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CRICK, WATSON & FRANKLIN

THEORIES OF EVOLUTION &
LIFE

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In 1869, Swiss doctor Friedrich Miescher, discovered DNA. He first observed the substance in human eukaryotic cells.

CRICK, WATSON & FRANKLIN

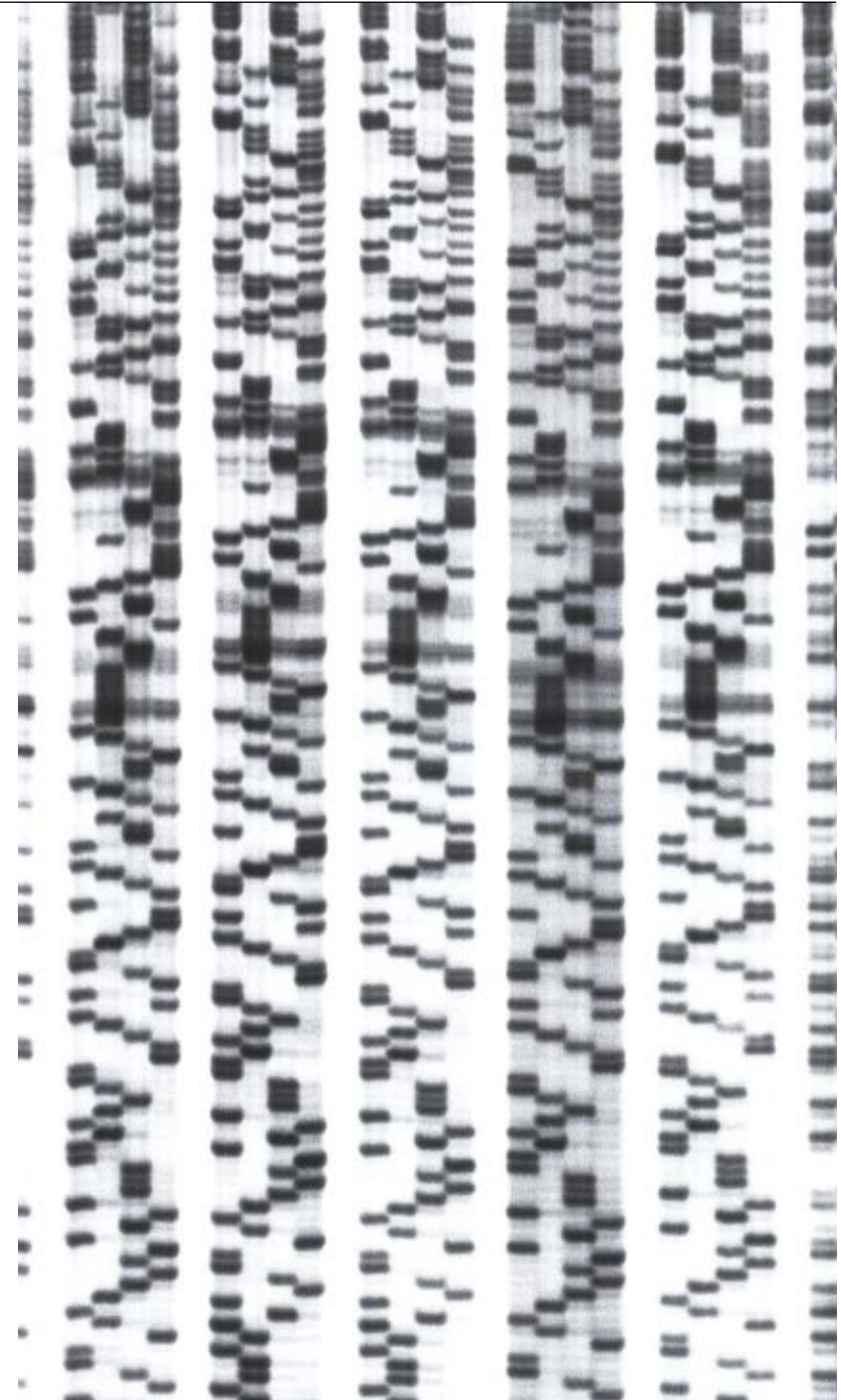
THEORIES OF EVOLUTION & LIFE

By David Baker

Fifteen years later, German biochemist Albrecht Kossel made the next critical discovery. He worked out that the substance in the cells was made out of five different organic chemicals. In 1889, German pathologist Richard Altmann coined the term “nucleic acid”. The term DNA stands for deoxyribonucleic acid. The “N” and “A” are for nucleic acid. In 1919, American scientist Phoebus Levene made another crucial discovery. He figured out that the chemicals were held together in a strand. In 1943, three biochemists, Oswald Avery, Colin MacLeod and Maclyn McCarty confirmed the incredible theory. DNA encoded the individual traits of an organism.

DNA is the mechanism that had eluded Charles Darwin. Finally we understood how exactly traits were transmitted from parents to offspring. The question was: just how did DNA work? This was the great task for biochemists in the 1950s. They needed to create a functional model of this highly complex structure.

