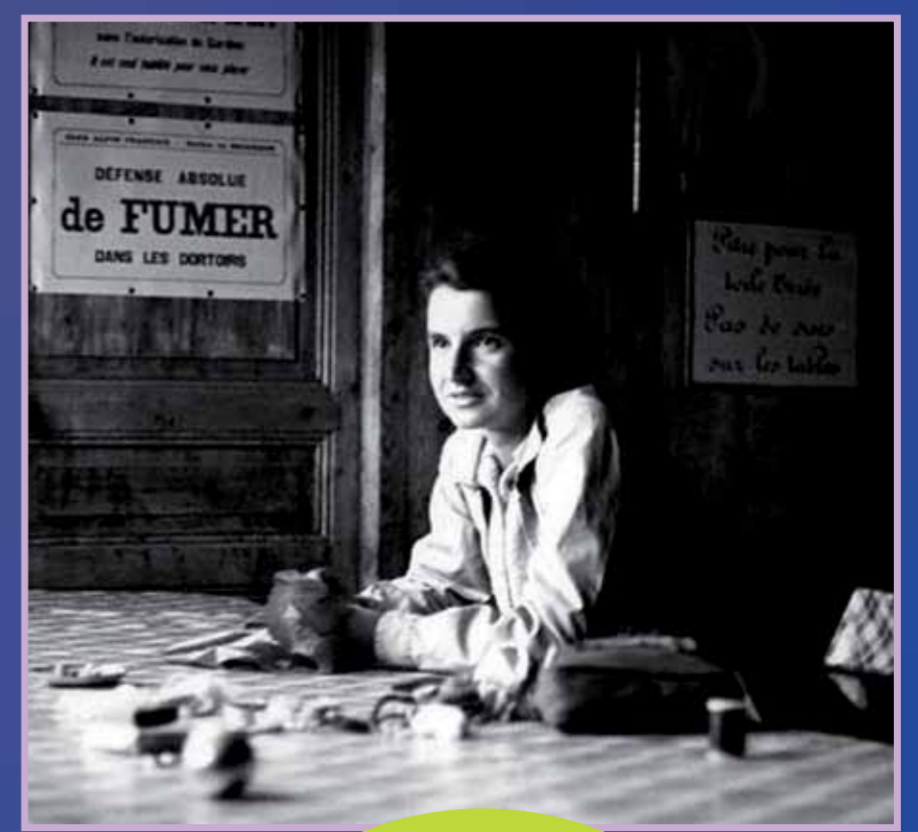


X-rays and DNA

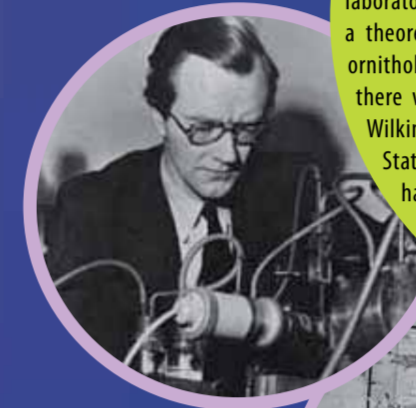
DNA is present in all living cells. It carries the organism's hereditary information, the «secret of life». It is made up of two complementary strands formed by two regular sequences of small molecules, wound into a double helix. They can thus be duplicated identically, characterising the entire genetic make-up. It was Rosalind Franklin's image of a pseudo-crystal made of DNA fibres, obtained in 1951 by X-ray diffraction, which enabled the structure of the molecule to be determined.



Rosalind Franklin (above), James Watson and Francis Crick with a DNA model, with Maurice Wilkins

This is a novel that begins in 1869 when the Swiss Friedrich Miescher isolated the molecules of DNA from the cell nucleus. After the Second World War there was a fierce race amongst scientists to explain the structure of the molecule. In W.L. Bragg's laboratory in Cambridge, England, Francis Crick was working as a theoretician on his PhD, together with James Watson, a young ornithologist recently converted to X-rays. At King's College London there were two experimentalists, Rosalind Franklin and Maurice Wilkins, whilst the great chemist Linus Pauling in the United States suggested a three-helix structure for the DNA. Pauling had the right idea but was wrong in how to apply it. There should have been a crystal ...

