Genetic sciences has achieved a new milestone in the understanding of the human genome through the publication in September 2012 of 30 research articles describing the achievements of the ENCODE (Encyclopedia of DNA Elements) Project, which has defined the role of previously unknown functional elements within the human genome. The ENCODE Project was initially funded as a follow-up to the completion of the Human Genome Project in 2003. At that time, the entire sequence for protein-coding genes was identified and shown to make up less than 2% of the total DNA. The vast regions between genes were proposed to contain "junk DNA" thought to be remnants of evolutionary development and of no biochemical value.

The ENCODE Project was composed of 442 researchers from 32 institutions. These groups studied 147 cell types, each subjected to 100 experiments to determine which segments of the DNA were active and at which times. It was estimated that 300 hours of total computer time were used to analyze the results. The main paper of the series was published in Nature on September 6, 2012. This single publication had 442 contributors. It as well as 29 other papers described the function of 80.4% of the human genome, including 70,000 promoter regions that initiate DNA transcription to RNA, as well as 400,000 enhancer regions that regulate the expression of more distant genes. As more cell types are studied, it is probable that an even greater fraction of the genome can be correlated to biological function.

Fifty years ago, Drs Watson, Crick, and Wilkins were each awarded the Nobel Prize for their elucidation of the double-helix model for DNA. Somewhat forgotten in history was the achievement of Rosalind Franklin, whose x-ray diffraction studies of crystallized DNA were stated by Frances Cook in 1961 as "the data we actually used" to formulate the structure of DNA. Photo 51, presenting the beta structure of DNA, was thought to be shown to James Watson by Maurice Wilkins, a colleague of Rosalind Franklin 1957. The results of this pattern as reproduced suggested a closely packed helical structure containing 2, 3, or 4 nucleic acid chains per helical unit and having phosphate groups near the outside. Rosalind Franklin died in 1951. After her death, Watson and Crick made clear statements that they could not have discovered the structure of DNA without her work. Because the Nobel Prize is not awarded posthumously, Rosalind Franklin could not be cited for her essential role in the development of DNA structure.

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