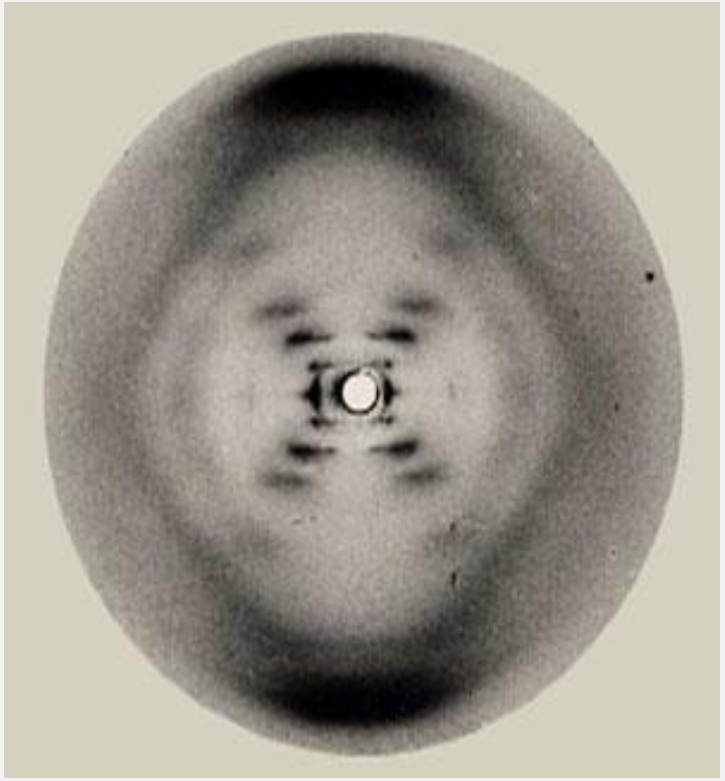
MEDICINE IN MODERN BRITAIN

GENETICS / LIFESTYLE

1900-Present

GENETICS (DNA)

It was clear that microbes and germs didn't cause all illnesses. Doctors wondered for the first half of the century why babies were born with conditions that appeared to develop in the womb and have been inherited.



What do you think this might be?

The first ever photograph taken of DNA taken in May 1952 in the lab of Rosalind Franklin

DNA is the building block of life. It is the complex chemical that carries genetic information. It is contained in chromosomes, which are found in the nucleus of most cells.

In other words, DNA is a chemical code and set of instructions that determine how living things physically look and work.

CRICK & WATSON 1953

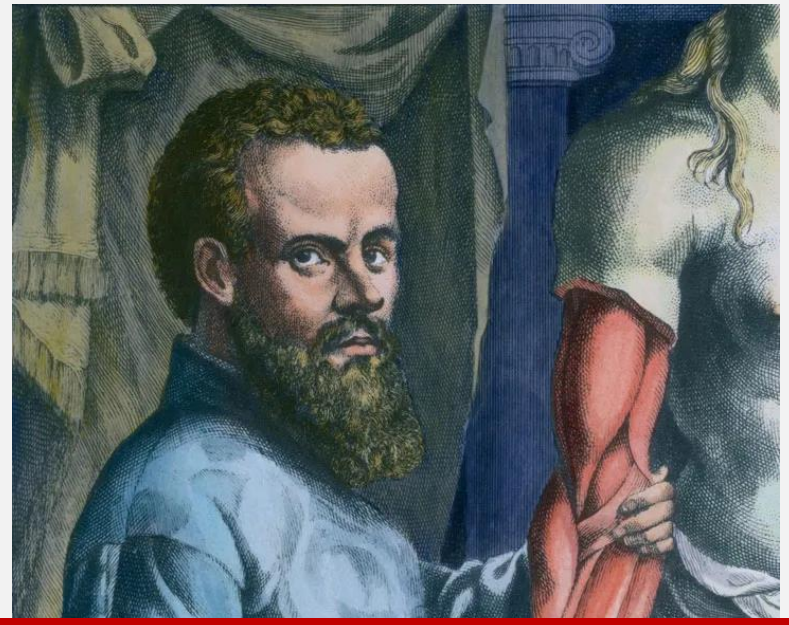
Crick & Watson discovered the structure of human DNA and how it passed on from parents to children.

In 1990s, the Human Genome Project began working out exactly how each part of human DNA affects the human body.

