

life sciences notes

BIOPHYSICS

New Technique for Cell Study

The exact site of metallic and mineral deposits in cells can be identified with a new technique that preserves cell structure for microscopic study. It may help scientists understand how calcium is transported and used by the body to build muscles, teeth and bones.

Pennsylvania State University scientist Dr. Wayne Hohman takes tissue from the chicken gland that produces egg shells and embeds it in a plastic block. He then cuts it into sections about half a millionth of an inch thick and places it in a low temperature instrument that reduces it to ash. Next, a stream of oxygen removes all organic materials from the tissue, leaving metals and minerals behind.

When the tissue is placed under an electron microscope, Dr. Hohman says, the location of the remaining materials can be photographed and studied because the low temperature technique does not destroy the fine structure of the cell as other methods do.

VITAMINS

Folic Acid Lack Can Retard Child

Pregnant women who do not have enough folic acid—a B vitamin—in their bodies can pass the deficiency on to their unborn children. It may lead to retarded growth and congenital malformations, according to Dr. A. Leonard Luhby of New York Medical College, who found that 22 percent of the 250 women he studied were deficient.

"Folic acid deficiency in pregnant women could well constitute a public health problem of dimensions we have not originally recognized," he says in the November issue of *NUTRITION REVIEWS*. "We now have evidence, for the first time, that this B vitamin deficiency occurs in infants of deficient mothers." It can be remedied by dietary supplements of folic acid if detected early enough in pregnancy.

Dr. Luhby and Dr. Jack M. Cooperman, also of New York Medical College, have developed a test for early urinary detection of a compound called formiminoglutamic acid which reflects folic acid activity at the cellular level.

CANCER

White Cells Shirk Their Jobs

White blood cells or lymphocytes that attack and destroy diseased cells in the body fail to fight cancer cells. Using a phase microscope and time-lapse photography, University of Southern California researchers have made the first film of this phenomenon in living tissue, showing that lymphocytes tend to avoid cancer cells. The phase microscope eliminates the need of killing and staining cells before viewing them.

According to Drs. Russell P. Sherwin and Arnis Richters, the newly perfected method of studying living tissue may provide some meaningful answers for diagnosing and treating lung cancer. "The implication," Dr. Sherwin says, "is that if we could find a way to help lymphocytes get near or in the cancer cells, they might destroy them." The film shows there are generally fewer disease-fighting white cells around cancer cells than in cancer-free areas.

BIOCHEMISTRY

Enzyme Deficiency Fatal

As scientists learn more about enzymes, the proteins that catalyze biochemical reactions in the body, they find that enzyme deficiencies account for a number of inherited diseases—some rare, some more common. Studies of patients with these deficiencies uncover new information about how living cells function.

From the National Institutes of Health, Bethesda, Md., Dr. Jarvis E. Seegmiller and co-workers report that one fatal nervous system disorder is caused by a lack of an enzyme called hypoxanthine-guanine phosphoribosyltransferase (PRTase). Evidence also indicates this enzyme is important in brain cell metabolism.

Lesch-Nyhan disease is characterized by cerebral palsy, mental retardation, uncontrollable movements of the hands and excessive quantities of uric acid in blood and urine. These patients have no PRTase in the basal ganglia of the brain to check the rate at which the chemical purine is broken down into its component parts—uric acid, hypoxanthine and xanthine. Hence normal purine metabolism, essential to the body's hereditary mechanism, is out of balance, Dr. Seegmiller says. The toxic effects of increased amounts of purine products plays a role in causing the neurological disease, he suggests.

BIOCHEMISTRY

Rare Disorder Aids Understanding of Gout

Another newly identified enzyme deficiency, involving a purine product, sheds light on treatment of gout. Called xanthinuria, the deficiency afflicts only eight known persons in the world, but may lead to improved understanding of therapeutic approaches to the much more common gout.

In studies of one of the world's eight xanthinuria patients at the National Institutes of Health, Bethesda, Md., Dr. Karl Engelman and co-workers found the disease occurs in persons lacking an enzyme called xanthine oxidase which is necessary for uric acid production. Without the enzyme, two intermediate compounds may crystallize to form kidney stones.

Patients with gout have a reverse problem; they produce too much uric acid. A new drug for this metabolic disease reduces uric acid output by inhibiting the action of xanthine oxidase in these individuals.

BLOOD ANALYSIS

Fast Blood Analyzer Developed

Using fluorescent light and enzymes, Georgetown University scientists have developed a new method of analyzing blood which they say "is highly sensitive and more specific than any other method in use." Dr. Martin Ruben says the fluoro-metric-enzymatic method can analyze the constituents in a blood sample in one to two minutes. Available semiautomatic procedures take 20 minutes.

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