

The GRACE project

Further uses of genetic testing

Sophie Roberts:

We've already looked at some ways in which we can use genetic testing to learn more about our health, such as our risk of developing certain diseases and passing a genetic condition on to our children.

Although these are all very important uses, genetic testing isn't just limited to the medical field.

In fact, we can use genetic testing for a variety of things including to trace someone's ancestry and even solve crimes.

Here, we'll look at some of the many other fascinating ways genetic testing can be used and why they're so important.

Even though we have more than 99% of our DNA in common with any other person, the small differences in our genetic instructions make each one of us genetically unique.

When scientists analyse someone's DNA, they can look for certain genetic differences which set them apart from anyone else.

This is used to make something called a DNA profile, which is completely unique to the person it belongs to, much like a fingerprint, and can identify someone based on their genetics alone.

Eco Dryer:

You might've heard about DNA evidence being used to identify or rule out suspects of a crime.

This is known as forensic testing, and works by comparing a suspect's unique genetic profile to the profile of a DNA sample found at the crime scene.

If the DNA profiles match, this may provide evidence that the suspect was at the crime scene, while differences in the DNA profiles suggest it comes from a different person, which may rule someone out.

Sas Amoah:

As we inherit half our genetic material from each parent, we are more likely to share similarities in our DNA profiles with members of our family.

This means we can use DNA profiling to work out if two people are related by looking at how well their DNA profiles match up.

This is much more accurate than going by looks alone, as although we tend to look similar to our family members, there are often some differences too.

Sophie Roberts:

Paternity testing compares the DNA profiles of a potential father to a child for matches which can confirm or rule out whether they are actually the biological parent.

More generally, kinship testing is used to work out how two people are related to each other, such as siblings or cousins, by looking for similarities in their DNA profiles.

This is part of what's known as genetic genealogy, which can use DNA testing to establish family relationships, help someone find lost relatives, and give information about a person's family history.

Kaustubh Adhikari:

Outside our family, we also tend to be somewhat more genetically similar to people from the same ethnic group as us, due to our shared ancestry.

Genetic ancestry testing works by comparing a person's DNA to others from all around the world to look for patterns and similarities.

This information can be used to predict things about a person's ancestry and heritage, such as their ethnicity and which parts of the world their recent ancestors originated from.

Having this knowledge can help people discover aspects of their heritage they may not have known about, and feel more connected with their ancestry.

Sophie Roberts:

As we covered in our other videos, DNA carries the genetic information in our bodies to influence our characteristics, such as eye colour.

We each have a unique genetic makeup which results in some of the common and harmless differences we see between people, such as whether someone has brown eyes or blue eyes.

Some types of genetic tests can look at our genetic information to predict how likely it is that a person will have certain characteristics.

These predictions are only accurate for a handful of traits which are strongly controlled by our genetics, such as having red hair.

For other traits where our environment has a bigger impact, predictions based on genetics alone are less accurate.

Most of the time, these predictions are checked for personal curiosity more than anything else, as someone would already know, for example, what colour their hair is.

But sometimes predicting characteristics can be useful, like knowing if someone is genetically likely to be lactose intolerant can explain why, in future, they may have issues after drinking milk.

We often focus on genetic testing in research as mainly being used to study health and disease.

But in fact, genetic testing can help scientists learn many things about how our DNA makes us who we are, beyond just our health.

This ranges from discovering how our genes control certain characteristics, to mapping genetic changes to different populations around the world.

In this video series, we've learned about genetic testing as a tool for understanding many important things about ourselves, including our characteristics, heritage, health, and identity.

But this is only the tip of the iceberg when it comes to the fascinating field of genetics.

Although genetics can sometimes seem intimidating, looking at how our genes shape us, and how we can benefit from genetic testing, shows just how important learning about genetics is.

However, it can sometimes be difficult to navigate the wide range of genetic tests and work out which test may be best for your needs, let alone what the results of a genetic test might mean.

That's why it's so important to seek guidance when deciding if genetic testing is right for you.

There's lots of support available from healthcare professionals and genetic counsellors who can talk through your options, and help you understand the results of a genetic test to avoid common misconceptions.