

1

ANCESTRY COMPOSITION

Trace your heritage through the centuries and uncover clues about where your ancestors lived and when.

2

MATERNAL HAPLOGROUP

Learn about the long, unbroken line of women on the maternal side of your family tree.

3

PATERNAL HAPLOGROUP

These are the men of your paternal line. Get to know their story.

4

NEANDERTHAL ANCESTRY

Your DNA may connect you to these extinct humans who interbred with our ancestors long ago.

5

YOUR DNA RELATIVES

Learn insights about your genetic relatives.

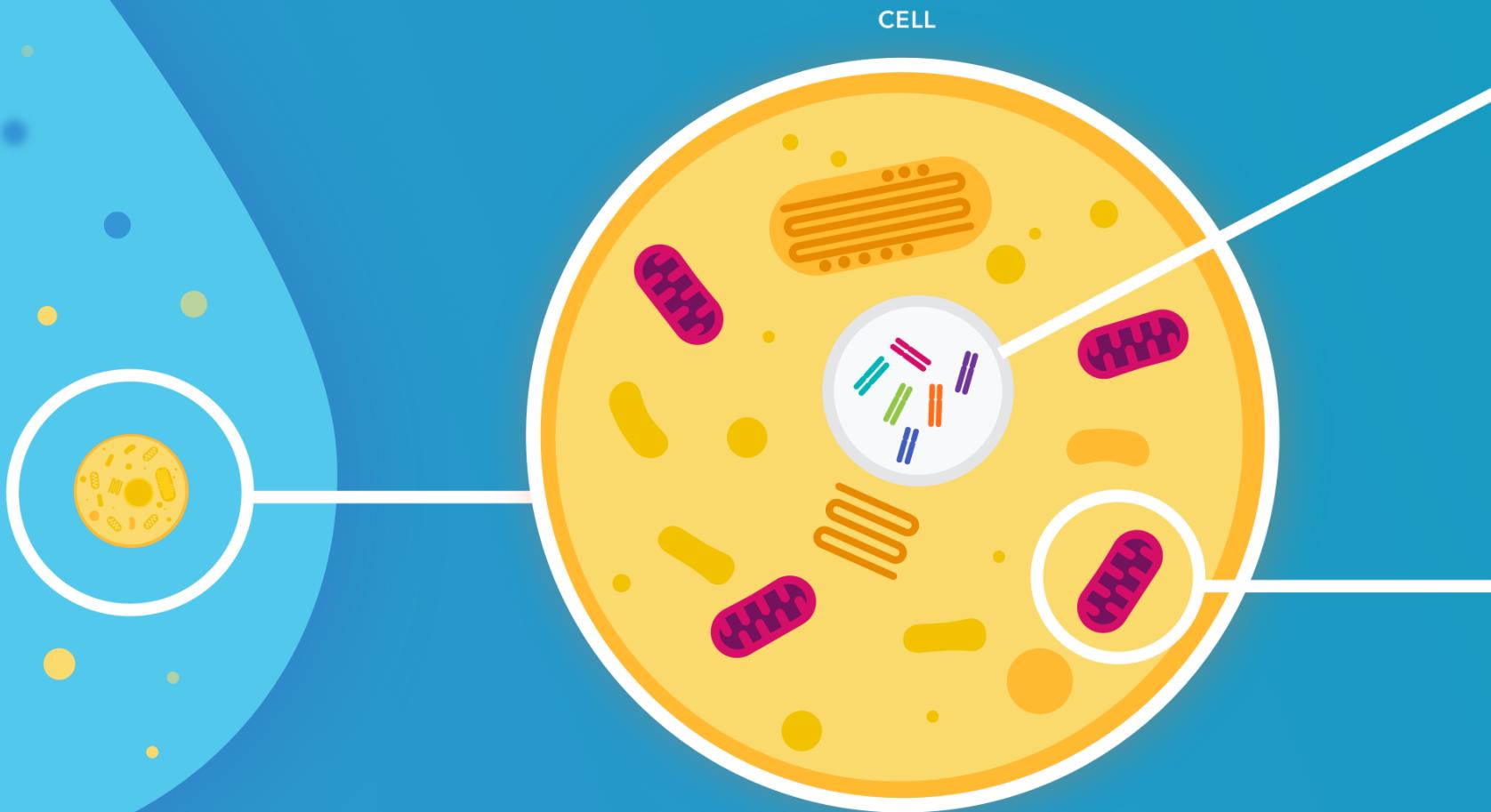
6

WHAT WILL YOU DO WITH YOUR DNA?

Next steps for the journey ahead.

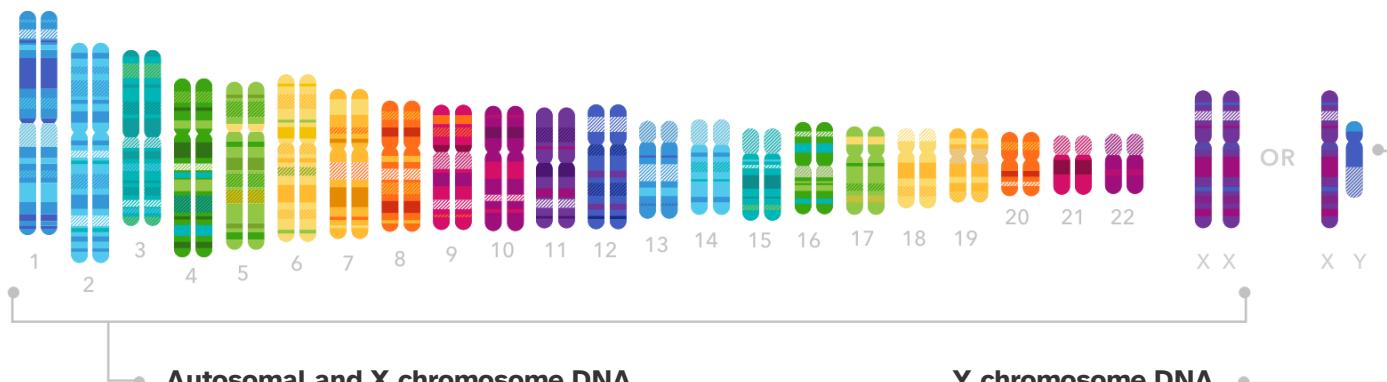
WHAT CAN SPIT TELL US?

Your spit contains a lot of DNA, packaged tightly inside your cells, which are the building blocks that make up all life on earth. Most of your cells store DNA in two places: in the nucleus and in the mitochondria. It may take a lifetime for you to explore all of the information encoded in your genes, but we hope this book helps you begin your journey.