<u>Why is this important?</u>

These discoveries have led to treatments for diseases which have genetic causes rather than being caused by bacteria. These include some cancers. Until the discovery of DNA, these illnesses were untreatable.

VESALIUS & CRICK / WATSON



Similar to each other, neither individuals discovered anything to make people better, but their work allowed later scientists to understand how the body worked and then to develop treatments or preventions. Crick & Watson's work allowed for scientists to later identify genes that cause certain illnesses and diseases.

HTTPS://WWW.YOUTUBE.COM/WATCH?V=ZWIBGNGE4AY

What is DNA?

Genome:
The complete set of DNA containing all the information needed to build a particular organism (human, plant, animal etc)

Did you know:

Not one single human being on earth has the same DNA
(except identical twins)

DNA'S JOURNEY…

Source B

In this 2013 news article, Angelina Jolie explains why she chose to have a mastectomy.

Angelina Jolie bravely reveals she has had a preventive double mastectomy after tests showed an 87% chance of contracting [getting] breast cancer.

The Hollywood actress is healthy and made the decision to undergo the procedure after discovering she carries the BRCA1 cancer gene.

Angelina said: 'My doctors estimated that I had an 87% risk of breast cancer and a 50% risk of ovarian cancer. I made a decision to have a preventive double mastectomy.'

The surgery was successful and doctors believe Angelina's chances of developing breast cancer have reduced to less than 5%.

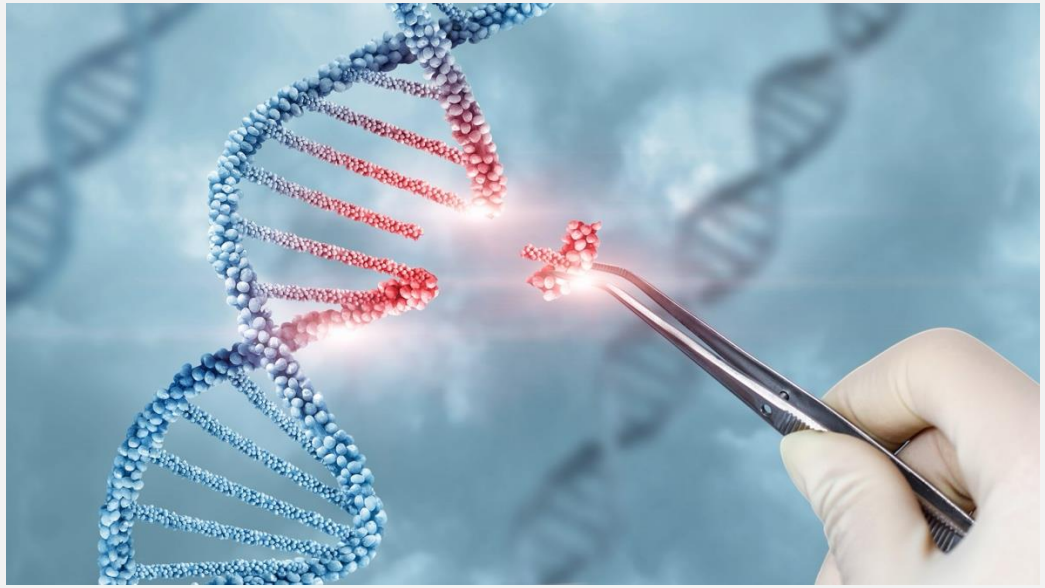
Angelina Jolie: What has she got to do with this?

PREVENTION?

TREATMENTS BECAUSE OF THE DISCOVERY OF DNA

GENE THERAPY

Gene therapy is a technique that uses genes to treat, prevent or cure a disease or medical disorder. Often, gene therapy works by adding new copies of a gene that is broken, or by replacing a defective or missing gene in a patient's cells with a healthy version of that gene.



