

In remembrance of Dr. James D. Watson (1928-2025)

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On November 6, 2025, the scientific community lost one of its most accomplished scientists, Dr. James Dewey Watson, a Nobel laureate recognized for co-revealing DNA's iconic double-helix structure - "the blueprint of life". His death marks the end of an important era in the biological sciences, although his legacy will continue to illuminate the scientific journey well into the future.

Dr. Watson was born in Chicago in 1928, and exhibited his brilliance at an early age: he started with an interest in ornithology, and then gravitated to genetics after reading Erwin Schrödinger's influential book on *What Is Life?* Salvador Luria originally drew Watson into the field of molecular biology through the groundbreaking work he performed on bacterial viruses, which motivated Watson on his career path as a scientist. Watson was able to think about the genetics of organisms at the molecular level while he was part of the lively Phage Group, and continued to become excited by the suggestion that a nucleic acid, DNA instead of a protein, was the genetic material. While at graduate school at Indiana University he used X-rays to investigate the inactivation of bacteriophages, and through this work he became even more interested in nucleic acids. A year after graduate school he had a postdoctoral year at the University of Copenhagen and was exposed to new biochemical techniques. It was a seminar by Maurice Wilkins,

which emphasized the possibility that DNA had an original and ultimately learnable structure, that was a significant influence in Watson's decision to acquire the learning to use X-ray crystallography. Ultimately, this decision brought Watson, in 1951, to England to begin the work that would lead to the elucidation of the double helical structure of DNA. In 1953 at the Cavendish Laboratory in Cambridge, the summit of Dr. Watson's scientific career would occur where he and Sir Francis Crick, utilizing the amazing X-ray crystallographic studies of Rosalind Franklin and Maurice Wilkins, proposed the elegant structural double helix of DNA – which altered our understanding of heredity, evolution, and life!

It was the detailed research by Rosalind Franklin with X-ray diffraction that, especially with Photo 51, supplied the clues for James Watson and Francis Crick to develop the correct double helix model, especially her sharp images of DNA. Her conjectures regarding the sugar phosphate backbone being on the outside and the strands being in an antiparallel configuration really aided the construction of the model, as did the observation that the complementing bases fit well in the model as well as the total width of the helix. The three classic papers in molecular biology are Watson & Crick, "A Structure for Deoxyribose Nucleic Acid,"; Wilkins, Stokes and Wilson "Molecular Structure of Deoxypentose Nucleic Acids"; Franklin & Gosling, "Molecular Configuration in Sodium Thymonucleate". These three historical papers substantially contributed to the basis of modern molecular biology. Excellent experimental data contributed by Franklin and model-building led by Watson worked in a positive, complementary way to establish the Collins & Crick DNA double helix.

For this remarkable discovery, Watson and Crick, and Wilkins received the Nobel Prize in Physiology or Medicine in 1962. Watson was an exceptional educator and author, and textbooks authored by him, helped to define modern molecular biology beyond his research career. His initial significant publication, 'The Molecular Biology of the Gene' incorporated a novel "heads" approach with a series of brief sub-headings that allowed for concise and clearer presentation of complex ideas. Subsequently, he coordinated the landmark textbook Molecular

Biology of the Cell, and co-authored Recombinant DNA which illustrated how genetic engineering defined perspectives from the 1970s onwards on understanding living systems. Dr. Watson then published documentation of his landmark role in genetics in his 1968 of his evocation memoirs, 'The Double Helix'. In this book, Watson paints a vivid often controversial picture of the race to discover the structure of DNA and the personalities involved. In the beginning The Double Helix was objected to by colleagues such as Dr. Linus Pauling, and academic publishing had suspicion about the writing style. However, The Double Helix became a best seller, often considered one of the most important nonfiction books of the 20th century.