AUTOSOMAL DNA

SEX CHROMOSOMES



Autosomal and X chromosome DNA

Autosomes (along with the X sex chromosome) help us determine your Ancestry Composition and Neanderthal Ancestry.

Y chromosome DNA

The Y chromosome is one of two sex chromosomes, and has a gene that determines male sex. Paternal haplogroups are traced through genetic variants in the Y chromosome, which females do not inherit.

MITOCHONDRIA



MITOCHONDRIAL DNA

Maternal haplogroups are determined by sets of genetic variants in a tiny, unusual loop of DNA called mitochondrial DNA (mtDNA). As the name suggests, mtDNA is found in mitochondria – small but mighty structures inside our cells that turn fuel from the food we eat into energy.





ANCESTRY COMPOSITION

Your DNA can reveal a lot about your ancestry — where your ancestors may have come from, when and where they may have migrated around the globe, and how you're connected to populations around the world.

ANCESTRY COMPOSITION

We compare your DNA to that of different populations around the world. When your DNA closely matches the DNA from one of these populations, we assign that ancestry to the corresponding piece of your DNA. Sometimes, DNA resembles reference DNA from several populations, so we assign a "broad" ancestry. The adjacent chart shows a breakdown of where your DNA comes from around the world.



Ziping Liu

100%

East Asian & Indigenous American 98.8%

- Chinese & Southeast Asian 89.6%

- Chinese 89.6%

Guangdong, Mainland China

Taipei, Taiwan

- Northern Asian 8.8%

- Manchurian & Mongolian 8.8%

- Japanese & Korean 0.2%

- Japanese 0.2%

- Broadly East Asian & Indigenous American 0.2%

Central & South Asian 0.7%

- Central Asian, Northern Indian & Pakistani 0.7%

- Central Asian 0.7%

Unassigned 0.2%

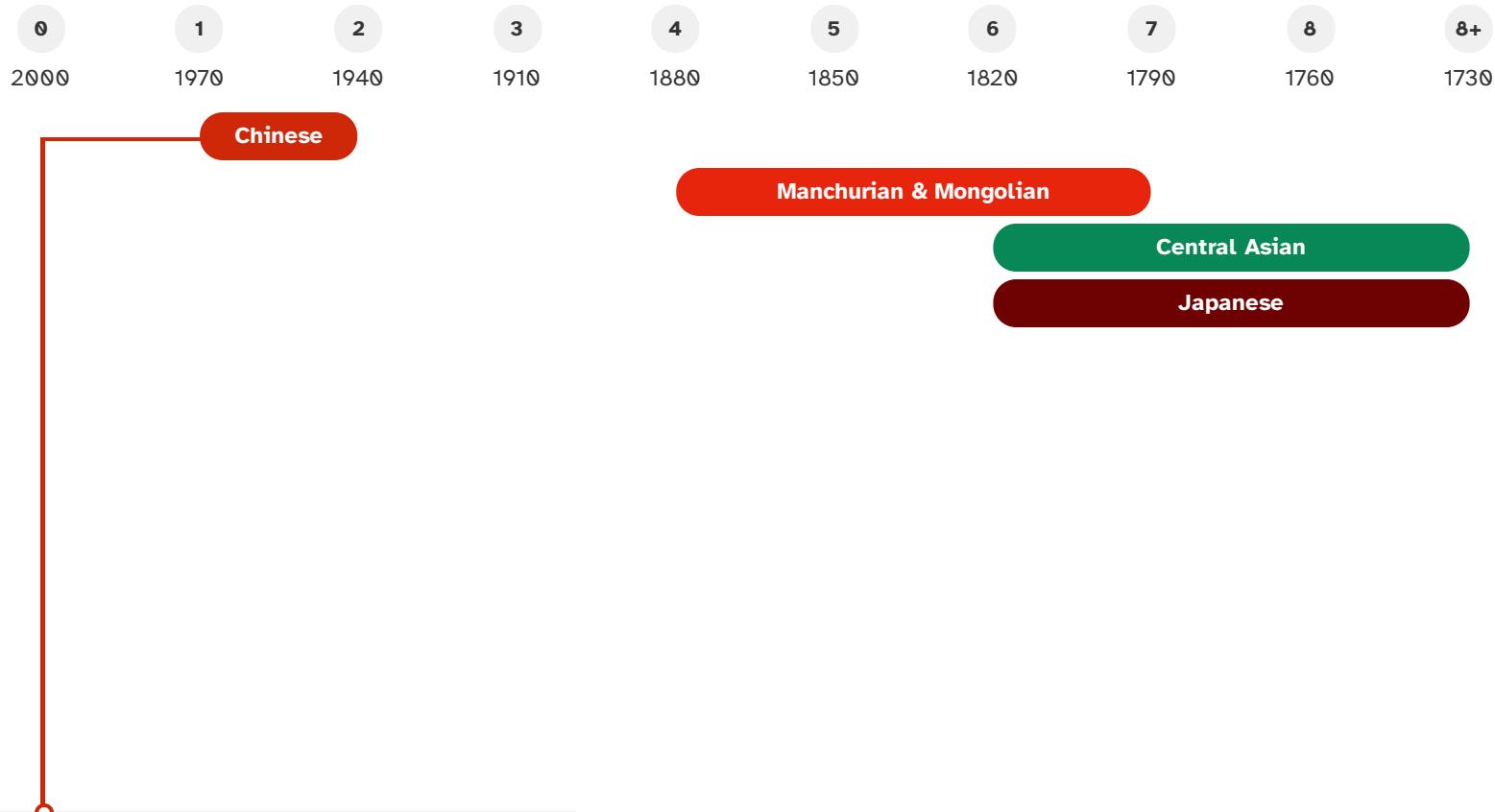
Trace Ancestry 0.3%

- Bengali & Northeast Indian 0.2%

- Cypriot 0.1%

ANCESTRY TIMELINE

Your Ancestry Timeline is a visual estimation of how many generations ago you may have had an ancestor who descended from a single population. These results may be helpful for learning about your genealogy and for piecing together the history of your ancestors' migrations.



YOUR 100% CHINESE ANCESTOR

You most likely had a parent or grandparent who was 100% Chinese. This person was likely born between 1940 and 1970.