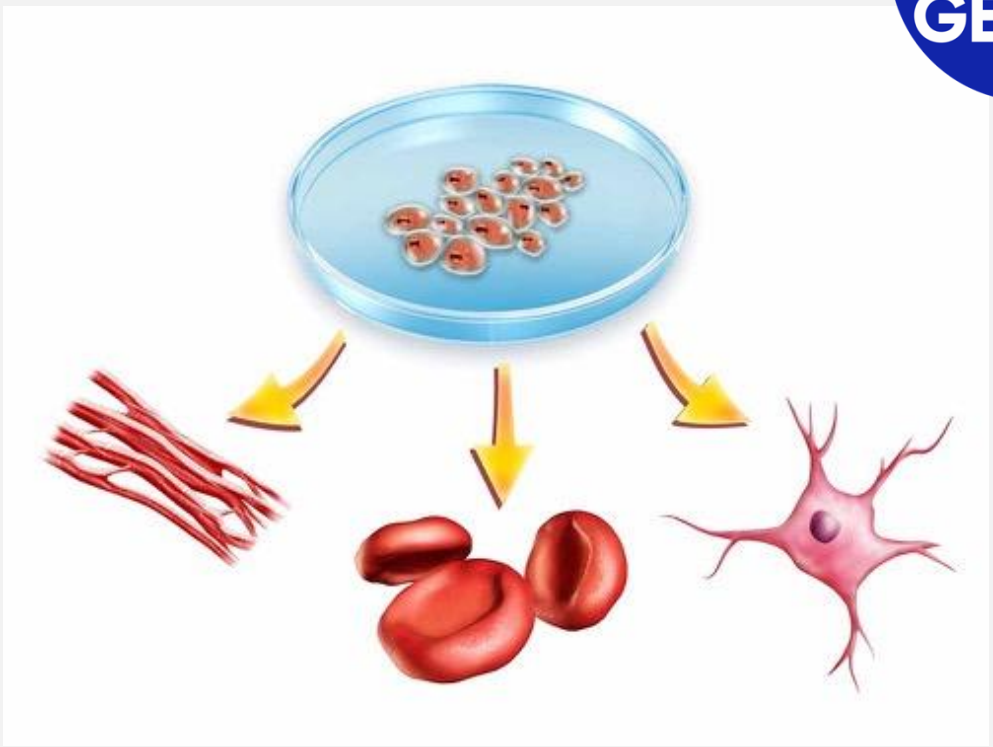
TREATMENTS

PRODUCING INSULIN

We can now genetically engineer bacteria to produce insulin (in a lab) allowing for management of Type1 diabetes.

STEM CELL

Basically, new cells can now be created that can be used to grow new organs or tissues



EG: SPINAL MUSCULAR ATROPHY

In March 2021 a treatment for spinal muscular atrophy was approved for use in the UK. SMA affects the muscles of young children, and many of those with a severe form of the disease die very young.

It occurs when a gene is damaged and the treatment, uses a harmless virus to send a working copy of the gene into the patient's cells, allowing them to function normally.

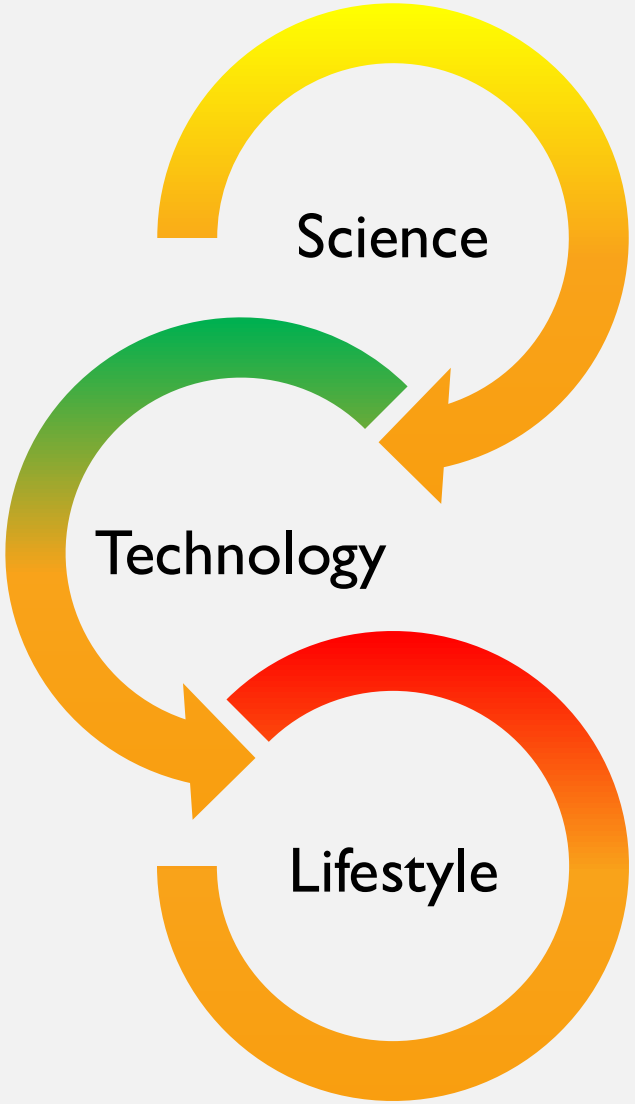
Only one dose of the treatment is required.

