

GENETICS

Partial Gene Duplication

► WHAT MAY BE an important step in the evolution of new forms of life, the duplication of part of a gene, has been demonstrated by a University of Wisconsin medical geneticist, Dr. Oliver Smithies.

Collaborating with two University of Toronto biochemists, Drs. George E. Connell and Gordon H. Dixon, they have traced the evolution of certain blood proteins to such a duplication.

The gene contains a blueprint for the production of a particular polypeptide. Several different polypeptide chains may combine to make a single protein. If a gene is changed by partial duplication, it specifies a new kind of polypeptide and, therefore, a new kind of protein.

Although such duplications are probably not uncommon, they do not always function. However, the partial gene duplication that Dr. Smithies and his co-workers demonstrated is completely functional.

The discovery resulted from an analysis of three common types of the hemoglobin-binding protein, haptoglobin. One of these types, they found, was composed of a piece of each of the other two.

The simplest explanation for the genetic

origin of this "double" type is that parts of the genes which code the two original haptoglobins joined up to form a new gene, Dr. Smithies concluded.

This combination gene now specifies a hybrid haptoglobin. The researchers note that there are many other proteins, such as the digestive enzymes, trypsin and chymotrypsin, which could have evolved by a similar mechanism.

Most new protein types which have been studied in the past arise from point mutations. These are single changes within tiny portions of the genes which specify their structures. The new gene forms, called point mutants, usually make only a very slight difference in protein structure.

If point mutations were the only functional genetic changes which could occur, the human species would have taken a much longer time to evolve than it did, Dr. Smithies suggests.

The big jumps, such as the one just demonstrated, were probably important steps in making evolution possible in the time that man has utilized in his evolutionary rise.

• Science News Letter, 84:84 Aug. 10, 1963

BIOCHEMISTRY

What Killed Napoleon?

► "ARSENIC AND OLD LACE" may be a modern version of arsenic poisoning, but three European doctors believe that someone in Napoleon's household on St. Helena outdid the old ladies 120 years earlier.

According to Napoleon's death certificate, he died of cancerous lesions of the stomach; but according to the hairs on his head, he died of chronic arsenic poisoning with occasional attacks of acute arsenic poisoning.

A century and a half ago, on June 20, 1815, Napoleon abdicated after the Waterloo disaster. Because the British feared another outbreak similar to the Hundred Days campaign, he was exiled to the tiny island of St. Helena in the South Atlantic.

During his five-year stay on St. Helena, Napoleon suffered many severe attacks of a strange disease, alternating with periods of good health. During the last two years his life was in danger more than once from violent attacks marked by fever and 34 other acute symptoms.

Although the death certificate on May 5, 1821, said he died from cancer, that view was not accepted by Dr. Francesco Antommarchi, Napoleon's personal physician on St. Helena, and other prominent medical writers. Since then, many have tried to analyze his signs and symptoms as a clue to the actual cause of death.

Drs. Sten Forshufvud, Hamilton Smith and Anders Wassen of Goteborg, Sweden, and The University, Glasgow, Scotland, used the method called "activation analysis" on a few short hairs taken from Napoleon's

head after his death. The analysis showed an arsenic content 13 times higher than the normal hair amount, which is negligible.

Later a family heirloom of a lock of Napoleon's hair was given to the doctors for further analysis. These studies showed conclusively that Napoleon was periodically exposed to arsenic and these periods of exposure as shown by hair growth correspond to the strange course of his disease. The arsenic could not have been sprayed on after his death, the doctors said, but the actual amount of the dosage is impossible to determine from the study.

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SOCIOLOGY

Problems of Health Industry to Be Probed

► THE PROBLEMS of such service industries as education, government and health are being tackled with money from Ford Foundation grants.

The grants, totaling \$4.9 million, will be used in studies of economic growth and public affairs, and will aid students, teachers and professionals in such fields as economics, law, medicine and the ministry.

Specific problems to be studied include the establishment of an "economic clearing house," care of elderly members of a community, information and research programs dealing with management and production.

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Questions

CONSERVATION—How can Americans prevent the "murder" of nature? p. 90.

ENTOMOLOGY—What are three USDA methods for controlling the spread of the cereal leaf beetle? p. 83.

GEOLOGY—What trees grew on what is now ocean 13,000 years ago? p. 86.

MEDICINE—Which drugs should not be labeled as to content? p. 96.

NUTRITION—What is another name for "cut-let fish" or "Fish 45"? p. 89.

SPACE—What produces the electrified blanket in the path of the S-66? p. 85.

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