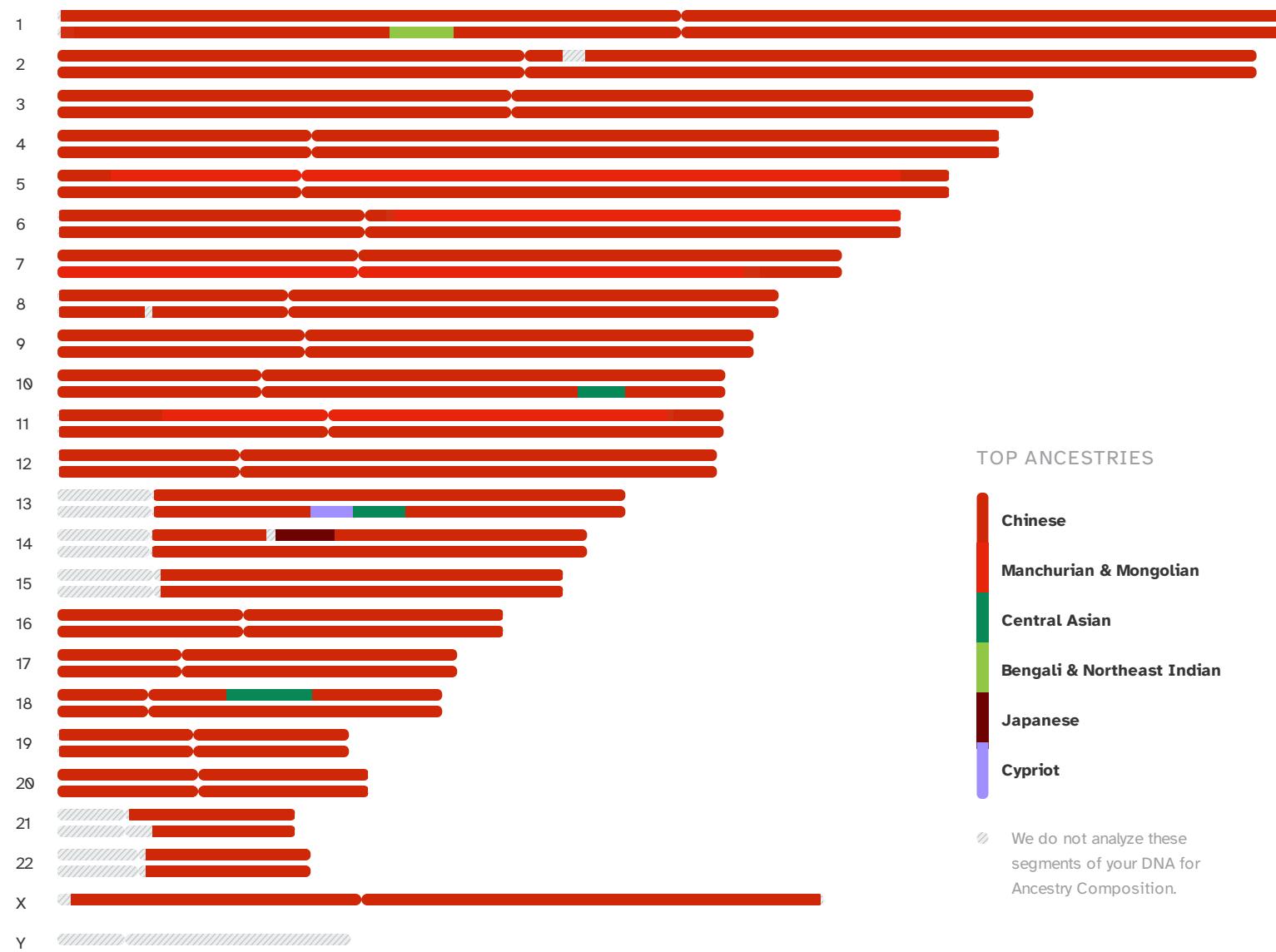
A large cluster of red paper lanterns hangs against a clear blue sky at dusk. The lanterns are spherical with horizontal pleats and feature intricate black paper cutouts at the top. They are illuminated from within, casting a warm, glowing light. The perspective is looking up, making the lanterns appear like stars in the night.

CHINESE

Red paper lanterns light up the streets.

ANCESTRY CHROMOSOME PAINTING

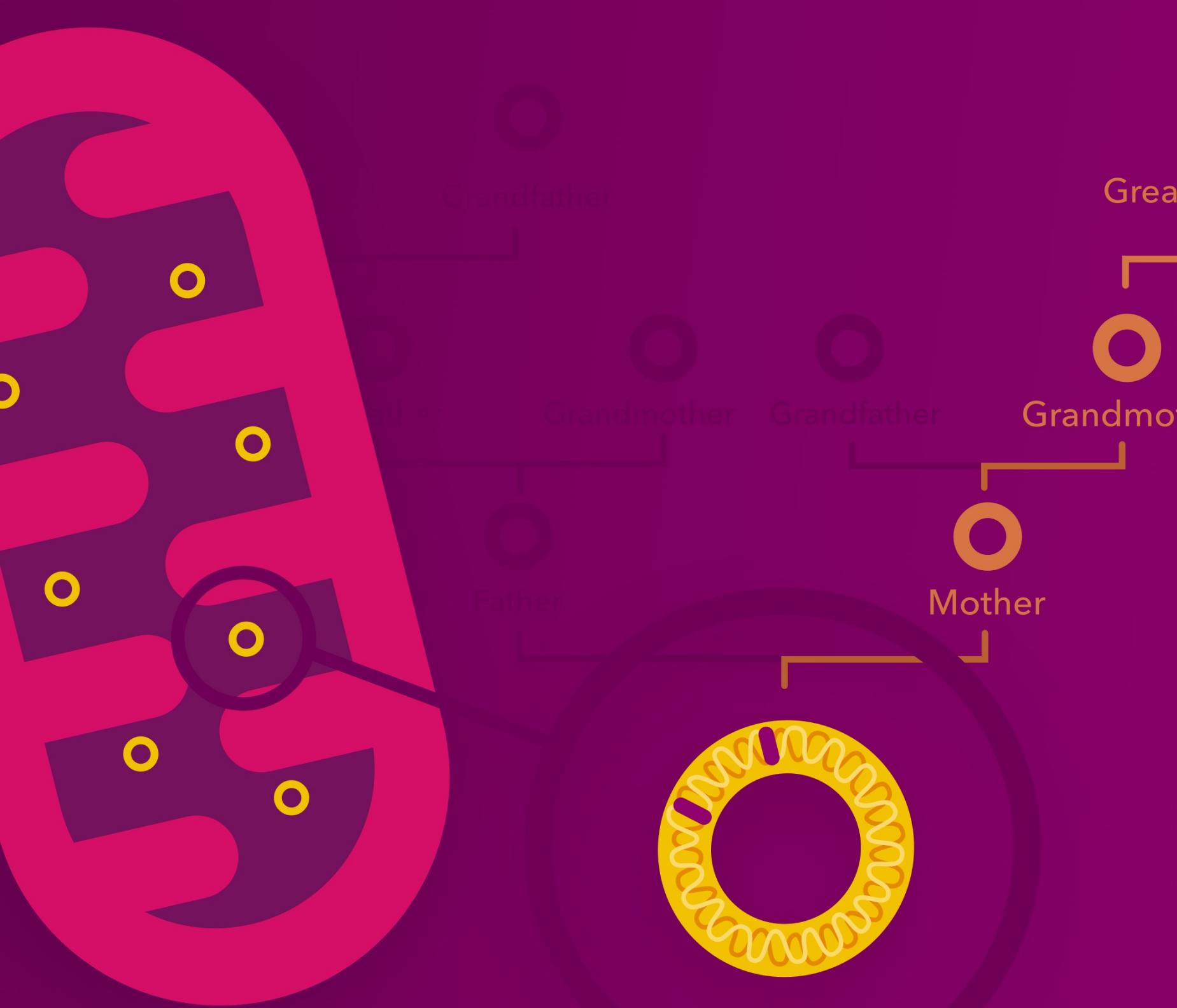
Your Ancestry Chromosome Painting shows how the DNA that matches each specific ancestry is distributed across your chromosomes. Typically, longer pieces of DNA from a particular population suggest a recent ancestor from that population, while shorter pieces suggest a more distant ancestor.



