

## A success story of DNA double helix

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**H**istory is the story of the achievements of men and women, but it records relatively few outstanding names and events. Many important contributions were by people whose names have been forgotten and whose accomplishments have been lost in the longer and deeper shadows cast by those who caught the fancy of the chroniclers. It has been said that in science the credit goes to the one who convinces the world, not to the one who first had the idea. Women are also not the exception here. There are notable examples of exceptional women not being publicly acknowledged for their contributions.

### *Lise Meitner (1878-1968):*

A pioneer of nuclear physics; discovered element Protactinium; conducted experiments that led to fissioning of Uranium.

Similar is the case for Rosalind Franklin (1920-1958) conducted the research central to the discovery of DNA's double-helix structure that led to Watson and Crick being awarded the 1962 Nobel Prize.



**Rosalind Elsie Franklin**  
(25 July, 1920 Notting Hill, London-16 April, 1958 Chelsea, London)

She was an English biophysicist and X-ray crystallographer who made important contributions to the understanding of the fine molecular structures of DNA, viruses, coal and graphite.

### **Background:**

Franklin was born in Notting Hill, London into an affluent and influential British-Jewish family. Her father was Ellis Arthur Franklin (1894-1964), a London merchant banker and her mother was Muriel Frances Waley (1894-1976); she was the elder daughter and second of the family of five children. Franklin was educated at St Paul's Girls' School where she excelled in science, Latin and sport. Her family was actively involved with a Working Men's College, where Ellis Franklin, her father, taught electricity, magnetism and the history of the Great War in the evenings and later

became vice principal. Later Franklin's family helped settle Jewish refugees from Europe who had escaped the Nazis.

There is probably no other woman scientist with as much controversy surrounding her life and work as Rosalind Franklin. Franklin was responsible for much of the research and discovery work that led to the understanding of the structure of deoxyribonucleic acid, DNA. Franklin excelled at science and attended one of the few girls' schools in London that taught physics and chemistry. When she was 15, she decided to become a scientist. Her father was decidedly against higher education for women and wanted Rosalind to be a social worker. Ultimately he relented, and in 1938 she enrolled at Newnham College, Cambridge, graduating in 1941. She held a graduate fellowship for a year, but quit in 1942 to work at the British Coal Utilization Research Association, where she made fundamental studies of carbon and graphite microstructures. This work was the basis of her doctorate in physical chemistry, which she earned from Cambridge University in 1945. After Cambridge, she spent three productive years (1947-1950) in Paris at the Laboratoire Central des Services Chimiques de L'Etat, where she learned X-ray diffraction techniques. In 1951, she returned to England as a research associate in John Randall's laboratory at King's College, Cambridge.

It was in Randall's lab that she crossed paths with Maurice Wilkins. She and Wilkins led separate research groups and had separate projects, although both were concerned with DNA. When Randall gave Franklin responsibility for her DNA project, no one had worked on it for months. Wilkins was away at the time, and when he returned he misunderstood her role, behaving as though she were a technical assistant. Both scientists were actually peers. His mistake, acknowledged but never overcome, was not surprising given the climate for women at Cambridge then. Only males were allowed in the university dining rooms, and after hours Franklin's colleagues went to men-only pubs. Rosalind But Franklin persisted on the DNA project. J. D. Bernal called her X-ray photographs of DNA, "the most beautiful X-ray photographs of any substance ever taken." Between 1951 and 1953 Rosalind Franklin came very close to solving the DNA structure. She was beaten to publication by Crick