

## Who Discovered DNA?

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Who discovered DNA? This is the story of the Nobel Prize Winners Wilkins, Crick and Watson and DNA discovery/development.



The banner features the Explorable logo and the text "Quiz Time!". Below the logo are three quiz cards: "Quiz: Psychology 101 Part 2" (with a roller skates image), "Quiz: Psychology 101 Part 2" (with a colored pencils image), and "Quiz: Flags in Europe" (with a Ferris wheel image). A "See all quizzes =>" link is located at the bottom right.

## DNA - The Molecule of Life

Deoxyribonucleic acid or DNA is the hereditary material present in the cells of all humans and other living organisms. DNA is a nucleic acid generally regarded as a blueprint, a recipe or a code of an organism. The blueprint contains instructions which enable development of cells in to body. And also controls the characteristics featured in a fully functional living structure through genes.

### DNA Research

The very first cell in a living being is formed when egg and sperm get mingled. At that point DNA molecule renders the entire genetic code to be used for the formulation of cells forever in that creature. These cells divide and replicate themselves perfectly to construct the body structure. They continue to do that for body maintenance as well i.e. formation of new blood cells or skin cells.

The Nucleotides are the basic structural unit of DNA. Each Nucleotide is a pair of polymers with backbones made up of sugar and phosphate groups connected by ester bonds. The two anti-parallel strands run freely in the nucleus. Four types of bases are attached to each sugar. The arrangement of these bases along the backbone encrypts information which is accessed

through transcription using the genetic code.

In each cells, DNA molecules are systematically arranged into longitudinal structures called chromosomes. During the process of DNA replication, chromosomes duplicate themselves before cells divide.

## **Discovery of DNA - Three Main Players**

"This structure has novel features which are of considerable biological interest."

This statement, perhaps the most scientific understatement, appeared in April 1953 in the scientific journal "Nature" when Watson and Crick presented the structure of the DNA-helix. In 1962, they shared Nobel Prize in Physiology or Medicine with Maurice Wilkins. Their brief life stories follow.

### **Francis Crick (1916-2004)**

As a boy, Francis Crick had a keen interest in physics, chemistry, and mathematics. Before World War II, he studied physics at University College in London. For two years after the war he was admitted to the British Admiralty Research Laboratory. He was influenced by the works of Erwin Schrödinger to alter his professional career from physics to biology.

After working at a Cambridge University laboratory he joined Cavendish Laboratory at Cambridge in 1949. The scope of his learning included biology, organic chemistry, protein structure and x-ray diffraction technology. In 1951, he was joined by James Watson. Both of them worked closely and presented their visual model of DNA in 1953. They shared Nobel Prize in 1962. He continued his professional career in various institutions and authored couple of books in later years.

### **James Watson (b. 1928)**

The American born James Watson was obsessed with bird-watching in his childhood. In 1947, at the age of 15 he graduated from the University of Chicago. He received his Ph.D. in Zoology from Indiana University in 1950. Then he joined Cavendish laboratories where he worked together with Francis Crick to ascertain DNA structure.

In 1953, when they created the model of DNA double helix, it was regarded as an enormous achievement in fields of molecular genetics and biochemistry. For their work Crick, Watson, and Wilkins were awarded the Nobel Prize in 1962. Before becoming director of Cold Spring Harbor Laboratory New York in 1968, Watson taught at Harvard and CalTech. In 1988, as an acknowledgement of his scientific glory and his administrative capabilities, he was appointed appointment as the head of the Human Genome Project at the NIH.

### **Maurice Wilkins (1916-2004)**

Maurice Wilkins was a New Zealand born British biophysicist and molecular biologist. After his early education he studied physics in Cambridge at St. John's College and acquired his degree in 1938. Then, in 1940 he received, from University of Birmingham, his Ph.D. in

physics. For two years he worked at the Manhattan Project at the University of California, Berkeley during World War II. After that he returned to King's College London. In 1945 he joined St. Andrews' University, Scotland as lecturer in physics and pursued research in biophysics. He worked with Raymond Gosling and Rosalind Franklin during 1950-52. Their combined efforts produced the images of the DNA molecule which resulted in Crick & Watson model in 1953.

Wilkins became Deputy Director of the Medical Research Council Unit in 1955 and taught biophysics at King's College. In addition to the Nobel Prize in 1962, he was also given the Albert Lasker Award by American Public Health Association in 1960. He shared both the awards with Watson and Crick. Later, in 1962 he was made a Commander of the British Empire.

## DNA Research: A Timeline of Discovery & Developments

<b>1866</b>	Gregor Mendel publishes results of his research on the inheritance of "factors" in pea plants.
<b>1869</b>	Friedrich Miescher discovers "nuclein" in the pus of discarded surgical bandages.
<b>1919</b>	Phoebus Levene identifies the base, sugar and phosphate nucleotide unit.
<b>1928</b>	Frederick Griffith discovers the transfer of traits in two forms of Pneumococcus.
<b>1937</b>	William Astbury produces the first X-ray diffraction patterns showing regular structure of DNA.
<b>1943</b>	Avery-MacLeod-McCarty experiment identifies DNA as the transforming principle.
<b>1952</b>	Hershey-Chase experiment shows that DNA is the genetic material of the T2 phage.
<b>1952</b>	Rosalind Franklin & Raymond Gosling produce single X-ray diffraction image.
<b>1953</b>	James Watson & Francis Crick suggest the first correct double-helix model of DNA structure.
<b>1958</b>	Meselson-Stahl experiment confirms replication mechanism as implied by the double-helical structure.
<b>1962</b>	Watson, Crick, and Wilkins jointly receive the Nobel Prize in Physiology or Medicine.

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