MANCHURIAN & MONGOLIAN

A typical Mongolian yurt.







t grandmother

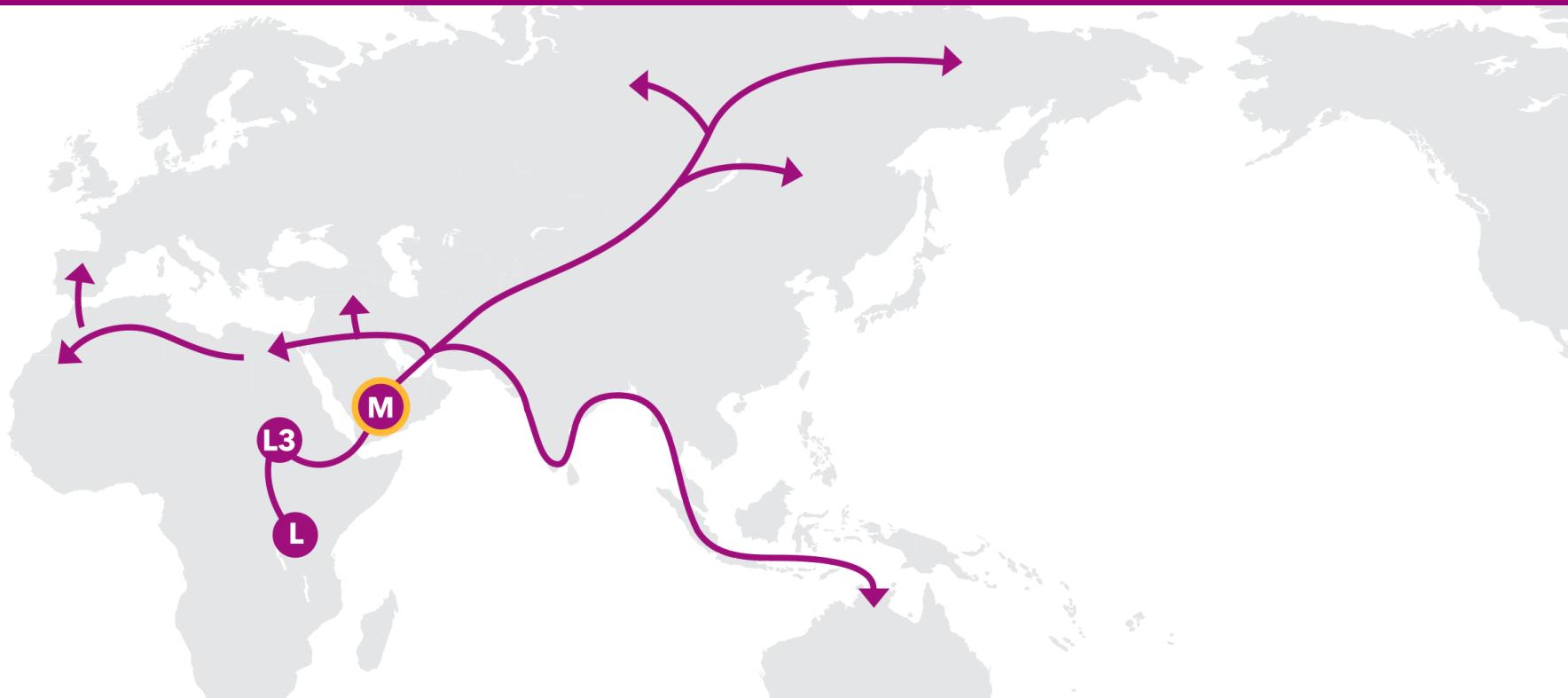
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MATERNAL HAPLOGROUP

Your maternal haplogroup refers to a unique set of genetic variations in your mitochondrial DNA that have been passed down to you for thousands of years through your maternal line — from your great-grandmother to your grandmother to your mother, and so on.

MATERNAL HAPLOGROUP

Ziping, your maternal haplogroup is M8a.



WHAT IS A MATERNAL HAPLOGROUP?

As our ancestors ventured out of eastern Africa, they branched off in diverse groups that crossed and recrossed the globe over tens of thousands of years. Your maternal haplogroup can reveal the path followed by the women of your maternal line.

180,000 Years Ago Haplogroup L

If every person living today could trace his or her maternal line back over thousands of generations, all of our lines would meet at a single woman who lived in eastern Africa between 150,000 and 200,000 years ago. Though she was one of perhaps thousands of women alive at the time, only the diverse branches of her haplogroup have survived to today. The story of your maternal line begins with her.

65,000 Years Ago Haplogroup L3

Your branch of L is haplogroup L3, which arose from a woman who likely lived in eastern Africa between 60,000 and 70,000 years ago. While many of her descendants remained in Africa, one small group ventured east across the Red Sea, likely across the narrow Bab-el-Mandeb into the tip of the Arabian Peninsula.