MODERN DISEASES

Make a list or brainstorm of illnesses and diseases we have today

Using 2 colours / highlighting, identify which you think are preventable or those that are genetic

FACTORS

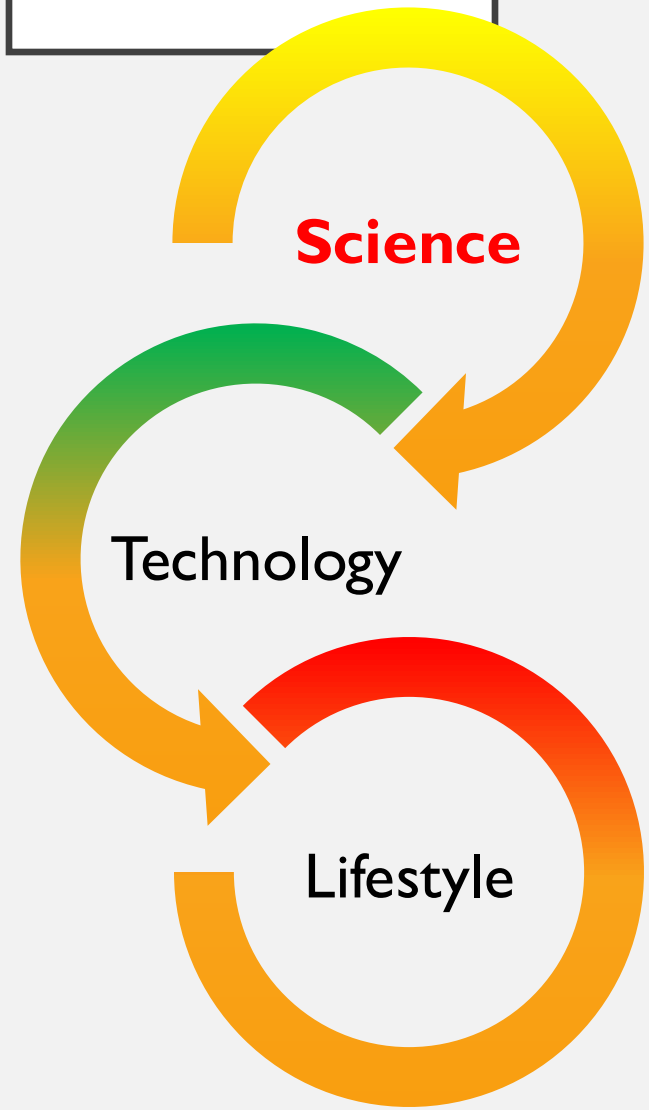


Write these factors down the left hand side of a clean page.

You'll be given some information now that you should connect and summarise to each factor

Science	
Technology	
Lifestyle	

FACTORS



Understanding DNA required a lot of collaboration in the Scientific community. The Human Genome Project was an example of this 'BIG SCIENCE'. Scientists from all over the world worked on this and made their work public so it could benefit as many people as possible.

Once the human genome was mapped, scientists were able to use this map to look for mistakes in the DNA of people suffering from hereditary diseases.

How has this led to change…

Impact of Science on genetics:

- Recognition of genetic disorders such as Huntingdon's and Down's Syndrome. This allows us to replace faulty genes, they might be able to put that information back in thus, treating these disorders.
- This gives us an understanding on how Genes influence other conditions (eg heart disease, diabetes etc)

GENETIC CONDITIONS

Haemophilia - where blood doesn't clot, usually affects men.
Cystic Fibrosis - affects the lungs and digestive system
Down's Syndrome - causes learning difficulties and health problems
Huntingdon's Disease - affects the nervous system
Some cancers - certain cancers are more likely depending on your genetics.

FACTORS

Science

Technology

Lifestyle

Discovering the shape of DNA, understanding how it works and then mapping the individual genes has been made possible through technological advances eg Microscopes and higher powered images.

