Go Deeper: Human Diversity

In this section, you'll find resources to expand your understanding and knowledge of the related interactivity: a summary of important concepts, an in-depth discussion of select questions, and Teaching Tips for educators.

Summary of Main Points:

There is not one gene, trait, or characteristic that distinguishes all members of one race from all members of another. We can map any number of traits and none would match our idea of race. This is because modern humans haven't been around long enough to evolve into different subspecies and we've always moved, mated, and mixed our genes. Beneath the skin, we are one of the most genetically similar of all species.

More Things to Consider:

Lots of animals are divided into subspecies. Why doesn't it make sense to group humans the same way?

Subspecies are animal groups that are related, can interbreed, and yet have characteristics that make them distinct from one another. Two basic ingredients are critical to the development of separate subspecies: isolation and time. Unlike most animals, humans are a relatively young species and we are extremely mobile, so we simply haven't evolved into different subspecies.

The earliest hominids evolved from apes about 5 million years ago, but modern humans (Homo sapien sapiens) didn't emerge until 150,000-200,000 years ago in eastern Africa, where we spent most of our evolution together as a species. Our species first left Africa only about 50,000-100,000 years ago and quickly spread across the entire world. All of us are descended from these recent African ancestors.

Many other animal species have been around much longer or they have shorter life spans, so they've had many more opportunities to accumulate genetic variants. Penguins, for example, have twice as much genetic diversity as humans. Fruit flies have 10 times as much. Even our closest living relative, the chimpanzee, has been around at least several million years. There's more genetic diversity within a group of chimps on a single hillside in Gomba than in the entire human species.

Domesticated animals such as dogs also have a lot of genetic diversity, but this is mostly due to selective breeding under controlled conditions. Humans, on the other hand, have always mixed freely and widely. As a result, we're all mongrels: Eighty-five percent of all human variation can be found in any local population, whether they be Kurds, Icelanders, Papua New Guineans, or Mongolians. Ninety-four percent can be found on any continent.

Animals are also limited by habitat and geographical features such as rivers and canyons, so it is easy for groups to become isolated and genetically distinct from one another. Humans, on the other hand, are much more adaptable and have not been limited by geography in the same way. Early on, we could ford rivers, cross canyons, move great distances over a relatively short time, and modify our environment to fit our needs. We are also extremely mobile as a species. Even the remotest island tribe in the Pacific originally came from elsewhere and maintained some contact with neighboring groups.

We may think global migration is a recent phenomenon, but it has characterized most of human history. Whether we're moving halfway around the world or from one village to another, the passage of genes takes place under many circumstances, large scale and small: migration, wars, trade, slave-taking, rape, and exogamous marriage (marriage with "outsiders").

It takes a long time to accumulate a lot of genetic variation, because new variants arise only through mutation - copying errors from one generation to the next. On the other hand, it takes just a very small amount of migration - one individual in each generation moving from one village to another and reproducing - to prevent groups from becoming genetically distinct or isolated. Humans just haven't evolved into distinct subgroups.

But I can see obvious differences between people - don't those translate into deeper differences, like propensity for certain diseases?

The visual differences we are attuned to don't tell us anything about what's beneath the skin. This is because human variation is highly non-concordant. Most traits are influenced by different genes, so they're inherited independently, not grouped into the few packages we call races. In other words, the presence of one trait doesn't guarantee the presence of another. Can you tell a person's eye color from their height? What about their blood type from the size of their head? What about subtler things like a person's ability to play sports or their mathematical skills? It doesn't make sense to talk about group racial characteristics, whether external or internal.

Genetic differences do exist between people, but it is more accurate to speak of ancestry, rather than race, as the root of inherited diseases or conditions. Not everyone who looks alike or lives in the same region shares a common ancestry, so using "race" as a shorthand for ancestry can be misleading. Sickle cell, for example, often thought of as a "racial" disease afflicting Africans, is actually a gene that confers resistance to malaria, so it occurs in areas such as central and western Africa, the Mediterranean, and Arabia, but not in southern Africa. In medicine, a simplistic view can lead to misdiagnoses, with fatal consequences. Racial "profiling" isn't appropriate on the New Jersey Turnpike or in the doctor's office. As evolutionary biologist Joseph Graves reminds us, medicine should treat individuals, not groups.

On the other hand, the social reality of race can have biological effects. Native Americans have the highest rates of diabetes and African American men die of heart disease five times more

often than white men. But is this a product of biology or social conditions? How do you measure this relationship or even determine who is Native American or African American on a genetic level? Access to medical care, health insurance, and safe living conditions can certainly affect medical outcomes. So can the stress of racism. But the reasons aren't innate or genetic.

Believing in race as biology allows us to overlook the social factors that contribute to inequality. Understanding that race is socially constructed is the first step in addressing those factors and giving everyone a fair chance in life.

Want More Information?

1. Map your family tree. How far back can you go? How do the number of known ancestors compare to the number of unknown?

2. Map the movements of your extended family, including people who have married into your family and come from other places. How many different places are connected by just one family?

3. Trace the route of a historical traveler - for example, Marco Polo or a trader on the Silk Road. Map all the different groups of people they might have encountered.

4. Research the history of one geographical location over time - for example, France, Turkey, or Indonesia - how many different groups have lived there over time? Anyone living in that location today is an amalgamation of all the groups who lived there previously.

5. Demonstrate non-concordance by sorting people using different criteria, such as: blood type, fingerprint type, tongue curling ability, hair color, lactose intolerance. See the Sorting People Go Deeper section for more on this.

6. Test your mtDNA and see who your genetic relatives are through the Dolan DNA Learning Center at Cold Spring Harbor Labs. Go to http://www.geneticorigins.org/ to learn more or look in the For Teachers section of this site for a lesson plan.