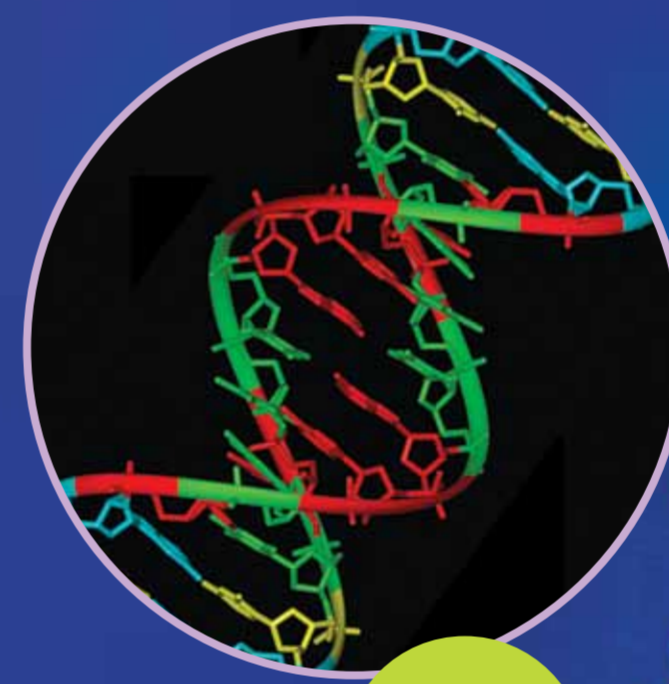
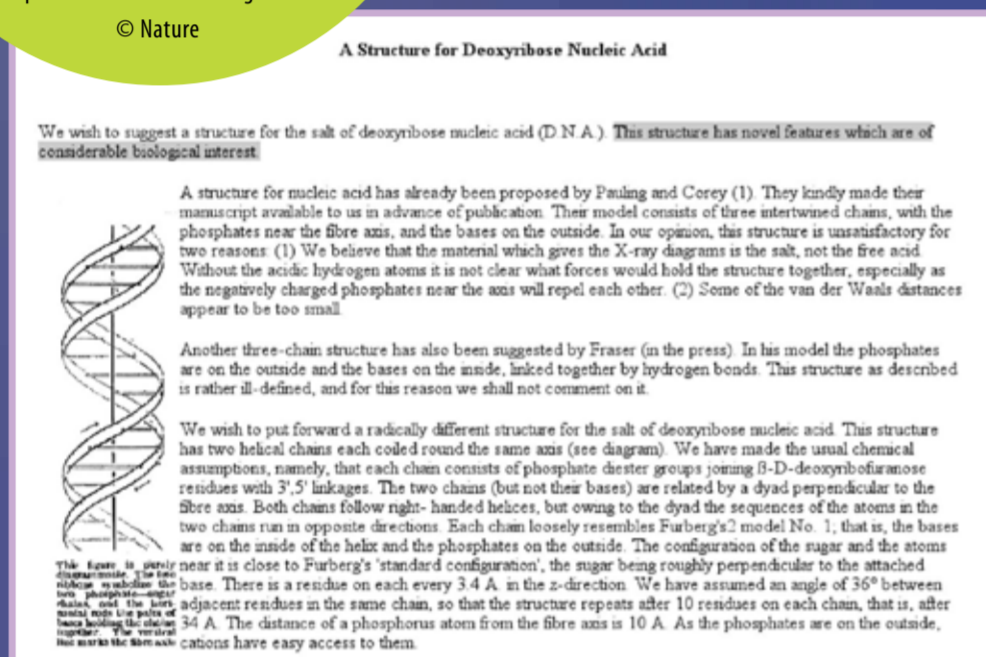
source: SciencePhotoLibrary



First image obtained by diffraction on DNA fibers

To understand the structure of DNA Rosalind Franklin produced a kind of one-dimensional crystal aligning long fibres of DNA molecules. With this bundle-shape crystal she obtained X-ray diffraction patterns of exceptional quality. Wilkins shows these photographs to Watson and Crick. They went on to assemble the pieces of the molecular puzzle, finding by trial and error the structure of the double helix DNA. Crick, Watson and Wilkins received the Nobel Prize for Medicine in 1962. Rosalind Franklin died in 1958 at the age of 38; she never received a Nobel, as the prize is reserved for living scientists.

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Model of the DNA structure (Desoxyribonucleic Acid) © IUCr journals

