

Enzyme Synthesized From Natural One

A new enzyme, not found in nature, has been created from a natural enzyme by researchers at Northwestern University.

This success and the method used by the scientists may open the way to the development of a wide variety of industrial organic catalysts and also be of use eventually in the treatment of diseases caused by defective enzymes.

Drs. Myron L. Bender, professor of chemistry, and Laszlo Polgar, research biochemist, synthesized the enzyme by chemically changing the bacterial enzyme called subtilisin. They devised a method that is much simpler than that usually used to synthesize complex biological proteins. Instead of linking together a long chain of amino acids—component parts of proteins which could number thousands—to create the enzyme, they substituted a sulfur-containing group of atoms for an oxygen group (hydroxyl) at the active site of the natural enzyme. The new enzyme, which they named thiol-subtilisin, is fully functional.

Research to now, in which enzymes structure was altered, produced inert proteins rather than active enzymes.

Enzymes are catalysts that trigger virtually all the chemical reactions that occur in living organisms, but they themselves are not used up or changed.

The catalytic activity of the enzyme is concentrated in a small part of the chemical structure known as the active site. It is this point that the two biochemists altered.

They first blocked the enzymatic action of the hydroxyl group in the subtilisin. When they did this, they also proved that this group was present in the enzyme, a past point of controversy.

Then Dr. Bender substituted a chemical group containing sulfur. Part of the group dropped off and the remainder of the sulfur-containing (thiol) group was substituted.

The research, sponsored by the National Institutes of Health, has provided scientists with a relatively simple technique for creating artificial enzymes.

BIOCHEMISTRY

Vampire Saliva Prevents Clotting

A new substance derived from the saliva of vampire bats may soon play an important part in saving lives.

The substance, named desmokinase, has been found to dissolve blood clots which cause heart attacks.

It was discovered by Dr. Christine Hawkey and her research team working for the Nuffield Institute of Comparative Medicine, London Zoo. They have been studying bats for over a year.

Vampire bats are not normally

found in Britain. Those used in the experiments were flown from South America and more are on the way.

"Vampire bats live entirely on the blood of animals and birds," Dr. Hawkey said. "They will even attack human beings, given the chance. But strictly speaking they are not blood-suckers. What they do is puncture the skin of their prey and lap up the blood as it drips from the wound."

Her experiments were started because it was realized that the bats must have some natural means of preventing blood from clotting while they fed. An anticlotting substance was in fact discovered in their saliva but a more important find was of desmokinase that could dissolve clots that had already formed.

The name is derived from the Latin name for the vampires, which is *Desmodus rotundus*.

CONSERVATION

Australia's Wild Buffalo Going Way of U.S.'s

The huge buffaloes that roam the northern territory may soon be killed and stored in cans as pet food, and their natural savanna lands may be taken over by domestic cattle.

Buffaloes were introduced into British Army outposts in the last century and released when the settlements were abandoned. For many years the only white men on the plain were the hide hunters who killed them by the tens of thousands. In 1955 the hide market collapsed, and buffaloes multiplied until their herds numbered more than 30,000.

Today markets for buffalo as pet food have increased. Once again the territory is being invaded by hunters. Mining sites and tourist camps have also been set up on the territory, one of Australia's last great refuges for wild game. Dingoes, kangaroos, wallabies, turkeys, geese, wild Banteng cattle, red deer and other wild animals have thrived in this area, along with saltwater crocodiles and silver barra-mundi, described by gourmets as one of the best eating fish in the world.

GYNECOLOGY

Sterilization O.K.'d For Military Wives

In the teeth of attacks last week by Roman Catholic prelates on OEO and HEW contraception programs (see page 450) the Department of Defense has disclosed a policy that permits military wives seeking surgical sterilization for contraceptive purposes to have the operation performed in military hospitals.

"Permissive sterilization" of dependent wives has been authorized as part of expanded family planning services that will start Jan. 1. Last month Con-

IN SCIENCE

gress passed legislation approving new military medical benefits. "Surgical sterilization is considered as a technique within the concept of a family planning service," Dr. Shirley C. Fisk, Assistant Secretary of Defense said.