50,000 Years Ago Haplogroup M

Beyond Africa, your maternal-line story can be traced through haplogroup M. M is one of two branches that split from L3 soon after humans first expanded out of Africa. Over the 50,000 years since the branch's rise, members of haplogroup M have ventured far and wide in southern and eastern Asia, where many diverse branches split off, many of which are major haplogroups in their own right.

21,000 Years Ago Haplogroup M8a

Your maternal line stems from a branch of M called M8a. M8a is an Asian haplogroup that traces back to a woman who lived approximately 20,000 years ago, perhaps in the Altay mountains of south-central Siberia. At that time the Ice Age would have made the area comparable to Arctic regions today, with vast stretches of tundra and sub-freezing temperatures for much of the year. Somehow the Altay Mountain people survived under those extreme conditions – most likely in small, isolated pockets – and dispersed throughout central Asia after the Ice Age.

Some of the populations where M8a is found today also share a linguistic link. People in present-day Mongolia, Manchuria and the Russian Far East all speak Altaic languages, and the populations of those areas also exhibit substantial levels of haplogroup M8a. For example, about 4% of the Buryat, who speak an Altaic language related to Mongolian, belong to branches of M8a. About 15% of the Udegay, who live along the river that separates China from Russia, also share the haplogroup.

Overall, members of M8a remain relatively close to the region of origin today, and are found mostly in southern Siberia, Korea and the northern Chinese provinces of Liaoning, Xinjiang, and Qinghai.

ANCIENT CHINA'S FAMOUS TERRACOTTA ARMY WAS CONSTRUCTED BY MEN BEARING HAPLOGROUP M8A.

Qin Shi Huang, who unified warring states to become the First Emperor of China and founded the Qin Dynasty, ruled the Chinese state of Qin from 247 BC to 210 BC. In addition to his political feats, his reign is known for the massive construction projects, including his mausoleum in the Shaanxi province of central China, which began construction in 246 BC. To aid him in the afterlife, 8,000 perfectly life-like soldiers were crafted out of molds and clay and placed at guard over his tomb: his own Terracotta Army.

An estimated 700,000 workers were involved in the mausoleum construction alone, and in 2003, hundreds of skeletal remains were unearthed near the mausoleum. Curious about the ethnic origins of these men, a group of Chinese scientists decided to examine their maternal haplogroups. They found that some of these workers belonged to haplogroup M8a, and that the group had come from a variety of places across East Asia.

Pictured below: Qin Shi Huang's Terracotta Warriors





21,000 Years Ago Haplogroup M8a

Your maternal haplogroup, M8a, traces back to a woman who lived approximately 21,000 years ago. That's nearly 840 generations ago! What happened between then and now? As researchers and citizen scientists discover more about your haplogroup, new details may be added to the story of your maternal line.

Today Haplogroup M8a

M8a is relatively uncommon among 23andMe customers. Today, you share your haplogroup with all the maternal-line descendants of the common ancestor of M8a, including other 23andMe customers.

1 in 4,700

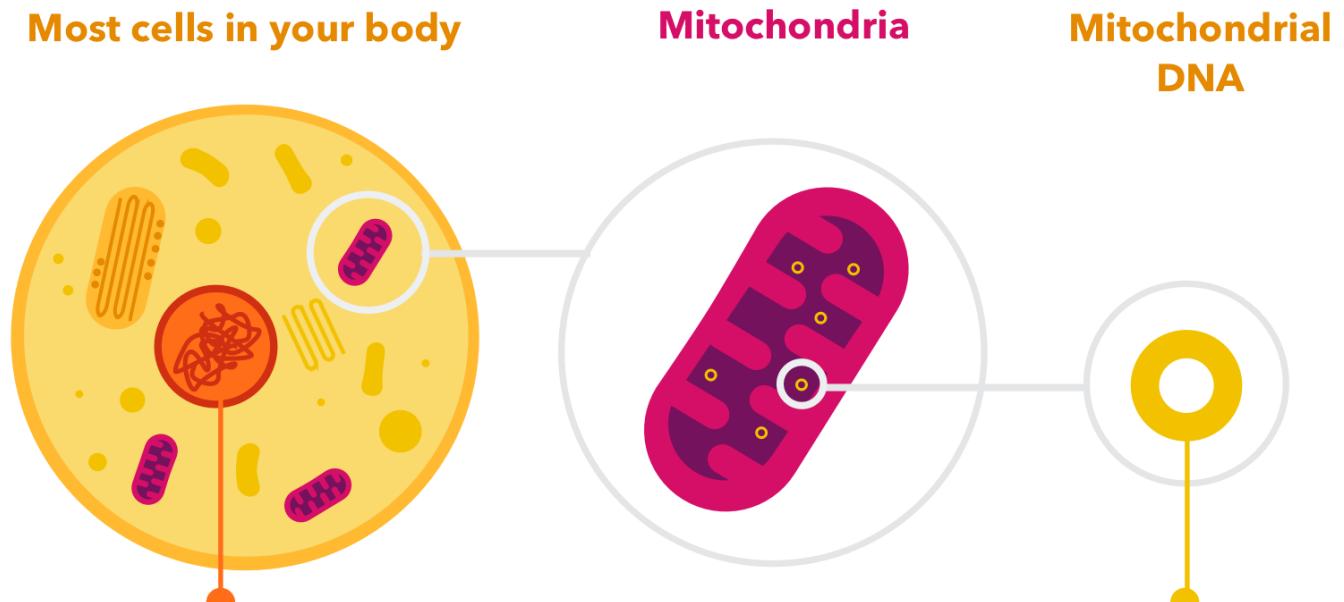
23andMe customers share your
haplogroup assignment

THE GENETICS OF MATERNAL HAPLOGROUPS

Mitochondrial DNA

Maternal haplogroups are determined by sets of genetic variants in a tiny, unusual loop of DNA called mitochondrial DNA (mtDNA). As the name suggests, mtDNA is found in the mitochondria, small but mighty structures inside our cells that turn fuel from the food we eat into energy.

Mitochondria evolved over billions of years from an independent bacterial cell that was engulfed by another cell. Instead of becoming lunch, the bacterium helped its new host use oxygen to produce energy. Over time it completely lost its independence and became an integrated part of the larger cell.



Your 23 pairs of chromosomes are found in a region of the cell called the nucleus.

