Scientists Isolate Single Gene in Step to Heredity Cell

Continued From Page 1, Col. 3

ever, the work has major implications for higher life because there is growing evidence that all living things, from the lowest single-celled bacterium to humans, receive their traits by fundamentally the same mechanism.

For this reason the achievement probably brings much closer the day when less than 25 years after some estimates when it will be possible to cure human diseases or change inborn traits by injecting new genes. Because such methods could be misused, many scientists view this prospect with considerable ambivalence.

'Elegant' Experiment

The Harvard work, the experimental details of which are being published today in London in the journal Nature, was performed over two months last summer. In an experiment that other scientists called "elegant," the Harvard team followed a process called a "promoter" that produces the "repressor," an "operator" that is normally repressed by the repressor and a "structural" portion, which is inserted in the gene and turned on by the operator and does the main work of the gene. It is driven by directing the production of cell proteins which in turn govern cell reactions and the formation of protoplasm, the cellular material. The proteins, thus, specify genetic traits.

Oparon Isolated

Therefore, what Dr. Beckwith and his team did was to isolate the lactose operon. As it is called, controls the bacteria's ability to metabolize lactose by governing the production of an enzyme, called beta-galactosidase, which chews up the sugar for immediate use.

The achievement brings the path for a detailed study of the workings of the Jacob-Monod mechanism in the test tube under controlled conditions. This may be possible, not only with the operon but with other bacterial genes, now that the techniques have been perfected.

For example, it should be possible to change the operon, so that the repressor binds to prevent its function, as well as where and how the gene directs protein synthesis. Such knowledge may permit scientists to turn genes on and off at will.

In addition, the purified gene and its chemical products of a gene in the test tube may be used in the study of other genes. Ultimately, it may also be possible to pin down the exact chemical units that make up individual genes.

It is generally believed that the operator is the key to the regulation of protein production. Recently, other scientists at Harvard University isolated the repressor, and now the repressor binds to prevent its function, as well as where and how the gene directs protein synthesis. Such knowledge may permit scientists to turn genes on and off at will.

In addition, the purified gene and its chemical products of a gene in the test tube may be used in the study of other genes. Ultimately, it may also be possible to pin down the exact chemical units that make up individual genes.

Dr. Beckwith, his team and the procedure are the forerunners of the new science of gene therapy, which has the potential to cure genetic diseases.

Electron microscope photograph of single gene, twisted strand in center of the picture. It is .000053 inches long.