

medical sciences

Gathered at the meeting of the 12th International Congress of Genetics in Toyko

HUMAN HEREDITY

Protection from mutations

The task of chief importance in the genetics of future mankind is the protection of human heredity from natural, chemical and radiation mutations, one of the Soviet Union's leading geneticists says.

Dr. Nikolai P. Dubinin, director of the Institute of General Genetics in Moscow, declares the "study of the nature and types of potential damages in human cells is one of the most burning problems facing geneticists today."

The mutation theory has changed greatly of late, he explained. According to a new concept, mutation production undergoes several stages instead of the momentary pattern formerly accepted.

Prior to real mutation a primary chromosome damage exists as a potential danger.

Professor Dubinin acted as chairman of most of an all-day session of an international symposium on genetic effects of space environment, held in conjunction with the genetics congress. Some 2,000 scientists from 53 nations attended the congress.

MUTANT VIRUS

Leukemia-type virus studied

In the hope of finding a cure for leukemia, Dr. Sol Spiegelman and his collaborators at the University of Illinois are at work on synthesizing the genetic material of a leukemic-type virus that cannot cause the disease. They plan to use the mutant virus to combat the virus that is known to cause the disease in mice.

Explaining his plan to the Tokyo genetics congress, Dr. Spiegelman, who in 1965 synthesized RNA, or ribonucleic acid, pointed out that this RNA molecule initially came from a virus and could itself cause a disease.

He said that by imposing the right selective conditions one can synthesize a mutant that cannot cause a disease, and this mutant grows better than the original viral nucleic acid. The mutant can be employed in combating the infection, and thus the technique could cover a broad range of curable infections.

TOBACCO

Nicotine content boosted

A North Carolina State University geneticist, who says he had no interest in whether increasing the nicotine content of tobacco plants was good or bad, reported achievement of the feat in flue-cured Dixie Bright and Coker 139 tobacco to the Tokyo meeting.

Dr. Dale F. Matzinger explained that tobacco is normally a self-fertilizing species. However, he used techniques normally used in cross-fertilization on the basis of crosses instead of normal self-fertilization.

He began his study 12 years ago, and after carrying it through three cycles of selection, he found that the nico-

tine was higher in almost all the families of plant population than the high parent in the original cross. Now virtually all the families are above or equal to the high parent. He predicted a like increase in tobacco-plant yield.

ENZYME DEFECTS

Sex-linked disease explained

A sex-linked neurological disease that includes one type of cerebral palsy can be prevented in states where laws permit abortions for mothers of babies who would be born abnormal.

As a result of the preliminary work reported at the Congress in Tokyo, Dr. J. Edwin Seegmiller of the National Institute of Arthritis and Metabolic Diseases, Bethesda, Md., and his collaborators have now examined amniotic fluid taken from the wombs of pregnant women through whom the disease is inherited. His discovery can control its continuance.

Deficiency of the enzyme called PRT is related to excessive uric acid formation, which results in some cases of mental retardation and epilepsy, as well as gout and the Lesch-Nyan disease in which the patient indulges in compulsive biting that mutilates the lips and finger nails.

Dr. Seegmiller took part in a panel discussion on the molecular basis of hereditary diseases in human beings.

Dr. Edward M. Scott, of the Arctic Health Research Laboratory in Alaska, reports a rare condition that is unusually prevalent in Southern Eskimos and Athabaskan Indians in Alaska and in Navajos of the Southwest, caused by absence of the enzyme NADH-methemoglobin reductase. Persons affected have bluish lips and fingernails and a slate-gray skin.

RADIATION

Mutations missing in mice

No visible mutations occurred in 50 generations of mice exposed to atomic energy radiation, Dr. John F. Spalding, scientist from the University of California in the Los Alamos Scientific Laboratory reports.

His studies were made over a 10-year period to determine how one-third of a lethal dose of X-ray exposure—2,000 rads—to each consecutive generation of mice might effect the constitution of succeeding generations.

Contrary to popular opinion, he pointed out, this mammalian species has been remarkably successful in perpetuating its original genetic code. The mice are still mice in every sense of the word with no change in the life span and no increase in killing diseases.

The 50 generations have been given about 10,000 rads of X-ray exposure. Allowing for 30 years in a generation of man, this means a period roughly equal to 1,500 years in mankind.

However, Dr. Spalding emphasized, the result of the mouse studies "is applicable to humans only in that a mouse is a mammal and has the same type of genetic inheritance."