

ENTER THE CELL

What is different about self-reproducing matter? How does a steak you eat turn into you and a steak I eat turn into me? Biologists have a new clue. In the last few years they have isolated the templates inside every cell which keeps living material organized in its own pattern. These templates are the nucleic acids DNA, short for deoxyribonucleic acid and its ~~most~~ similar colleague, RNA, short for ribonucleic acid. Both molecules are long strings of thousands of familiar groups of atoms whose individual patterns of recurrence make the difference between a cell of you and a cell of me.

Five years ago, when he was only 25, Chicago-born James D. Watson and the English physicist F.H.C. Crick worked out a model of the DNA molecule in the Cavendish Laboratory at Cambridge. They suggested that it acted as if it were two complementary strings wound around each other and held together by cross brace groups. Unwind the strings and you have two identical chains of molecules running in opposite directions. The stumps of the broken cross braces could then attract, assemble, or "grow" just the groups of atoms needed to make a new partner.

Proof of this model is engaging biochemists and biologists all over the world. ~~Now Assistant Professor~~ Now Assistant Professor of Biology at Harvard, Dr. Watson is trying to correlate the structure of the DNA molecule with its biological role as the key genetic material.

Thirty-three-year-old Joshua Lederberg, newly appointed chairman of the newly created department of medical genetics at the University of Wisconsin is a young biologist who has helped suggest a new answer to an old question. How did sex begin? Sexual reproduction is the key to evolution because it shuffles genes from two parents to produce individuals

who vary just enough for natural selection, but how did nature hit on this marvellous device? ~~in~~ The single-celled bacteria which reproduce by the simple process of splitting do not sound like a promising approach but that's just where Josh Lederberg and Edward L. Tatum found the clue.

Lederberg was a 21-year-old graduate school at Yale when he started working on ~~the same group of bacteria as those used by Tatum~~ bacteria. Bacteria have DNA and a group at the Rockefeller Institute for Medical Research had changed one pneumonia bacteria into another form by artificially injecting its DNA into the alien cell. ~~in~~ Could bacteria transfer DNA to each other naturally? Lederberg and Tatum When ~~they~~ mixed different strains of bacteria together on the same plate they got one in a million offspring with characteristics of both, like Mendel's crossed peas. Further studies of bacteria at the University of Wisconsin convinced ~~him~~ Lederberg that bacteria have genes strung along chromosomes just like higher forms of life and that some bacteria are "males" ~~in~~ who can give characteristics to "females" even though they don't need sex to reproduce. The males snuggle up to the females and slide part of the long DNA molecule into them. It takes a half hour. When the female splits, ~~the~~ the offspring just divide the genetic material.

Lederberg's work has won him many awards, including the Eli Lilly citation for 1953 as the outstanding young bacteriologist. His work on the sex life of bacteria equips biologists with a perfect laboratory animal for the study of genetics. Bacteria are simple, compact, ~~and~~ cheap to keep, prolific, and a new generation is born every twenty minutes.