

## Francis Crick lives on Father of DNA structure passes on



James Watson and Francis Crick in 1953

The 1953 work of Francis Crick and James Watson, with Rosalind Franklin and Maurice Wilkins, transformed the nature of biology and our way of thinking of life and evolution, says S.Ananthanarayanan

Francis Harry Compton Crick died on 28<sup>th</sup> July in La Jolla, California, at the age of 88. Just over 50 years after the epochal discovery of the structure of DNA, the molecule that carries hereditary information in living cells.

### The setting

During the first half of the 20<sup>th</sup> century a suspicion that the mysteries of evolution and heredity were going to be explained was a somewhat disconcerting presence at molecular biology laboratories. Darwin had shocked the church by finding that man was a product not of creation but of evolution and the discoveries since then suggested that it was inside the microscopic cells of which living things were made that the secret lay.

The work of Gregor Mendel, a monk in Austria, in the 1860s, had shown that hereditary traits passed from parents to offspring in a form of ‘packages’ or units. Each parent contributed these ‘factors’, as they were called, equally, each parent passing on half her or his own store to the child. Depending on what ‘factors’ the child received, she may inherit features like her mother’s brown eyes, long nails or a tendency to diabetes and her father’s large nose and strong bone structure. And she may pass on to her own children these and other ‘factors’ that were not expressed in herself. Her daughter, for instance, may get her grandfather’s blue eyes!

The structure of cells, and the constituents of their nuclei, or central regions, had also been studied but there was no evidence to assert that these could have a role in heredity. It was only in 1943 that it was found that it was an acidic substance in the nuclei of cells that carried genetic

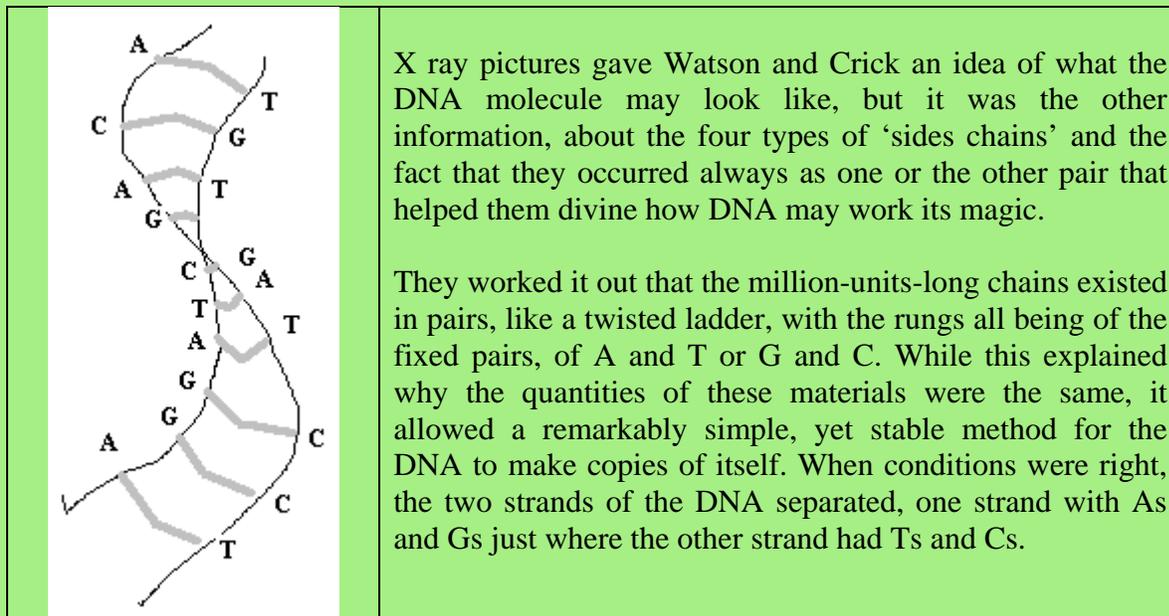
information. It was found that injecting the nucleic acid from one strain of bacteria into another strain changed the second strain of bacteria into the first!

## Nucleic acid

This acid was deoxyribonucleic acid, known for short as DNA. It was found to be a long chain of chemical links which attached to one another, end on end, and sideways to other chemical groups, like beads on a string. A remarkable thing was that these 'side-groups' or 'beads' all belonged to one of just four kinds, known by the first letter of their names, A, G, T and C. And another wonder, that the quantities of A and G or T and C, when a sample of DNA was 'melted down', were always equal.

## Watson and Crick

Watson was an ornithologist turned chemist-biologist and Crick was a physicist who had made the same change. Crick had worked in the field of using X Rays to discover the structure of complex crystals or even molecules. The method is to use regularities in patterns of X Rays reflected by molecules to work out the regularities in the molecules. X Rays are used because ordinary light waves are too large to be affected by the details of molecules.



Now, when these separate strands, in the two halves of a divided cell, rebuilt their 'other-halves' from the chemical 'soup' of the cell, the A, T, G, C got attached just as they had been before. Voilà, the DNA was reproduced!

This was the breakthrough, the mechanism of passing on the genetic code, that set the stage for genetic engineering, which may be the greatest technology of the new century.

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