History, Medicine through time

Lesson 12 of 30

Worksheet:

How did ideas about causes of disease change after 1900?

Miss Holland

Discovery of DNA

In the early 1900s, some scientists and doctors believed that **hereditary** diseases were caused by inheriting genes from one or both parents but had no proof.

Rosalind Franklin worked as a scientist researching the structure of **DNA**. Working alongside Maurice Williams, in 1951 she was able to take a x-ray photograph of DNA. This was significant in influencing the work of **Francis Crick** and **James Watson** 2 years later. Franklin had also begun to discover the **helical** shape of DNA.

In **1953** Crick and Watson had used Franklin's x-ray photograph to build their own model of DNA which Franklin then corrected until it was discovered that DNA was in fact a **double helix** held together by 'bases'. Each strand of DNA was like a set of instructions which grouped together to form genes. These tell your body how to function, e.g. your eye colour. A mismatch/missing part of DNA is responsible for causing hereditary diseases.

Discovery of DNA

The discovery of DNA was made possible because of advances in technology. DNA was first identified through powerful microscopes producing highly magnified images. For example, the electron microscope was developed in 1931 and it was more powerful than any other microscope before it (10,000,000 times magnified).

Computers were also significant in storing and sharing research into DNA, and the Human Genome Project (on the next slide) would have been impossible with them.

Finally, scientific collaboration was extremely important for both the discovery of DNA and the Human Genome Project.

Impact of DNA

By 1953 the structure of DNA was understood and this led to groups of scientists trying to work out the functions of DNA, and how they could possibly understand the links between DNA and certain diseases.

In 1990 the Human Genome Project was launched with the aim of mapping the human **genome**. Completed in 2003, nearly 3000 scientists had worked together to discover the genetic blueprint of human beings. The mapping of the human genome was important in understanding the cause of hereditary diseases. For example, it is possible to identify a gene present in women suffering from breast cancer, which means women can choose to have preventative surgery - a **mastectomy**.

Lifestyle factors

Since 1900, there has been a greater understanding of how lifestyle choices affect our health.

- In the 1950s, doctors began to link smoking to lung cancer. In the present day, it is now understood that smoking is linked to even more diseases such as other cancers (mouth/throat), heart disease and tooth decay.
- We all know that a healthy diet is important but we also now understand that too much sugar can cause type 2 diabetes and a high fat diet can lead to heart disease.
- Drinking excessive amounts of alcohol can lead to illness of the liver and kidney.
- Other diseases can be spread through sharing bodily fluids e.g. intravenous drug taking.

Technology in diagnosing illness and disease

Developments in technology have been significant in giving modern day doctors the ability to diagnose patients more accurately than ever.

- Laboratories are used to carry out blood tests which can test for a range of illnesses, e.g. an infection. Blood tests were being carried out since the 1930s.
- CT and MRI scans are important for being able to see inside the human body without the need for invasive surgery. CT scans are more detailed forms of x-rays whilst MRI scans give detailed images of the soft tissues. Both were in use from the 1970s.
- X-rays were in development from the 1890s and were significant for the diagnosis of broken bones. They were also important in WW1 for identifying **shrapnel** embedded within the body.
- Endoscopes have tiny cameras on the end and can be inserted into the body and allow doctors to see inside. Sometimes they can also be used to take samples to send off for testing. This technology has been used since the 1900s but has become more advanced.
- ECG machines have been in use since the 1900s and monitor heart rhythms and activity. They can be used to diagnose someone who may have had or be at risk of a heart attack.
- Patients with diabetes can now take their own glucose levels usings a blood sugar monitor to allow them to keep on top of their condition. These were in use from the 1960s but are now much more advanced.

Glossary

- **DNA -** Deoxyribonucleic acid - it carries genetic information.
- **Genome** - The complete set of DNA.
- **Helical** - The helix is a spiral shape.
- **Hereditary -** When something (like a disease) is passed from individuals to their descendants (like children).
- **Mastectomy** - When one or both breasts are removed.

Comprehension Questions

1. Can you describe 1 similarity and 1 difference in the understanding of the cause of disease from c.1500 to the present day?
2. Can you describe three examples of new methods in diagnosing illness in the modern period?
3. How important was technology in causing progress in the understanding of the causes of disease in the modern period?
4. Other than technology, what factors do you think were also important in changing ideas about the causes of disease in the modern period?
5. Challenge question: To what extent did understanding of the causes of disease progress **rapidly** in the modern period?

You may want to use the following sentence starters:

- *To some extent I agree that the understanding of the causes of disease progressed rapidly because...*

- *However to some extent it could be argued progress was not rapid because...*