BIOCHEMISTRY

Change Virus Heredity

➤ KNOWN GENETIC CHANGES, or mutations, in the chemical structures of viruses have been induced for the first time by scientists at the University of California.

Moreover, the rate at which these mutations can be induced is the highest ever achieved by any means, and the mutants produce mutant offspring.

The work suggests that scientists may some day be able to treat virus diseases with chemicals that would turn deadly viruses into harmless ones. Viruses now are almost immune to attack by antibiotics and other chemicals.

For the present, however, the Berkeley scientists are concerned solely with the fundamental chemical structure of virus heredity and how hereditary characteristics can be bestowed by making chemical alterations in the agents.

The research has been performed by Miss Rose M. Litman, Abraham Rosenberg Fellow, and Dr. Arthur B. Pardee, assistant professor of biochemistry.

Miss Litman achieved the mutations by altering the fundamental structure of the ribonucleic acid of a virus that attacks bacteria. Ribonucleic acid is an all-important life substance.

Miss Litman actually "fooled" the viruses. She put some sulfanilamide into the virus culture, thus blocking the formation of thymine, normally an essential part of the nucleic acid of the viruses.

She also put into the culture a chemical called 5-bromouracil, which is something like thymine.

When new viruses were formed, there was no thymine for them, but they accepted the 5-bromouracil in its place.

About 10% of offspring were mutants containing this chemical. This is a rate of mutation about 1,000 times larger than occurs normally. The mutant viruses also produce offspring that are mutants.

The work is considered by Dr. Wendell Stanley, director of the Virus Laboratory, to be an important development in studies of genetic change, not only among viruses, but among all living forms.

If it is possible on a planned basis to cause chemical mutations of one virus, he said, then it may be possible for others. Eventually the point might be reached where infectious viruses could be made to produce non-infectious ones, thus halting virus infections in man, animals and plants.

Science News Letter, December 29, 1956

BIOPHYSICS

Repeated X-ray Doses

➤ X-RAYS in moderate but repeated doses speed the formation of tumors more than a single large dose of equal strength, studies with rats have shown.

This is one of several results noted in studies of effects of total body irradiation of rats at the Atomic Energy Project of the University of California at Los Angeles by Dr. Baldwin Lamson, Dr. Leslie Bennett and Raymond Meek.

It has been shown previously that total body exposure to X-rays can hasten "old age" in rats. The UCLA studies showed that rats surviving whole body irradiation developed characteristics of old age considerably earlier than normal rats.

In addition to a general shortening of the life span, total body irradiation appeared to accelerate formation of tumors that usually occur in rats during old age and to cause diseased kidneys and high blood pressure in the animals.

These effects resulted from sublethal doses repeated at intervals of several months as well as from large single doses equal to the total strength of the moderate ones. The series of sublethal doses accelerated tumor growth more than the large single doses.

Although it has been demonstrated that a lack of oxygen increases chances of survival in irradiated rats, the amount of oxygen available to the animal did not seem to influence the latent effects of X-rays.

The doctors emphasized that the animal studies were only preliminary and that much more work was needed before the findings could be related to effects in man. These doses are very much higher than those used in conventional medical practice, they noted.

Science News Letter, December 29, 1956

GENERAL SCIENCE

Deny Young Scientists Succumb to Communism

➤ SCIENTISTS and others familiar with the rising generation of scientists are not in agreement with the opinion of District Judge Alexander Holtzoff who stated from the bench that he inferred that "the younger generation of pure scientists specifically engaging in research in physics has succumbed to communistic propaganda."

The records of some 4,500 who have received honors as America's top young scientists in 15 years of the Science Talent Search, for instance, have failed to disclose even one who "has succumbed to communistic propaganda."

Judge Holtzoff made his remarks in the course of imposing a 90-day jail sentence upon Bernard Deutch, 27-year-old graduate student in physics at the University of Pennsylvania, who was convicted of contempt of Congress after refusing to answer certain questions before the House Un-American Activities Committee.

At least two scientific groups, the Federation of American Scientists and the Philosophical Society of Washington, have sent Judge Holtzoff letters of protest. He has insisted, in return, that he was not accusing a whole group.

Science News Letter, December 29, 1956

BIOLOGY

Tree's Electricity Measured in Storm

➤ A TREE'S ELECTRICITY and how it changes during severe thunderstorms is being measured by Dr. H. S. Burr, Yale University School of Medicine, New Haven, Conn.

He reports "very considerable" variations in the tree's electrical field. These are associated with "very profound changes in earth and atmospheric electricity," Dr. Burr states in *Science* (Dec. 14).

Measurements of the potential of the tree have been made for more than a decade, but those of nearby moist earth were started only last summer. Dr. Burr hopes to install equipment for measuring atmospheric potential soon.

The potential difference is charted using two electrodes embedded in the cambium of the tree about three feet apart. There are daily, monthly and seasonal variations in the tree's electricity, and a suggestion of a correlation with sunspot activity, Dr. Burr reports. The potentials are measured in thousandths of a volt.

Science News Letter, December 29, 1956

BIOCHEMISTRY

Bee Sting Venom Causes Formation of Antibody

➤ THE SEARCH for immunity against bee stings is still far from over, but scientists at the University of Wurzburg, Germany, report finding that two components of bee venom cause antibody formation in rabbits.

Earlier studies have shown that bee venom is composed of two groups of ingredients, Ernst Habermann and Mahmoud M. A. El Karemi report in *Nature* (Dec. 15).

One group, the so-called "fraction I," contains the highly poisonous ingredients, they report. The other group, "fraction II," contains the enzymes phospholipase A and hyaluronidase.

Rabbits given repeated doses of the two enzymes built up immunity to them by forming antihyaluronidase and antiphospholipase in their body, the researchers found.

However, the highly poisonous "fraction I" caused no apparent production of antibodies, and the body fluid from immunized rabbits was helpless against the effects of the toxin in white mice or on human red blood cells, they reported.

Science News Letter, December 29, 1956