MEDICINE

Ideas From Cell Studies

Because of recent work with living cells that indicates how natural "feedback" regulates cell metabolism, treatment of metabolic diseases may be advanced.

➤ NEW WORK with living cells, showing how a natural "feedback" regulates cell metabolism, promises to eventually help in the treatment of metabolic diseases such as arthritis and rheumatism.

In normal cells, the feedback, or system of checks and balances, adjusts the rate of food utilization to meet the needs of the cells. When such control mechanisms fail and metabolism becomes unbalanced, metabolic diseases result.

Up to now, research about some cell growth processes has depended largely on test tube methods in which the cell is taken apart, its components put in a test tube and their reactions to different chemicals observed.

But now Dr. Frederick C. Neidhardt and graduate biology students at Purdue University, Lafayette, Ind., have developed new techniques that provide valuable insights into living cell processes.

Dr. Neidhardt and his associates, who worked with cells of the one-celled intestinal organism called *Escherichia coli,* fed them an artificial amino acid that would ordinarily be poisonous to living cells because it is similar to one of the amino acids from which the cell manufactures new proteins.

The scientists were able to find a mutant cell, however, which survived when others died. This cell survived because the enzyme responsible for that specific amino acid was so changed that it rejected the false amino acid and chose only the real thing.

Using a second technique, the Purdue scientists are studying other aspects of the protein-making process by developing mutants or cell variations that have become heat-sensitive in protein synthesis and thus cannot make new protein at ordinary temperatures.

Mutants obtained by both techniques are making possible study of the changed enzymes in living cells for the first time. By relating the mutation produced in the structure of a cell in one enzyme, for example, to the change in the cell's behavior, scientists will be able to identify the function of the various cell parts bit by bit.

Such knowledge eventually could help in the treatment of metabolic diseases. There should also be improvement of industrial processes that use living cells as tiny factories to produce important drugs and chemicals.

• Science News Letter, 86:341 November 28, 1964

PALEONTOLOGY

Ice Age Started Early

➤ SHELLS OF MICROSCOPIC FOSSIL creatures found at the bottom of the ocean now indicate that the earth's mighty ice age started about 1.5 million years ago—half a million years earlier than scientists originally thought.

By analyzing remains of tiny creatures known as Foraminifera, pulled in long cores from the mud and sediment of the sea, scientists can observe in detail the changing climates on this planet eons of years ago.

Since man emerged during this ice period known as the Pleistocene age, the new time scale will be most important in studying man's evolution, stated Drs. David B. Ericson, Maurice W. Ewing and Goesta Wollin of the Columbia University's Lamont Geological Observatory, Palisades, N.Y.

Results of a long study of 26 cores of ocean sediment, selected from more than 3,000 samples, were published by the scientists in Science, 146:723, 1964. The 3,000 cores were raised by Dr. Ewing and his staff from all oceans and adjacent seas during 44 oceanographic expeditions since 1947. The 26 cores studied intensively, ranging in length from 18 to more than 71 feet, were all taken from points on the bottom of the Atlantic Ocean, half a mile to three miles deep.

These deep-sea sediments mostly consist of tiny shells of Foraminifera which have slowly and continually rained down upon the ocean floor for millions of years.

Certain of these Foraminifera species were sensitive to temperature and hence lived and thrived in different geographical zones. The species can be divided into three groups, explained the scientists: those that lived in warmer climates near the equator, those in the middle latitudes, and those in the higher latitudes, toward the Poles.

As climatic changes occurred during the million and half years, populations of these species shifted from latitude to latitude. But they always left a trail of their slow migrations in the millions of shells that sunk to the sea floor.

By studying deep cores of sediments taken from areas where shells have settled and remained in place, undisturbed by vast ocean currents or other dynamic changes, scientists can construct a close record of climate or temperature changes.

An absolute time scale has been established from the present date back to about 175,000 years ago by means of radiocarbon, protactinium-ionium and protactinium methods, the scientists note. These dates indicate that sediment in the 26 cores was accumulating at the average rate of nearly one inch every 1,000 years. The thickness of the whole Pleistocene section in the cores was about 124 feet.

On the basis of the average rate of accumulation and the Pleistocene thickness, the scientists, by extrapolation beyond 175,000 years, established a new time scale for the entire Pleistocene age.

• Science News Letter, 86:341 November 28, 1964

MEDICINE

New Antibiotic Effect Continues Eight Hours

➤ A NEW ANTIBIOTIC called Ceporin, that begins to take effect a half an hour after injection continues to be active for eight hours.

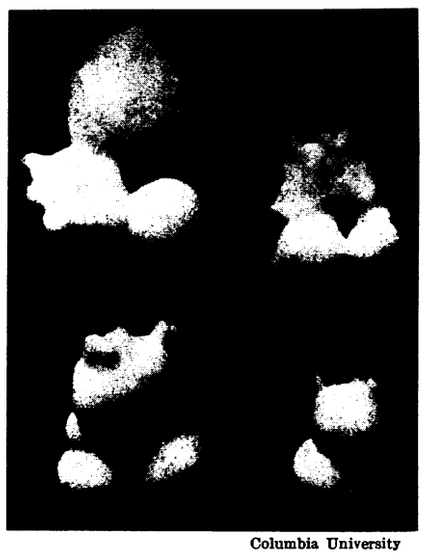
Sizable doses can be injected repeatedly over long periods without troublesome side effects, researchers at Glaxo Research Laboratories, London, reported in the British Medical Journal, Nov. 14, 1964.

Patients who were found to be allergic to penicillin can take the new antibiotic without adverse reactions, and repeated injections of experimental animals for three months have failed to produce any hypersensitivity.

Ceporin, also called cephaloridine, is a semisynthetic antibiotic, derived from cephalosporin C. It is equally active against organisms that are both Gram-positive and Gram-negative. Injections are painless.

No abnormal findings were reported in urine samples taken from volunteers before, during and after experiments.

• Science News Letter, 86:341 November 28, 1964



Columbia University

TELL-TALE FOSSILS—Greatly enlarged microscopic Foraminifera fossils, found in the ocean floor, reveal a new theory that the earth's ice age started half a million years earlier than formerly believed.