The electron microscope was developed in 1931 and by 1932 was able to magnify up to 10,000,000 times

FACTORS

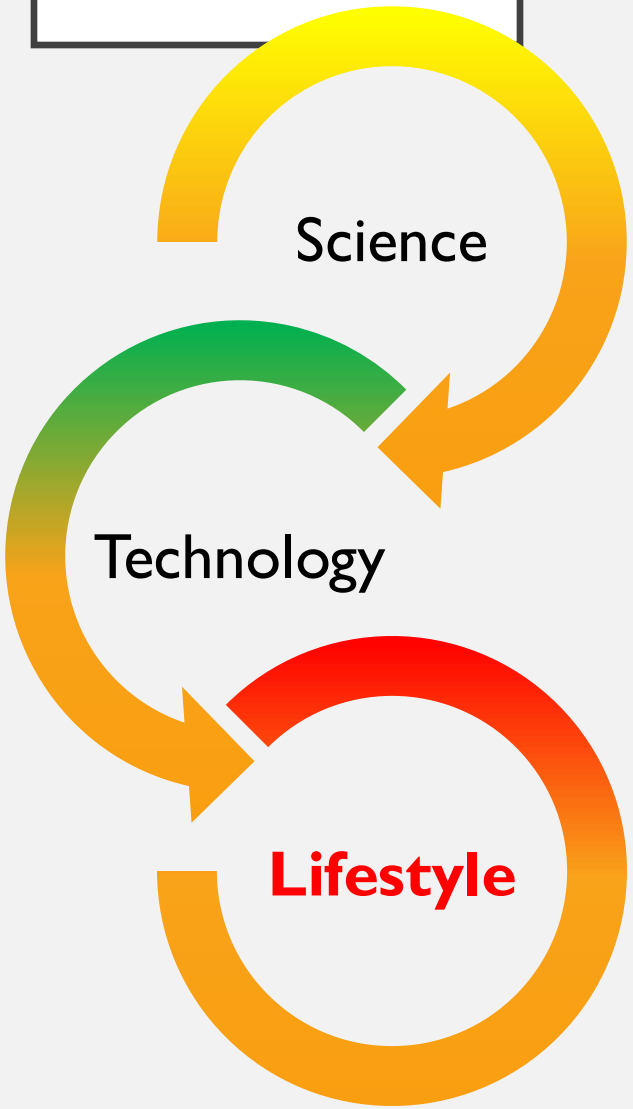
Science

Technology

Lifestyle

We're now understanding lifestyle choices on our health a lot more. Smoking became more popular in the 1920s. By the 1950s doctors started to notice a worrying rise in lung / throat cancers. Doctors today have associated High Blood Pressure, other cancers, heart disease, gum and tooth disease and asthma. It is the biggest cause of preventable disease in the world. It is even dangerous to non smokers who inhale the smoke.

FACTORS



Diet too, what we eat and how much of it affects our health.

How have the government tried to deal with this?

The main problems with food are SUGAR and FAT leading to diabetes and other preventable diseases.

Sex and Drinking. Binge drinking or lots over a long time will destroy our liver and kidneys, again preventable diseases. We also know that unprotected sex (sharing bodily liquids) and sharing needles will spread disease eg Warts, HIV (Aids), Heppatitis etc.

Tanning. Sunbeds or too much exposure to the sun causes skin cancer


15-24 year olds account for half of all new STD Infections

CREATE AN ADVICE LEAFLET

You have been approached by the government to produce an advice leaflet explaining the threats to our health.

You should include the different lifestyle factors and their associated illnesses.
Advice on how to avoid getting associated diseases

Sex, Alcohol, Drugs, Food etc

Which Factor was most important in the development of our understanding of genetics? Write a paragraph

- Science
- Technology

GENETICS & DIAGNOSIS CHECK POINT

Summary

- After 1900, understanding about the causes of disease and illness progressed rapidly.
- By the end of the 20th century, doctors recognised that many factors caused disease.
- The structure of the gene was discovered by Watson and Crick in 1953 and the human genome was mapped by 2000.
- Lifestyle factors such as smoking, a poor diet and drinking alcohol can all contribute to illness and disease.
- New technology has enabled doctors to carry out more detailed diagnoses of their patients.

Checkpoint

Strengthen

S1 Give one example of how the mapping of the human genome helped doctors to better understand the causes of disease and illness.

S2 Describe two ways that technology has led to a better understanding of the causes of disease and illness.

Challenge

C1 Describe five pieces of technology that have had an impact on diagnosing the causes of illness and disease.

If you are struggling, discuss the answers to these questions in groups. Your teacher can give you some hints.