

Reference 7: People and Genetics

RYAN: You see genetics – it's all of us, we're all carriers of something and everything. Only in some of us, that something turns out to be a problem. What this campaign is about is – it's an issue for everyone to be concerned with, not only the unlucky few who open the cupboard on something nasty.

As RYAN says in *The Gift*, genetics is about all of us. Our genes define all our lives and the new genetics will affect all our futures. Here is just a selection of some of the people who have either increased our understanding of genes, genetics and inheritance or who have had their lives affected by genes and genetics.

ARISTOTLE

Aristotle was one of the greatest of the ancient Greek philosophers. He thought that children were made by something he called 'the substance', which was found in women, and the 'form', which came from men. The form and the substance did not mix together but the form had a magical influence on the substance. Aristotle also believed that living things gradually changed from plants through animals, to end in the highest form – humanity. This was the first time the idea of evolution, changing from one form to another, had been recorded.

CHARLES DARWIN

Charles Darwin made a major contribution to our thinking on evolution and genetics. He realized that any tiny difference, which gave one species a slight advantage over another, would make its chances of surviving and breeding that much greater. If the children received, or inherited the difference, their chances of survival would also be higher. Darwin called this process evolution by natural selection. It was later to be more popularly known as the survival of the fittest. Darwin believed that evolution depends on two things: the ability of species to change, called variability, and competition imposed by habitat. Darwin published his book *On the origin of the species by natural selection* in 1859. Charles Darwin's cousin was Francis Galton.

MARJORIE GUTHRIE

Probably the most famous sufferer from Huntington's disease was the American folk singer Woody Guthrie, who spent the last 15 years of his life incapacitated by the debilitating effects of the disease. After Guthrie's death on 3 October 1967, Marjorie decided that she had to try to do something about the disease. So she set up a committee to combat Huntington's disease. The work of the committee led to the discovery of the gene for Huntington's Disease in March 1993.

GREGOR MENDEL

Our modern understanding of inheritance starts in the 19th century with the Augustine monk Gregor Mendel. In his spare time he studied inheritance in many plant species. He published his discoveries with pea plants in an obscure scientific journal, *The Transactions of the Brunn Natural History Society*. Mendel's work led to the identification of five basic principles that govern inheritance.

WILLIAM BATESON

It was the British biologist William Bateson who finally gained Mendel's work the attention it deserved. He was a firm believer in Mendel's work, he translated it from the original German and had it published in the *Journal of the Royal Horticultural Society* in 1900. Bateson showed that Mendel's work on plants applied to animals as well. Bateson also introduced the term 'genetics'.

VAVILOV

Vavilov, had the misfortune of being the Director of the Institute of Genetics in Moscow during Stalin's regime. Stalin instructed his Director of Agriculture, Trofim Denisovitch Lysenko to start a campaign against genes and chromosomes. As a result of that campaign, Vavilov was arrested in 1940 and after 1700 hours of interrogation, he was sent to a prison camp, where he died of starvation in 1943. Many other geneticists were also imprisoned at the time.

QUEEN VICTORIA

In 1853, Queen Victoria's youngest son was born with haemophilia, an X-linked disorder. He died, aged 30 – after a major fall, with a blow to the head – of a brain haemorrhage. Queen Victoria's daughters, Alice and Beatrice, passed on the disease to other European Royals. Most notably Alice's daughter married Tsar Nicholas, last Tsar of Russia. Alexandria and Nicholas produced Alexei, who suffered from haemophilia. As a last resort his parents consulted Rasputin who claimed to possess mystic healing powers.

HENRY VIII

Henry's obvious ignorance of XY and XX chromosomes was evident in his profound displeasure at his Queens, who did not bear him a male heir. Henry was blissfully unaware that it is the sperm that determines the sex of a child.

CHARLIE CHAPLIN

In 1945, Charlie Chaplin was sued for paternity by Joan Barry. Carol Annie Kay, the child, had blood group B; Charlie had blood group O; the mother had A. He could not possibly be the father. He lost both case and retrial. California, soon after, introduced legislation to prevent paternity suits where blood groups were mismatched.

JOE BROWN (PSUEDONYM)

In 1904 an unknown student Joe Brown arrived in Chicago from Grenada. After developing a cough, he consulted Doctor James Herrick who diagnosed anaemia. On examining his blood cells he found not too few blood cells, but the mixture of shapes and sizes mainly thin long crescent shapes. This was sickle-cell disease, the first inherited disease to be analysed at a molecular level.

ROSALIND FRANKLIN

In 1953, at a time when women were not particularly welcome in academic circles, Rosalind Franklin, a chemist, joined Maurice Wilkins, who was investigating the structure of DNA at King's College in London. Rosalind had already taken the best X-ray pictures of DNA that anyone had obtained. Unfortunately she and Wilkins did not get on, and although Wilkins was the senior partner in the collaboration, Franklin clearly felt that the DNA project had been assigned to her. It was she who provided the pictures from which Crick and Watson deduced their famous helical structure for DNA. Unfortunately Rosalind wasn't alive when Crick, Watson and Wilkins received the 1962 Nobel Prize for the discovery of the structure of DNA as she died of leukaemia in 1958.

CINDY CUTSHALL

In 1991, four year-old Cindy Cutshall became the first patient ever to undergo a successful gene transplant in the treatment of a fatal genetic disease, ADA. Intact copies of a gene were inserted into cells of her body to compensate for the non-functioning defective copies that she had inherited. The transplanted genes provided a new set of instructions for the affected cells and helped her inborn disorder.

COLIN PITCHFORK

In 1988, Colin Pitchfork was the first murderer to be convicted as a result of DNA fingerprinting. Pitchfork, a Leicestershire baker, persuaded a friend to give a fraudulent blood sample under his name and was caught only after DNA fingerprints had eliminated a young man who had made a false confession. He received a life sentence for the murder of two young girls.

JOSEPH MENGELE

Joseph Mengele was a key player in the execution of Hitler's eugenics programme. After the second world war Joseph Mengele fled to South America. In the late 1980s, bones allegedly belonging to Mengele were found. His son gave a blood sample. Comparison with the DNA in the remains of his 'father' showed that the bones were indeed those of Joseph Mengele, who had now been found as a result of DNA testing but too late for justice.