytocin is a tiny protein with extraordinary power, and Dr. du Vigneaud and his co-workers hope that much of the structure can be dispensed with altogether, thus simplifying problems and extending future uses. The researchers hope to discover how oxytocin works on human tissues.

Vasopressin is so similar chemically in structure to oxytocin that whatever information is discovered about the structure of oxytocin could conceivably apply to vasopressin.

In the future, perhaps a new blood-pressure-raising or -lowering drug may be discovered when more knowledge is obtained about vasopressin.

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Nerve Action Clarified

➤ EXPERIMENTS using deadly nerve gases and insecticides are giving a clearer picture of the amazingly complex way that messages to and from the outside world are dispatched between the senses and the brain.

Working with electric eels, lobsters and squids, scientists now believe they have located not only the molecule, but also the specific atom responsible for controlling communication currents in nerve cells.

A team of researchers from Columbia University's College of Physicians and Surgeons reported the work to the International Congress of Biochemistry in New York.

Dr. David Nachmansohn, professor of biochemistry at Columbia, described how the legs of lobsters were paralyzed by poisonous matter used for nerve gases and insecticides, and how they then were quickly restored to action with an antidote he developed.

The work with lobsters, carried out mainly by his colleague, Dr. Wolf-Dietrich Dettbarn, assistant professor of neurology, revealed that the decision of whether a nerve is sparked rests with an oxygen atom in the molecule acetylcholine-esterase.

This molecule, abbreviated ACh-esterase, is found in the excitable membrane surrounding nerve fibers, tiny cylinders that relay messages through the body.

ACh-esterase consists of a string of amino acids that in a few millionths of a second can split the chemical controlling the movements of electrically charged atoms in the membrane.

The process can be blocked by poisonous preparations, using enzymes obtained from electric eels, and specific fibers can then be studied. The lobster was chosen for study because the membrane around some of its nerve fibers lets in life-restoring antidotes such as pyridine aldoxime methiodide (PAM).

Dr. Nachmansohn said that PAM can enter the fibers of squids also, with the help of preparations from snake venom. The chemical reactions in such fibers are believed to be the same in the nervous systems of all forms of life.

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Bell Telephone Laboratories

STRONG JOINTS — For the first time, strong adhesive joints, with tensile shear strengths of 4,000 pounds per square inch, have been formed between untreated fluorocarbon polymers and epoxies at relatively low temperatures. Here, Dr. Harold Schonhorn of Bell Telephone Laboratories, New York, inserts a composite test specimen into a tensile testing machine.

Enzyme Synthesis Lack

➤ CANCER CELLS in the liver are malignant because of the lack of enzyme synthesis, Dr. Henry C. Pitot of the University of Wisconsin Medical School believes. Dr. Pitot told the Sixth International Congress of Biochemistry, New York, that it is now apparent that the environment in which a cell lives and grows determines to a considerable degree the method and selection of its own hereditary expression.

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Enzyme Structure Found

➤ TRYPSIN, one of the oldest known enzymes, has had its chemical structure established. Details were given to the Sixth International Congress of Biochemistry in New York, by Dr. Kenneth A. Walsh, who worked with a team under the direction of Dr. Hans Neurath, professor of biochemistry, University of Washington.

By establishing the sequence of the 223 amino acids in the structure of trypsin, investigations of the way enzymes catalyze the body's self-sustaining chemical reactions will be aided.

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