1 x 60

# Secret of Photo 51

WGBH International

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On April 25, 1953, the science journal *Nature* announced that James Watson and Francis Crick had discovered the double helix structure of DNA, the molecule that is fundamental to life. But absent from most accounts of their Nobel Prize-winning work is the contribution made by a rival scientist—molecular biologist and crystallographer Rosalind Franklin—who would never know that Watson and Crick had seen a key piece of her data without her permission and that it would lead them to the double helix. Fifty years later, NOVA's *Secret of Photo 51* unravels the mystery behind the discovery of the double helix and investigates the seminal role that Rosalind Franklin and her remarkable X-ray photographs played in one of the greatest discoveries in the history of science.

Born into a prominent Jewish family in London in 1920, Franklin was a mathematically gifted student who faced rigid gender barriers in her pursuit of a scientific career. She earned a PhD in physical chemistry at the University of Cambridge and became one of the world's foremost experts in X-ray crystallography—the difficult art of probing the inner structure of molecules with X-rays.

In 1951, she accepted a post at King's College London to study the structure of DNA with Wilkins. The two didn't get along and pursued their work separately, with Franklin discovering two different forms of DNA and making detailed X-ray pictures of each type.

Her Photo 51, which required 100 hours of exposure in May 1952, was exceptional. The following January, without her knowledge, Wilkins casually showed the image to Watson, who was unofficially working on the DNA problem with Crick at Cavendish Laboratory in nearby Cambridge.

"My mouth fell open and my pulse began to race," Watson recalled in his famous memoir, *The Double Helix* (1968). The distinctive pattern in Photo 51 proclaimed that the structure had to be a helix. Back at Cavendish, Watson and Crick quickly took the next steps by working out a structure that accounted for Franklin's data and other pieces of the puzzle. The discovery won Watson and Crick the Nobel Prize in 1962, which they shared with Wilkins. Sadly, Franklin was not eligible since she had died in 1958, at 37, from ovarian cancer; the Nobel is not awarded posthumously.

Even so, it is impossible to say if Franklin would have been honored had she lived, since another stipulation is that the Nobel Prize cannot be split more than three ways. Ironically, her role in one of the most important discoveries in the history of science was hidden even from her, since she never knew that Photo 51 sparked the final insight that led to the solution of the double helix.


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