

Parallel Thinking Part 35: Genetics I

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The Czech abbot and horticulturalist, Gregor Mendel (d. 1884) was the first to note that certain physical traits, such as the colour of pea plant flowers, are inherited by offspring. The Swiss biochemist

Freidrich Miescher (d. 1895) discovered the DNA molecule present in every living cell which is responsible for passing these traits on.

By the mid-1950s the structure of DNA was fully understood through the seminal work of Rosalind Franklin (d. 1958, a member of the New West End United Synagogue) and Maurice Wilkins (d. 2004) who studied DNA using a technique called x-ray crystallography. Their results were used by James Watson and Francis Crick (d. 2004), who eventually won the Nobel Prize in 1962 after discovering the double-helix structure of the DNA molecule.

In 1990, the Human Genome Project began deciphering all of the information held in human DNA. The project was completed in April 2003, which allows scientists to access the 20,000 or so genes which determine the physical characteristics of every human being. These are encoded in the DNA found in almost every one of our approximately 37.2 trillion cells.

The ability to understand and analyse human DNA has many practical applications, such as forensic science and new medical technologies. In addition, since genetic information is passed on from parents to children, our genes contain information about who our ancestors were. Furthermore, since until recently people generally married people who were geographically close to them, the ability to read our genetic code also offers the opportunity to understand where each one of us comes from.

A number of studies carried out on the genetics of the Jewish people have provided fascinating results. One of the pioneers in Jewish genetics, Professor Karl Skorecki from the Rambam

Hospital in Haifa determined that male Kohanim (Priests) who are descendants of Aharon, the brother of Moshe, have a common gene located within the Y-Chromosome that determines that a baby will be a boy.

Other work which examined sets of genetic variations which tend to be inherited together, known as haplotypes, supported the historical accuracy of the information that we have regarding the migration patterns of the Jewish people. A letter published in the *Nature* journal in 2010 by over 20 researchers, including Professor Doron Behar from the Israel Institute of Technology in Haifa, outlines the evidence that the Jewish people originated in the Middle East, but later migrated to Europe, Africa and Asia.

Behar also studied mitochondrial DNA, which is only passed from mother to child. While there is significantly greater variation in the maternal line, the conclusions were that most Jewish communities appear to be genetically similar, sharing a common geographical origin.

Genetic research cannot determine one's Jewish status; only those who have a Jewish mother or who convert can be considered Jewish. Yet while our genetic makeup has been made more diverse through conversion and intermarriage, the genetics of the Jewish people highlight that we are all part of one diverse family.

The next article will examine whether genetics can teach us anything about the origins of spirituality and religious belief.



Rosalind Franklin (25 July 1920 – 16 April 1958) was an English chemist and X-ray crystallographer who made contributions to the understanding of the molecular structures of DNA, RNA, viruses, coal, and graphite.