

Editorial

FRANCIS CRICK (1916-2004)

No Ghost in the Machine

Your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules (1).

Watson-Crick's double helix is a sufficient expression today in the modern biomedical literature. It refers to the double helix model of DNA structure discovered by James Watson and Francis Crick in 1953, and the discovery for which they shared the Noble Prize in Physiology/Medicine along with Maurice Wilkins and Rosalind Franklin in 1962. In his memoir, Francis Crick commented that it is indeed the molecule that has the glamour, not the scientists (2).

The helix of Watson and Crick's names are so lumped in the public mind along with their double helix model of DNA that Crick used to often obtain compliments for the book named, *The Double Helix*, which is in fact a memoir of Watson. As the opening sentence of his memoir (*The Double Helix*), Watson wrote, "I have never seen Francis Crick in a modest mood" (3). Francis Crick - one part of the historic helix after half century of its grand discovery - died in San Diego on 28 July at age 88. He had been suffering from colon cancer.

The son of Harry Crick, a footwear manufacturer and Anne Elizabeth (Wilkins) Crick, Francis Harry Compton Crick was born in Northampton, England on June 8, 1916. The family moved to London when Francis was a boy. He was educated in North London and attended the University College London. He earned his bachelor's degree in Physics in 1937 and began his graduate study on the viscosity of water, which he later described as 'the dullest problem imaginable'. It led to his working with the British Admiralty during World War II. Once the war was over, vexed with physics, Crick became intrigued with 'the chemical physics of biology'. His friends encouraged him in this cross over. The encouraged Francis Crick went to Cambridge to work for his doctorate study, where he met James Watson in 1951 (4).



The golden helix at work. Francis Crick is on the right, James Watson on the left and the double helix model of DNA at the centre of the photograph. (Courtesy: Media Credit).

Drawing on X-ray diffraction studies by Wilkins and Franklin, and protein structure studies by Linus Pauling, Francis Crick and James Watson deduced the double helix model of DNA structure in the next two years. Francis Crick indeed clarified this issue on the BBC radio in 1999, "It was fairly fast, but you know, we were lucky. One must remember, it was based on the X-ray work done here in London started off by Morris Wilkins and carried on by Rosalind Franklin, we wouldn't have got to the stage of at least having a molecular model, if it hadn't been for their work." Watson recalls the final days, "The final version was ready to be typed on the last week-end of March. Our Cavendish typist was not on hand, and the brief job was given to my sister. There was no problem persuading her to spend a Saturday afternoon this way, for we told her that she was participating in perhaps the most famous event in biology since Darwin's book. Francis and I stood over her as she typed the nine-hundred-word article that began, 'We wish to suggest a structure for the salt of deoxyribose nucleic acid (DNA). This structure has novel features which are of considerable biological interest.' On Tuesday the manuscript was sent up to Bragg's office and on Wednesday, 2 April, went off to the editors of *Nature* (3)".

Dr. Crick received his doctorate in 1954 and subsequently became a leader in the study of protein synthesis and genetic coding. Along with Sydney Brenner, he

showed how transfer RNA is involved in DNA mediated instruction for amino acids to make proteins (4). Those three things - the double helix, [RNA] molecules, and the triplet nature of the genetic code - are considered as the greatest intellectual hat trick by Crick in the history of biology. In 1976, Dr. Crick moved to the Salk Institute for Biological Studies in La Jolla, California. There the main focus of his research became neurobiology. He continued his theoretical research until shortly before his death.

Francis Crick entered into the field of molecular biology with the hope to make biology free of vitalism. According to the 19th century theory of vitalism, living organisms possess special metaphysical elements what attribute life force into matter. Francis Crick contested this theory by holding the antithesis that even the most complex living organism contains no metaphysical spirit, there is no ghost in the machine (1). Crick spent the last three decades of his life to explain consciousness. The neurobiologists could not substantiate his two theories: the searchlight hypothesis and rhythmic voltage fluctuations in the brain as the basis of consciousness, and Francis Crick indeed admitted that he had proved wrong. He was, none-the-less, greatly appreciated by the neurobiologists for his novel viewpoints. Crick's life teaches us all to stretch our boundaries, try with new ideas and to be willing to take risks.

REFERENCES

1. Crick FHC. *The astonishing hypothesis. Scientific search for the soul.* Simon & Schuster, New York, 1994.
2. Crick FHC. *What a mad pursuit. A personal view of science.* Basic Books, New York, 1988.
3. Watson JD. *The double helix. A personal account of the discovery of the structure of DNA.* Penguin Books, Middlesex, 1968.
4. *Nobel Lectures, Physiology or Medicine 1942-1962.* Elsevier Publishing Company, Amsterdam, 1964.