The procedure will be allowed only if, in the opinion of the attending physician the sterilization is in "accordance with sound medical practice in the particular case."

Free contraceptive drugs and devices will also be dispensed under the new provisions. In the past, family planning "advice" was the only service offered.

MEDICINE

Olympic Athletes Face Month's Acclimatization

It will take four weeks for athletes at the Olympic Games in Mexico City in 1968 to get used to differences in altitude, climate and time, according to Dr. Charles Walker, president, Australian Sports Medicine Foundation.

It is safe for athletes to compete at 7,000 feet, the altitude of Mexico City, he said in agreement with the president of the International Olympic Committee, Mr. Average Brundage who recently said all athletes at Mexico City would face the same problem and so would begin on equal footing.

The influence of sports medicine is becoming more and more apparent as world records, which ten years ago seemed almost impossible, are now being set with monotonous regularity.

BIOCHEMISTRY

Strange Protein Found In Schizophrenic Brain

A particular kind of protein or globulin has been found attached to cells in the brains of schizophrenics, a noted neurologist reported.

The globulins were not found in the brains of normal people.

Dr. Robert G. Heath, chairman of the Department of Psychiatry and Neurology at Tulane University—and a pioneer in the search for the biological cause of this common mental disease—said the globulins were found at sites in the forebrain region of schizophrenics by a fluorescent antibody technique within ten hours after their death.

His latest work supports the hypothesis that schizophrenia is an autoimmune disease, Dr. Heath told the annual meeting of the National Association for Mental Health in New Orleans.

An autoimmune disease is one in which the body manufactures an anti-

E FIELDS

body that acts against its own cells. In this case, Dr. Heath believes the globulins, originating in the blood of schizophrenics, impaired the normal transmission of messages from one brain cell to another.

GEOPHYSICS

Earth Getting Colder As Ice Age Nears

Immense glaciers of a new Ice Age may start creeping across the land in a few thousand years, with a peak about 15,000 years from now, according to new studies of ocean cores.

We are approaching another glacial period similar to those which have advanced over the earth eight times in the past 425,000 years, said Dr. Cesare Emiliani of the Institute of Marine Science, Miami, Fla.

As a result of recent studies based on ocean and land cores, it appears almost certain that the simple scheme of four or five major glaciations will have to be abandoned—and many textbooks will have to be changed, he added.

In its place is apparently emerging a picture of many alternating high and low temperature states, fluctuating in waves as much as 18 degrees Fahrenheit over an average wave length of 50,000 years. These stages will continue for millions of years in the future until the mountains are eroded away and the seas will move onto the land thus diminishing the cloud cover that reflects back the sun's radiation. Then the earth will warm up and the glacial periods will be ended.

Temperature oscillations during the past million years have been studied by means of isotopic, chemical and micropaleontological analysis of fossil remains in deep sea cores from the Caribbean Sea and the equatorial Atlantic Ocean, reported Dr. Emiliani in Science (Nov. 18).

The average temperature of the earth's surface may have decreased 9 to 18 degrees Fahrenheit during the past 150 million years. This decrease may be due in part to a decrease in solar emission, as the sun, that great "nuclear machine" used up a fraction of its probable life.

EXO BIOLOGY

Antarctica Studied To Learn About Mars

A team of biologists arrived at McMurdo Sound in Antarctica last week, to search for clues to life on Mars.

Helicopter-hopping around several ice-free valleys, the scientists have al-

ready begun gathering samples of the frigid, desert-type soil, searching for microorganisms. One ton of soil will be shipped back to the U.S. under refrigeration for detailed study.

Headed by Dr. Roy E. Cameron of the University of California's Jet Propulsion Laboratory, the NASA-sponsored team arrived Nov. 17 and will stay until the end of January, taking hundreds of measurements of temperature, humidity, wind, evaporation, solar radiation and heat exchange.