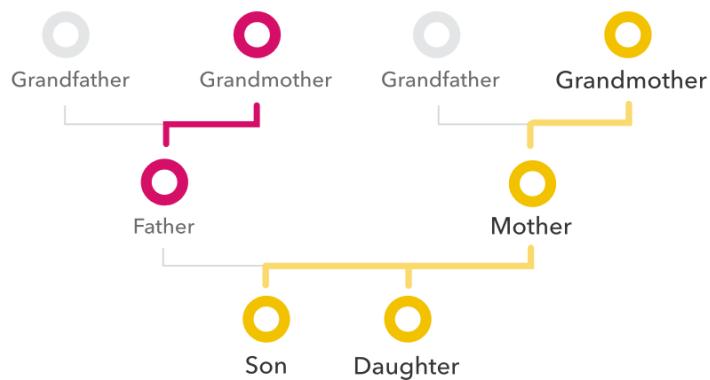
mtDNA makes up a tiny fraction of your total DNA.

Maternal Inheritance

Mitochondrial DNA is a powerful tool for tracing the history of maternal lines because of the way it is inherited: everyone has mtDNA, but only mothers pass it down to their children. So, you inherited a copy of your mother's mtDNA, who inherited it from her mother, who inherited it from hers, and so on through the generations along an unbroken line of women.

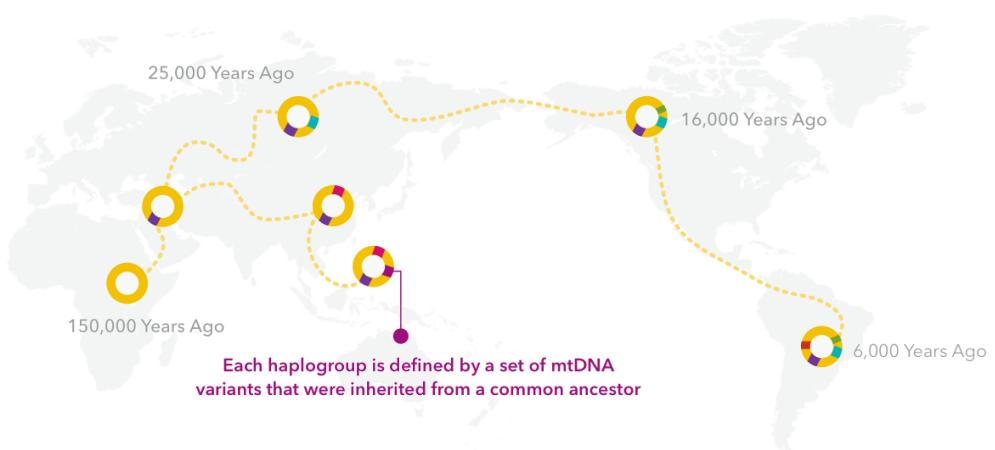
The copies passed down are not always perfectly identical, however. Small typos in the mtDNA sequence occasionally occur, creating new genetic variants. Over many generations, these variants stack up in unique patterns that are carried by different maternal lines around the world.

Only mothers pass their mtDNA down to their children



Tracing Female Migrations

Geneticists study the relationships between haplogroups and compare them with the distribution of each group around the world. Because closely related haplogroups tend to share geographic roots, researchers can play a sophisticated version of connect-the-dots to estimate the origins and migration patterns of particular haplogroups.



Combining this genetic evidence with data from other fields of study helps researchers place the story of each maternal line within the broader context of human history.

