VIDEO TRANSCRIPT

The Common Thread: Human Genetic Variation

Link to video.

[**narrator**]: People around the world have a lot in common with each other. At the same time, we also show great diversity in terms of how we look, how we act, and how we feel. So where does this diversity come from?

In part, we are shaped by the environments we grow up in, the foods we eat, the languages we speak, our cultures and traditions, the people we meet, and so on. And we are also shaped by our DNA.

DNA is a code that consists of 4 letters: A, G, C, and T. It is found in nearly every cell in our bodies and the total code is around 3 billion letters long. You can think of this DNA code as a sort of cookbook that interacts with the environment to create you, and me, and every other living being on this planet. Your DNA code is exclusive to you, and it is part of what makes you unique.

When you compare DNA between people, you will find that their codes are mostly the same - with some differences. For example, if we zoom in and look at a specific site in the DNA, we might see that some people have the code ATC. Other people might have a variation in the DNA code where the middle T is an A, or a C, or a G. We call these differences in code, variants. And these variants in our DNA code are one reason why people are not identical to each other. Because of this kind of variation, you might be taller than your friends or have a different eye color than your grandparents.

So, let's zoom out again. If we look at the DNA code from people all across the world - how different is our DNA?

The answer may surprise you. Whether we are looking at people who are neighbors or people who live on opposite sides of the globe, it turns out that more than 99% of our DNA code is identical. In other words, only a small fraction of our DNA - less than 1% of the code - varies from person-to-person.

Let's have a closer look at this variation and how it affects our traits.

Let's take the trait 'height' as an example. How tall you are is, in part, dependent on your DNA. Your height is influenced by thousands of variants in your DNA code.

If you look around the world, you'll find people of all different heights wherever you go. And the same is true for the DNA variants that affect height - they are also found all across the world.

It is true that being over 6-feet tall might be more common in certain regions of the world. But being that tall is not exclusive to any part of the world. People who are over 6 feet tall can be found all across the globe. And the same is true for most DNA variants that affect height - some variants might be more common in certain regions of the world, but they are not exclusive to those regions.

Scientists have found this holds true for the majority of human genetic variation. Although DNA variants might be more common in some parts of the world and less common in other regions, most DNA variants are found in people all across the world.

In contrast, a small fraction of human genetic variation consists of DNA variants that are unique to certain populations.

If we group all people in the world into continental populations, we can find DNA variants that have only been found in, for example Asia. However, it is important to recognize that only some people on the Asian continent carry this DNA variant. In other words, this DNA variant that is unique to Asia, cannot be used to define all people who live in Asia.

Of the countless DNA variants that have been examined, no variant has been found that can be used to unambiguously divide people into continental populations.

So, what have we learned? Human diversity is affected by many factors, like the environment we grow up in, our life experiences, as well as our DNA.

At the DNA level humans are very similar to each other, as we are more than 99% identical in our DNA code.

Most of the DNA variants that do exist between humans can be found all across the world - though they can be more common in certain regions than others.

There are some variants that are unique to people of certain populations, but these variants cannot be used to define those populations as a whole or to divide people into discrete groups.

The study of DNA shows us how genetic variation contributes to the wonderful human diversity that we see around the world and, at the same time, how much we have in common.