Francis Crick and James Watson began working on their model at Cambridge in 1951. They built models out of steel or paper. Meanwhile at King’s College London, three other scientists were using X-ray to get a better understanding. These scientists were Maurice Wilkins, Rosalind Franklin and Raymond Gosling. They were focused on finding solid proof for DNA structure. Crick and Watson’s work tended to be more theoretical.



Over the next 18 months Crick and Watson came up with a thorough set of models. These models were flawed though. Crick and Watson looked at X-ray photos taken by William Astbury in the 1930s. Following this, they tried the double-helix model. However, even this had flaws.

By 1953, Crick and Watson had been working on their model for nearly 2 years. They were competing against American biochemist Linus Pauling. He had recently put out his own of DNA's structure. This was also flawed. Watson went on a trip to King's College London. He went there to convince Wilkins, Franklin and Gosling to join their team. They wanted to beat Pauling to the punch.

During Watson's visit, Maurice Williams showed Watson "Photo 51". This was an exceptional photo. It showed the structure of DNA far more clearly. It was taken by Raymond Gosling. Crick and Watson were also influenced by Rosalind Franklin. She provided valuable suggestions about their ideas.

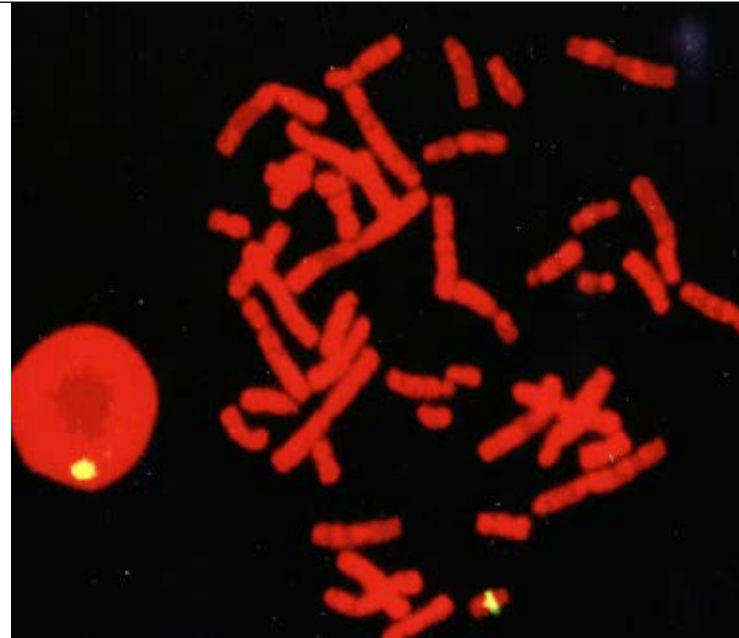
The importance of "Photo 51" cannot be underestimated. It enabled Crick and Watson to modify their model. Their research culminated in a 1953 research article. This is where they published their model for DNA. Crick and Watson were careful to give credit to the team at the King's College London.