Great Grandfather



Grandfather



Father



Son



Grandmother



Mother

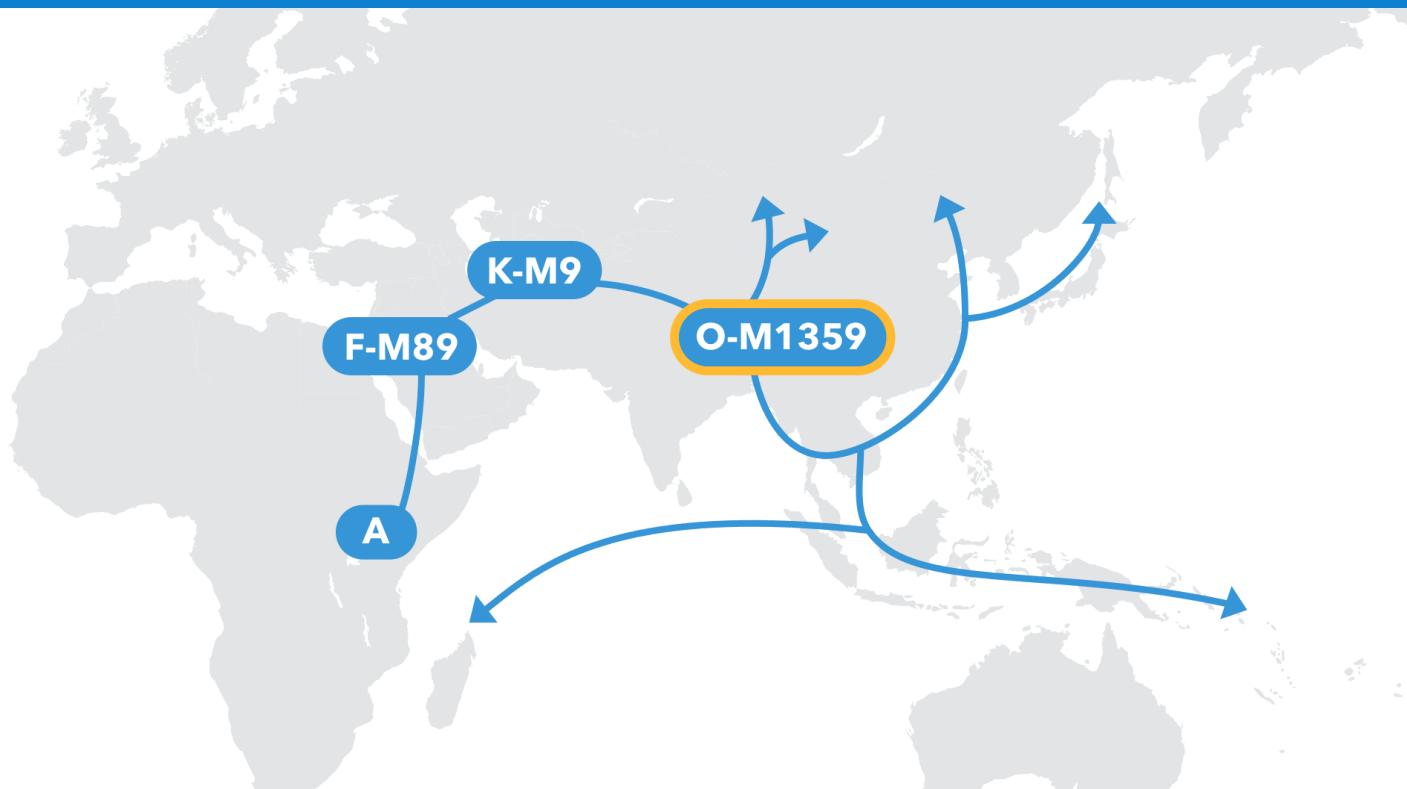
Y

PATERNAL HAPLOGROUP

Your paternal haplogroup assignment is based on genetic variants in your Y chromosome DNA (or on the Y chromosome of a male-line relative like your dad). These variants — a unique genetic signature inherited from a common paternal-line ancestor — are shared among the members of your haplogroup.

PATERNAL HAPLOGROUP

Ziping, your paternal Haplogroup is O-CTS52.



WHAT IS A PATERNAL HAPLOGROUP?

Similar to how your maternal haplogroup can reveal the migratory paths of your ancient maternal line, your paternal haplogroup can trace the migrations of your paternal-line ancestors.

275,000 Years Ago Haplogroup A

The stories of all of our paternal lines can be traced back over 275,000 years to just one man: the common ancestor of haplogroup A. Current evidence suggests he was one of thousands of men who lived in eastern Africa at the time. However, while his male-line descendants passed down their Y chromosomes generation after generation, the lineages from the other men died out. Over time his lineage alone gave rise to all other haplogroups that exist today.

76,000 Years Ago Haplogroup F-M89

For more than 100,000 years, your paternal-line ancestors gradually moved north, following available prey and resources as a shifting climate made new routes hospitable and sealed off others. Then, around 60,000 years ago, a small group ventured across the Red Sea and deeper into southwest Asia. Your ancestors were among these men, and the next step in their story is marked by the rise of haplogroup F-M89 in the Arabian Peninsula.

53,000 Years Ago Haplogroup K-M9

Passing through the Middle East, your paternal-line ancestors continued on to the steppes of Central Asia, vast grasslands stretching all the way from central Europe to the eastern edge of Asia. From its origin in the western steppes nearly 50,000 years ago, haplogroup K-M9 spread across most of the globe. In fact, nearly half of all paternal lineages outside of Africa are branches of haplogroup K.

45,000 Years Ago Haplogroup O-M1359

While some men turned west, your ancestors continued heading east. The man who gave rise to haplogroup O-M1359 likely lived in eastern Asia about 45,000 years ago. For thousands of generations, his descendants have stayed in east Asia where they have become the majority of the Han Chinese, Japanese, and Taiwanese. One late migration carried haplogroup O men all the way to Madagascar.

34,000 Years Ago Haplogroup O-M119

Your paternal line stems from O-M119, one of the major branches of haplogroup O. O-M119 diverged from its brother haplogroups approximately 30,000 years ago. In the last 4,000 years or so it has also traveled from Taiwan through the Philippines and Melanesia to the Pacific Islands. As a result, O-M119 is found at exceptionally high levels among indigenous Taiwanese and is relatively common in the Philippines and along the southeastern coast of China, where it reaches levels of 15% among the Han majority. Despite its southern concentration, men bearing this haplogroup can also be found at trace levels as far north as Siberia.



< 34,000 Years Ago Haplogroup O-CTS52

Your paternal haplogroup, O-CTS52, traces back to a man who lived less than 34,000 years ago. That's nearly 1360 generations ago! What happened between then and now? As researchers and citizen scientists discover more about your haplogroup, new details may be added to the story of your paternal line.

Today Haplogroup O-CTS52

O-CTS52 is relatively uncommon among 23andMe customers. Today, you share your haplogroup with all the paternal-line descendants of the common ancestor of O-CTS52, including other 23andMe customers.

1 in 4,300

23andMe customers share your
haplogroup assignment

HAPLOGROUP O-M119 AND THE ORIGINS OF THE HAN.

Your haplogroup is a branch of O-M119, also called O1a. O-M119 and its branches are present in both northern and southern Han Chinese men at low to moderate frequencies, but are most common among the Jiangsu, Shanghai, and Zhejiang southern Han groups. The Han people, who all share the same language and similar cultural practices, are the largest ethnic group in the world, with about 1.2 billion people. Historical evidence shows that Han people are descendants of the ancient Huaxia tribes that come from northern China, and Han language and culture only expanded into southern China in the last 2,000 years. The spread of Han people and culture from northern to southern China was likely driven by warfare and famine in the north. As a member of O-M119, you belong to a group that has helped to shape the culture of the world's largest ethnic group.

Pictured left: Huangshan (Yellow Mountain) in eastern China.

