BIOCHEMISTRY

Partial Enzyme Synthesis

➤ THE MYSTERY of how enzymes cause chemical reactions in the body is closer to solution with the first partial laboratory synthesis of the enzyme ribonuclease.

Enzymes are catalytic agents that speed up chemical changes in living organisms without being changed themselves. They are the basic functioning units of all life. The absence of the means to produce enzymes, scientists believe, may lie at the heart of genetic defects, such as mongolism, or idiocy, certain other kinds of mental deficiency and congenital coronary disorders.

Dr. Klaus Hofmann, the University of Pittsburgh biochemist who first synthesized ACTH two years ago, said his earlier work, which required seven years, had made it possible to synthesize ribonuclease in slightly more than a year.

Ribonuclease (R-nase), which breaks down ribonucleic acid, or RNA, in the body, has been studied more extensively than most enzymes. RNA is the genetic messenger within each cell that tells the cell how to reproduce itself.

Synthesis of R-nase involved the first 13 amino acids in a chain of 124 that make up the R-nase molecule. The partially synthetic enzyme has 70% of the activity of the natural product. Its synthesis also revealed important information regarding the R-nase molecule's so-called "active site," that part holding the key to an enzyme's function.

The active site is the figurative keyhole through which the material being acted upon must pass before the enzyme can do its job. The active site is that portion of the enzyme molecule that makes the initial contact with the substance known as "substrate," which it causes to react chemically.

Because the active site is believed to work in concert with other amino acids close to it geographically within a curled-up molecular chain, scientists believe that the discovery of the active site could answer many basic biological questions.

Dr. Hofmann reported the partially synthetic enzyme in the Journal of the American Chemical Society, March 20, 1963. An international team at the University of Pittsburgh assisted him in the work. The team included Miss Frances Finn of Pittsburgh, and Dr. Wilhelm Haas, Germany; Dr. Michael J. Smithers, England; Dr. Yecheskel Wolman, Israel, and Dr. Noboru Yanaihara, Japan, who also worked on the ACTH project.

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MEDICINE

Loss of Good Drugs Seen

➤ PUTTING new drugs on the market before they have been thoroughly tested can cause loss of potentially good ones as well as catastrophes from bad ones.

No drug, however thoroughly tested, is "absolutely safe," Dr. Walter Modell of the department of pharmacology, Cornell University Medical College, stated in Washington, D. C.

Dr. Modell believes that the public, as well as the medical profession, must be fully aware of the disaster-producing possibilities of drugs. An American Medical Association journal report said one out of 20 patients admitted to a large New York hospital was there because of adverse reaction to drugs.

The pharmaceutical industry is in a rat race to market new drugs quickly, Dr. Modell said. Its use of promotional devices common to all business does not allow time for physicians to learn about the drugs scientifically.

Stockpiling of large amounts of vaccines by pharmaceutical houses before adequate field experiments on humans have been made can result in a calamity such as happened when preliminary use of polio vaccine caused more than 120 cases of paralytic polio, Dr. Modell noted. Public announcement by the manufacturers that the vaccine was ready was made, by "curious" coincidence, on the same day, April 12, 1945, that President Roosevelt, a long-time polio victim, died of other causes.

At the same time the Polio Foundation was claiming that positive results with the vaccine in field trials had not yet been established, several manufacturers had sunk fortunes into work for producing the vaccine and were busily stockpiling it.

In spite of the dangers of new drugs, Dr. Modell believes it would be a tragedy if the public and physicians developed a negative attitude toward them.

"Never before in its history," he reported in Science, 139:1180, 1963, "has medicine had so many useful, effective drugs on hand; and never before has there been such promise of even better ones to come."

Inescapably, every person is a guinea pig, Dr. Modell noted, because even though he is not involved in the preliminary research, a drug may be eventually prescribed for him if needed.

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PUBLIC HEALTH

Large Syphilis Increase In 15 to 19 Age Group

➤ TEEN-AGERS from 15 to 19 showed the biggest increase in syphilis for the year ending June 30, 1962—10% over the previous year. The syphilis rate for all age groups climbed for the fifth consecutive year in the United States, it was reported in New York.

Young persons under 24 accounted for 54.7% of infectious syphilis in 1962, slightly more than in the past two years, and for 55% of gonorrhea, slightly less than in 1961.

One of the control problems is lack of legal authority to treat minors without their parents' consent, the American Social Health Association, the American Venereal Disease Association and the Association of State and Territorial Health Officers said in an annual joint statement on today's VD control problem. Only 19 states and 40 city health officers have such authority.

Unwillingness to deal with the "unpleasantness" of venereal disease has been reported among parents and parent groups. Confusion of sex education with VD education is one of the obstacles to education in schools, and both are feared. Parents, like the general public, are too complacent about the danger because of their reliance on penicillin as a treatment.

Prostitutes and homosexuals were reported as contributing an increased percentage of infectious syphilis last year. Nineteen states and 44 cities reported more than 20% of infected males named males as their sex partners. In 1961 only 14 states and 33 cities made such reports. Among the VD outbreaks in 25 states and 31 cities last year, several were limited almost exclusively to homosexuals.

The appropriation of $2 million more in Federal funds for VD control in 1963 is encouraging, but the three organizations call for another $2 million for 1964, which would bring the total to $10 million.

Other recommendations include uniform reporting of cases to the local public health department and expansion of medical school courses on VD diagnosis and treatment. Routine blood tests for syphilis on hospital admission is urged as a requirement that should be reinstated for accredited hospitals.

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PUBLIC HEALTH

NCI and AEC Launch Cancer Research Program

➤ A JOINT research project to investigate the roles of radiation, viruses, and chemicals as causes of cancer is being undertaken by the National Cancer Institute and the Atomic Energy Commission. The research will be done at the Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tenn.

The collaborative investigation takes advantage of the facilities of the Atomic Energy Commission and its previous studies of the effects of radiation on various biological materials as well as of the special research competencies and previous findings of the National Cancer Institute.

"The incidence of cancer, especially lung cancer, and the increase in number and amount of potentially cancer-causing agents to which man is being exposed emphasize the importance of these studies," said Dr. Luther L. Terry, Surgeon General of the Public Health Service.

This new research project will supplement and support the research and control efforts of several other Public Health Service programs directly concerned with the growing problem of environmental hazards to man.

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