Dr. Cameron and another scientist have already gathered 750 pounds of soil from what is probably the driest area on earth—the Atacama Desert in Chile. There they discovered a group of microscopic plants which proved to thrive on very little oxygen. Tests are continuing on samples taken from altitudes up to 20,000 feet.

Both the desert and Antarctic studies will provide information that is needed in the design of life-detection experiments to be sent to Mars. Because of its thin atmosphere and scant water, Mars is believed to be largely desert.

The Antarctic expedition has been preparing for the trip since 1961. For the past five summers, soil studies have been made high in the White Mountains of California, with samples taken from as high as 14,250 feet above sea level. The area offered a close-to-home simulation of alpine-polar sites.

Biologists have previously found lichens and mosses at sea level in Antarctica, but studies in the higher valleys were "sketchy," says JPL, and yielded no microorganisms.

SPACE

Apollo Delayed

A growing series of delays and failures in the infant stages of Project Apollo has finally forced the National Aeronautics and Space Administration to make drastic changes in crew line-ups and flight schedules in order to keep up with its own optimistic timetable.

One manned flight has been cancelled altogether, and the rest of the program is hardly recognizable. Originally, there were to have been two manned flights in the first quarter of 1967. Now the second one has been scratched, and its crew—Walter Schirra, Donn Eisele and Walter Cunningham—has been made the back-up crew for the previous flight.

The crew they replaced—James McDivitt, David Scott and Russell Schweickart—has yet to be assigned to a future mission.

The revamped schedule now calls for a manned flight, followed by the unmanned launch of the first lunar landing module atop a Saturn I rocket. Next will come the dual launch of a manned Apollo (also via Saturn I—a much smaller booster than the Saturn V that will be used on the moon flight) followed a day later by an unmanned lunar module. The Apollo

crew will use the moon lander for docking practice in earth orbit as rehearsal for lunar flights.

The first manned Apollo launched aboard a Saturn V is still set for late 1967. But it must follow an unmanned Saturn V test which is already being postponed three months. Things could still go on time, but the safety "cushion," is getting pretty slim.

Originally, estimates were for a moon landing "by the end of this decade," or 1969. Later predictions slipped into 1970, but the rapid-fire successes of the Gemini Program have hauled guesses back as far as the middle of 1968. A more realistic figure is probably late 1968 or early 1969. And that requires the early Apollo flights go without a hitch.

The present reshuffle stemmed, according to NASA, from three things: the failure during altitude testing of an oxygen cooling unit intended for the first manned Apollo flight; the destruction of an Apollo service module during pressure tests in October and a string of miscellaneous troubles with the Saturn V's second stage.

GEOPHYSICS

Deep Core Drill Set for South Pole

Scientists who found what might be 2,000 feet of permafrost under the Greenland ice cap are starting to probe toward the mysterious bedrock lying one and a half miles beneath the Antarctic ice cap.

A coring drill which has recently dug the deepest ice core in history has been transferred from Greenland to Antarctica and will be operating in early December, according to Dr. C. C. Langway Jr. of the U.S. Army Cold Regions Research and Engineering Laboratory.

Dr. Langway and his colleagues hope to drill through the more than 8,000-foot-deep ice cap and bring up core sections showing records of dust and debris that have been settling for eons on this undisturbed ice field. Dust from such things as volcanic explosions, space, man's early fires, and more recent nuclear explosions will unfold, layer by layer, world history.

Temperatures lower than anticipated were discovered last summer at the bottom of the hole drilled through the Greenland ice cap. Contrary to calculations that temperatures would be above freezing, temperatures were found to be about nine degrees F. These low temperatures may indicate that there may be 1,500 to 2,000 feet of permafrost beneath Greenland — more than in any other place. Lowest temperature of the core was minus 12 degrees F. at depths of about 426 feet. From then on temperature increased at lower depths, because of the heat generated by the immense pressures and grinding frictions of the ice cap and by the heat of the earth.