However, this was only the beginning. Crick and Watson continued to improve their model of DNA over the next few years. Crick made an important lecture in 1957. He introduced the concept of DNA replication. At this point, Crick and Watson's model remained theoretical. It needed further evidence. There were still other competing models at play.

In 1958 American scientists, Matthew Meselson and Frank Stahl confirmed Crick and Watson's model. How did they prove this? They deliberately bred a bacterial species. From this they could clearly see the DNA process in action.

In the same year Rosalind Franklin passed away from cancer. This was possibly brought on by her exposure to X-ray radiation.

The work of the Cambridge and King's College teams culminated in the 1962 Nobel Prize. It was awarded to Francis Crick, James Watson, and Maurice Wilkins. Nobel prizes are not given after a person has died. Therefore, Rosalind Franklin did not share in the prize. Nor were Raymond Gosling, Alex Stokes or Robert Wilson included in the prize. They were all alive and had made important contributions.



During this period of time there were a series of big breakthroughs that revolutionized science. The discovery of Cosmic Background Radiation gave us the Big Bang. Alfred Wegener's theory gave us plate tectonics. Finally, the model of DNA gave us a look at the origin of species. These breakthroughs gave us a new picture of the Universe.

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IMAGE CREDITS

'CRISPR Cas9' Credit: National Human Genome Research Institute, <https://www.flickr.com/photos/genomegov/39603195652/> Creative Commons BY-NC 2.0 (<https://creativecommons.org/licenses/by-nc/2.0/>).

'DNA sequencing. This method of DNA sequencing is called di-deoxy sequencing. It is used to determine the order of bases (A,C,G and T) in a piece of DNA using radioactively-labelled modified nucleotides. They are then separated by electrophoresis in a polyacrylamide gel and detected on x-ray film by a process called autoradiography.' Credit: Michele Studer/ Wellcome Collection, <https://wellcomecollection.org/works/c7sv89k4> Creative Commons BY 4.0 (<https://creativecommons.org/licenses/by/4.0/>).

'DNA probe for Y chromosome, meta/interphase' Credit: Dr Rosemary Ekong/UCL/Wellcome Collection, <https://wellcomecollection.org/works/zkmehrvs> Creative Commons BY 4.0 (<https://wellcomecollection.org/works/zkmehrvs?query=dna&page=1>).

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James Watson, Francis Crick, and Maurice Wilkins won the Nobel Prize for Physiology or Medicine in 1962 for their work in determining the structure of DNA and its significance. http://www.nobelprize.org/nobel_prizes/medicine/laureates/1962/. Rosalind Franklin did not receive the Nobel Prize because she had died of cancer before the Nobel Prize was awarded, and the Nobel Prize is not awarded posthumously. Meave60 Â· 1 Â· Oct 21 2015. Questions. How does the watson-crick model of dna relate to chargaff's rule? James Watson and Francis Crick, 1959 Â© Crick and Watson, together with Maurice Wilkins, won the 1962 Nobel Prize in Medicine for their discovery of the structure of DNA. This was one of the most significant scientific discoveries of the 20th century. Francis Harry Compton Crick was born on 8 June 1916 near Northampton.Â Franklin had died in 1958 and, despite her key experimental work, the prize could not be received posthumously. Crick and Watson both received numerous other awards and prizes for their work. These four scientistsâ€”Watson, Crick, Franklin, and Wilkinsâ€”codiscovered the double-helix structure of DNA, which formed the basis for modern biotechnology. Home / Learn / Historical Biographies. At King's College London, Rosalind Franklin obtained images of DNA using X-ray crystallography, an idea first broached by Maurice Wilkins. Franklin's images allowed James Watson and Francis Crick to create their famous two-strand, or double-helix, model. After looking through Franklin's data, Watson and Crick were able to find that the DNA structure was a double helix with antiparallel strands, which meant that the strands ran in opposite directions. By discovering the DNA strand directions, they just needed to find the appropriate DNA base pairings, which are nucleotides, commonly referred to as bases, that are able to bond with one other nucleotides.