Dr. James D. Watson was also and remain a front a front-line leader in modern genetics through his long tenure at Cold Spring Harbor Laboratory from 1968 going forward. He had provided significant, various leadership which included changing the Cold Spring Harbor Laboratory from a small research lab, into a Fischer Institute of internationally known education discussant in modern genetics, molecular biology, cancer genetics, and modern basic biological neuroscience. Under Dr. Watson's leadership and directorship Cold Spring Harbor Laboratory has significantly expanded genetic research. Under the directorship of Dr. Watson as president, chancellor from 1968 to date, it has expanded and indicated world class education training of sorts, research programs, including fundamental research studies from the genetic basis of cancer studies and provided modern sophisticated training until his resignation in 2007 following controvercial public comments. Clinical professional scientists directed that had definitional genetic molecular biologist of sorts and a few respective generations of molecular biology scientist, researchers, professionals, medical and visceral practitioners in genetics. Watson was also responsible for launching significant scientific initiatives that positioned the laboratory to fully understand and diagnose human diseases at the molecular level. During the first directorship (1988–1992) of the Human Genome Project at the National Institutes of Health (NIH), he facilitated the launch of the international project that resulted in the complete sequence of the human genome and itself is the cornerstone of genomic medicine and ultimately, genetic

diagnostics and more personalized treatments. He was a vigorous advocate for maintaining the human genome in an open domain and opposed the patenting of genes to allow the ongoing and free scientific process to be maintained. He published his own complete genome in 2007 to further enhance openness and to accelerate the pace of personalized genomics.

James D. Watson, a Nobel Prize-winning scientist himself, mentored many students and fellows who also achieved groundbreaking innovation. In 1993, Phillip A. Sharp was honored with the Nobel recognition for revealing how RNA molecules are spliced. His co-laureate, Richard J. Roberts, demonstrated that genes can exist in separated segments. Sharp's mentorship also produced exceptional scientists, including H. Robert Horvitz, later awarded the Nobel in 2002 for uncovering how genes regulate programmed cell death, and Mario Capecchi, who earned the 2007 Nobel for developing gene-targeting methods that enabled the creation of knockout mice. Beyond these Nobel Prize winners, Watson supervised and mentored numerous PhD students, postdoctoral fellows, and interns, including Ewan Birney, Ronald W. Davis, Peter B. Moore, Joan Steitz, and John Tooze, many of whom, in not only Watson's but made pivotal discoveries that achieved the foundation of molecular genetics and modern biomedicine.

In later years, Dr. James D. Watson's sense of curiosity, intelligence, and his lifetime scientific vision inspired generations of scientists to make important contributions to further science. In 2014, he was the first living Nobel laureate to auction his medal, its proceeds in support of research in the sciences, conservation on Long Island, and academic programs at Trinity College Dublin. The medal fetched USD 4.1 million, to be transferred back to him by the buyer out of deep respect for not only his intellectual contributions in biology not designated in the auction context but for his entire life's work."

In a grateful salute to Dr. James D. Watson, 1928–2025, an intellectual pioneer who "unlocked the door" to our understanding of how DNA replicates and encodes genetic information opening decades of rapid advancement in our understanding of genetics and modern biomedical science, his co-discovery of the double-helix structure of DNA is one of

humanity's most important scientific discoveries, fundamentally reorienting our thinking about life, heredity, and disease. He received the Nobel Prize, Lasker Award, Copley Medal, National Medal of Science, and many other accolades on the global stage for his contributions to science and society.

We acknowledge and remember Dr. Watson not solely because of the distinguished awards he had won but instead of the revolution he had engendered. He lay the foundation for genetics, biotechnology, personalized medicine, and genomic discoveries that have catalysed research we witness and recognize today. Decades later, laboratories, students, clinicians, and scientists build upon his work and discoveries.

We honour Watson, for through each of those DNA experiments, through each of the advances in medicine, and through each of the glimpses into how life operates at the most basic and fundamental levels, one thing is apparent-his legacy. His work brings us back down to reality that great science can demystify the meaning of life and continue to excite multiple generations of scientists and thinkers to seek out the boundaries of knowledge.

Rest in peace, Dr. James Watson!

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