Gregor Mendel—Overview

Gregor Mendel is best known as the “father of genetics.” He was born to a farming family on July 22, 1822, in what is now the Czech Republic. His parents, Anton and Rosine Mendel, named him Johann Mendel. Johann attended grammar school, gymnasium, and a philosophical institute. Johann continually struggled between the need to help his family on the farm and the desire to obtain an education. He persevered in obtaining an education. In 1843, he was accepted into a monastery, the Augustinian order, which would provide for his financial needs. His acceptance to the monastery also denotes his selection of the name, Gregor (Yannuzzi, 2004).

The abbot of the monastery, Father Napp, recommended Gregor for a 7th grade teaching position. To become the permanent teacher, Mendel took a teaching licensure exam, but was unsuccessful. As a result, Father Napp sent him to the University of Vienna to study science for 2 years. Mendel then attempted the teaching licensure exam again, but did not complete it. At this point, Mendel shifted his focus from teaching to a study of heredity (Yannuzzi, 2004).

Mendel began his study of the inheritance of traits by breeding mice; however, the local bishop put an end to this study because he did not approve of it. Mendel then continued his study by using garden peas. Mendel studied seven traits in his cross-fertilizing study: seed shape, seed color, plant height, flower position, pod color, pod shape, and seed coat color. The self-pollinated plants were the parental (P) generation. The first generation of these plants was called the F1 or first filial generation, followed by the F2 or second filial generation. Through these studies of crosses, Mendel was able to identify dominant and recessive traits. Mendel developed his first law, the

principle of segregation, as well as his second law, the principle of independent assortment form these traits. Mendel died in 1884. Unfortunately, the greatness of his work was not truly appreciated until after his death (Yannuzzi, 2004).

Gregor Mendel—Digital resources

- **The Science Channel**

  http://science.discovery.com/videos/100-greatest-discoveries-shorts-genetics.html

  This short video clip (2:15) gives a concise and accurate overview of Mendel's work.

Interactive Digital Content—Heredity

- **Genetic Science Learning Center—University of Utah**

  http://learn.genetics.utah.edu/content/begin/traits/tour_trait.html

  This website presents an overview of traits.

- **DNA Learning Center—Cold Spring Harbor Laboratory**

  http://www.dnaftb.org/1/animation.html

This website provides an animation of Gregor Mendel and his work with the pea plants.

Rosalind Franklin—Overview

Rosalind Franklin is best known for Photo 51, her contribution to the discovery of the double helix structure of the deoxyribonucleic acid (DNA) molecule. Franklin was born on July 25, 1920, in London. Rosalind was born into a wealthy family, which afforded her the opportunity to attend private school, and then boarding school at the age of nine. When she was eleven, she attended a public day school in London, St. Paul's

Girls'School, where she developed her interest in science. She then attended Newnham College at Cambridge University to study physical chemistry (Polcovar, 2006).

Upon graduation from Newnham, she began her graduate career in physical chemistry, studying under Ronald Norrish, who later won a Nobel Prize for his work. Working with Norrish was not a good match, so after her first year, she left when given an opportunity to work at the British Coal Utilization Research Association (BCURA). In 1945, she was awarded a Ph.D. based on her research at the BCURA. In 1946, Franklin made a connection with Marcel Mathieu at a scientific conference in London. This connection led to Mathieu offering Franklin a position as a physical chemist in Paris. X-ray crystallography was a focus of her work in Paris. Although she was happy personally and professionally in Paris, she felt the need to return to England. In 1950, she was awarded a three-year fellowship at King's College in London to work under the direction of John Randall. She began this work in 1951. Maurice Wilkins and Franklin both researched DNA during her time at King's. During this time, Franklin is credited with her famous "Photo 51," which Maurice Wilkins shared with James Watson and Francis Crick. Watson and Crick's paper was published in *Nature* in the spring of 1953 on the double helix structure of DNA. Unfortunately, Rosalind Franklin died in 1958 at the age of 37. The Nobel Prize for Medicine was awarded to Watson, Crick, and Wilkins in 1962 for this work on DNA structure.

Rosalind Franklin-Digital Resources

- **NOVA News Minute**

  http://www.pbs.org/wgbh/nova/minutes/q_3009.html

This video clip gives a short overview of Rosalind Franklin's contribution to DNA structure.

Interactive Digital Content—DNA

- **NOVA—Journey into DNA**

http://www.pbs.org/wgbh/nova/body/journey-into-human-dna.html

This site provides an interactive look at visuals and background information on human DNA.

- **NOVA—The Anatomy of Photo 51**

http://www.pbs.org/wgbh/nova/tech/DNA-photograph.html

This site provides an interactive look at Rosalind Franklin's Photo 51.

Watson & Crick—Overview

Francis Crick was born June 8, 1916, to a middle class family near the town Northampton in England. He attended Northampton Grammar School, and then Mill Hill School in London. At 18, Crick attended University College, in London where he studied physics and earned his degree. In 1937, Crick started research for his Ph.D., but his studies were interrupted by the war. He worked for the British Admiralty as a scientist during the war. Crick then went to Cambridge to work at the Strangeways Research Laboratory. In 1951, Crick befriended James Watson. Their work together at the Cavendish Laboratory at Cambridge led to their proposal for the DNA structure in 1953. Crick completed his Ph.D. in 1954 with his study of X-ray diffraction. In 1962, he was awarded the Nobel Prize for Medicine with James Watson and Maurice Wilkins. The focus of his research later shifted to neurobiology when he worked at the Salk Institute in La Jolla, California. He died in July 28, 2004 at the age of 88.

James Watson was born on April 6, 1928, in Chicago, Illinois. He attended the Horace Mann Grammar School and South Shore High School. He went on to attend the University of Chicago, where he obtained a degree in zoology in 1947. He then obtained a Ph.D. in Zoology from Indiana University in 1950. He began his post-doctoral work in Copenhagen as a Merck Fellow. It was during this time that he met Maurice Wilkins at a symposium. The meeting with Wilkins influenced the direction of Watson's research. In 1951, he began his work at Cavendish Laboratory, where he met Francis Crick. Watson and Crick began working on the structure of DNA. Their first proposal for the structure of DNA was not correct, but after additional work their proposal for the double helix was published in April of 1953. Watson later worked at Harvard University and Cold Spring Harbor Laboratory. He is currently 84 years old (Nobelprize.org).

Watson & Crick- Digital Resources

- **James Watson discusses DNA Base Pairing**

http://www.youtube.com/watch?v=PDeaLxoL75M

This video clip provides footage of the actual scientist, James Watson, discussing DNA Structure.