

Lesson 3: DNA discovery

Teachers' notes

Starter

Rosalind Franklin –Teacher's Script

Rosalind Franklin was born in 1920 and grew up to be a gifted scientist, gaining a first class degree from Cambridge in a time when few women became scientists. She was trained to make rational decisions based on hard scientific evidence.

She worked in Paris, becoming expert in x-ray diffraction, and using this helped to discover the structure of many compounds.

In 1951, she was asked to work at Kings College, London, with a team lead by J. T. Randall and Maurice Wilkins. The team were trying to determine the structure DNA. The elements that make up DNA were well known by this time, but in order to understand how the DNA in a cell copied itself and controlled all the functions of a cell, scientists needed to find out how the DNA molecule fitted together. Many teams of scientists the world over were trying to work out the structure - it was the great scientific race of the time.

When Rosalind started work in London her supervisor, Maurice Wilkins, did not like her very much. When he first came into the lab, he presumed she was just a lab aide and not a research scientist. He also found her very quiet. Rosalind was a very organised and methodical scientist, and the pictures she took using x-ray diffraction were the clearest and best ever seen.

Maurice Wilkins was a friend of a Cambridge scientist called Francis Crick with whom he shared information about their current work. James Watson, an American who was also interested in working on DNA attended a lecture given by Rosalind about her techniques. Unfortunately, he was more interested in Rosalind's appearance than her work and later wrote "I wondered how she would look if she took off her glasses and did something with her hair".

In May 1952, Rosalind took the best photo of a DNA molecule ever. At the time she filed it away - wanting to get more information and repeat results before she published it.

Wilkins, Watson and Crick frequently met to discuss their work and the work of other international scientists on DNA, often in the pub. They did not include Rosalind in their discussions and she was left to work alone. Rosalind was very close to unravelling the final pieces of evidence and work out the structure. Always cautious, she went over her data many times and was preparing articles for publication.

Contemporary Science Issues

One day in early 1953, when Rosalind was not in the lab, Wilkins showed Watson her beautiful photo of DNA, and when he saw it instantly realised it was the key to understanding the structure of DNA. His instinctive reaction gave him the idea which brought together all the scientific information at that time. Using Rosalind's information he worked with Crick to make ball and stick models of DNA. They published their work in 1953 and were hailed as the discoverers of the structure of DNA. As they had to publish their work so quickly, and Rosalind was still writing up her work, they did not credit her in their article.

Watson and Crick, and Maurice Wilkins were given the Nobel Prize for their discovery. Rosalind left the Kings College laboratory, where she had never been happy or accepted, and eventually died of cancer caused by the radiation she received when taking her x-ray photos.

An audio discussion about Rosalind Franklin can also be found at http://www.bbc.co.uk/radio4/womanshour/2005_44_tue_02.shtml

Main Activity

There are two versions of the timeline - one for lower ability and one for higher ability. The latter will have to read and understand some more complex text (more good basic skills).

Letter key to time line

e 25 July 1920
d 1942 -45
j 1938-41
m 1947
a 8 January 1951
i Late January 1951
o 21 November 1951
f October/November 1951
k May 1952
b 30 January 1952
n 16 April 1958
l 1962
c 7 March 1953
g April 1953
h February 1953