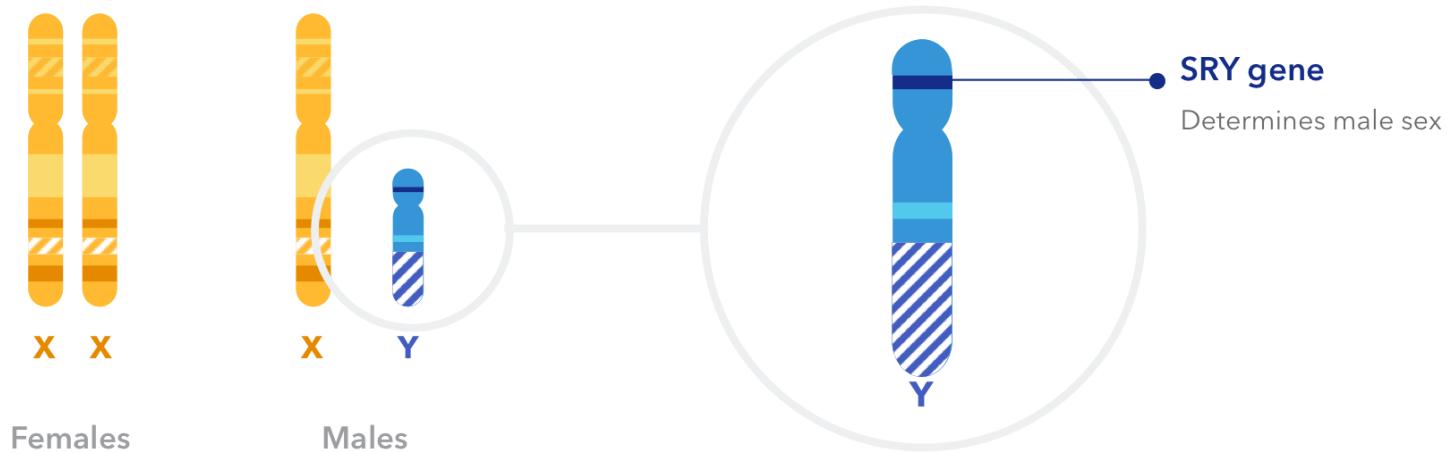
THE GENETICS OF PATERNAL HAPLOGROUPS

The Y Chromosome

Most of the DNA in your body is packaged into 23 pairs of chromosomes. The first 22 pairs are matching, meaning that they contain roughly the same DNA inherited from both parents. The 23rd pair is different because in men, the pair does not match. The chromosomes in this pair are known as "sex" chromosomes and they have different names: X and Y. Typically, women have two X chromosomes and men have one X and one Y.

Your genetic sex is determined by which sex chromosome you inherited from your father. If you are genetically male, you received a copy of your father's Y chromosome along with a gene known as SRY (short for sex-determining region Y) that is important for male sexual development. If you are genetically female, you received a copy of the X chromosome from both of your parents.

The Y chromosome is used to determine paternal haplogroups

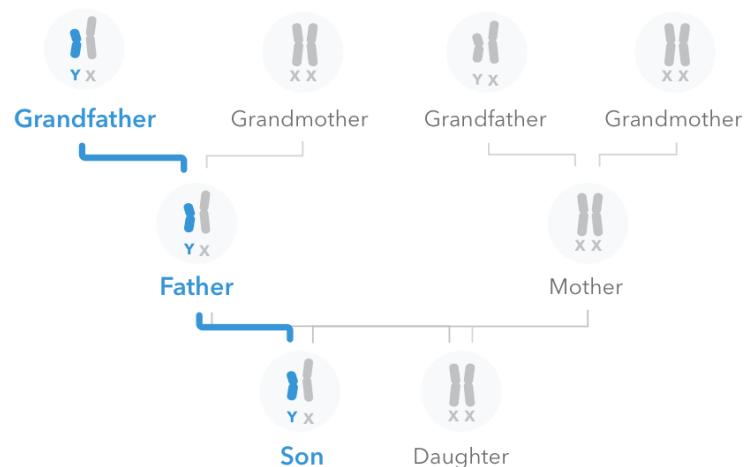


Paternal Inheritance

Each generation, fathers pass down copies of their Y chromosomes to their sons essentially unchanged. Between generations, the matching chromosomes in the other 22 pairs make contact and exchange segments of DNA. This process shuffles the genetic information that is passed down from parent to child, making it difficult to trace genealogy over many generations. Except for two tiny sections at the chromosome's tips, however, the Y chromosome skips this step. Instead, a nearly identical copy is handed down each time.

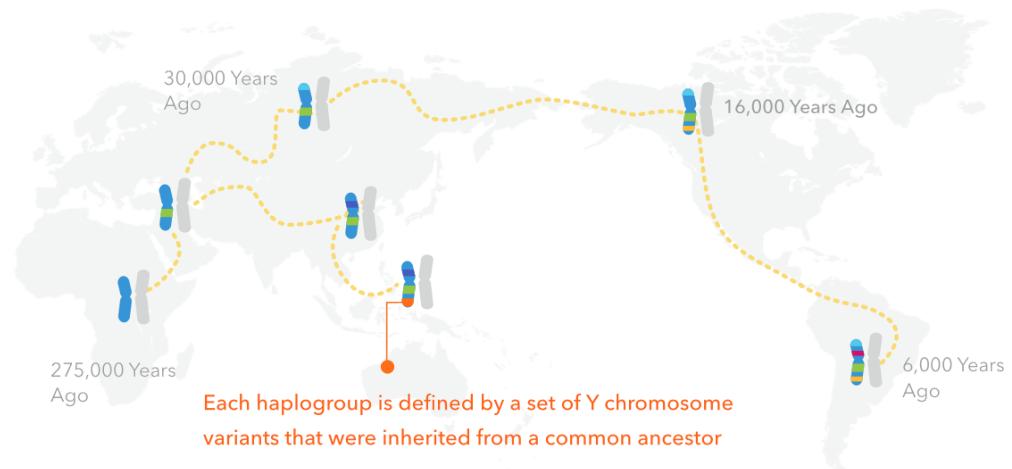
But, every so often, small changes to the DNA sequence do occur. These changes, called mutations, create new genetic variants on the Y chromosome. Because the Y chromosome does not recombine between generations, these variants collect in patterns that uniquely mark individual paternal lineages.

Fathers pass their Y chromosome down to their sons



Tracing Male Migrations

Because closely related haplogroups tend to share geographic roots, researchers can use the modern distributions of haplogroups around the world to trace major migrations, from the voyage to Australia over 40,000 years ago to the peopling of North and South America in the last 19,000 years.







NEANDERTHAL ANCESTRY

Neanderthals (*Homo neanderthalensis*) were a group of ancient humans who interbred with modern humans (*Homo sapiens*) in Europe and Asia before becoming extinct around 40,000 years ago. Neanderthals looked a little different from us, but are thought to have exhibited complex social behaviors. This section reveals how much of your ancestry can be traced back to our ancient evolutionary cousins, the Neanderthals.



Ziping, you have more Neanderthal DNA than 99% of other 23andMe customers.

You inherited a small amount of DNA from your Neanderthal ancestors. Out of the 7,462 variants we tested, we found 361 variants in your DNA that trace back to the Neanderthals.

All together, this makes up less than 2% of your DNA.

YOU HAVE NEANDERTHAL DNA THAT MAY INFLUENCE YOUR TRAITS

This report highlights associations between Neanderthal DNA variants and certain traits, but it does not explore how other factors may be involved — from your human DNA variants to your environment and lifestyle.



You have two variants associated with being a better sprinter than distance runner.



You have one variant associated with being less likely to have a chin dimple.

Other 23andMe Customers

Some people have Neanderthal variants associated with other traits, such as:



Having difficulty discarding rarely-used possessions.

NEANDERTHALS, DECODED

In 2010, scientists sequenced the Neanderthal genome for the first time, leading to the discovery that most people can trace up to 2% of their DNA to the Neanderthals, who lived throughout western Eurasia — from Wales to southern Siberia near the Altai mountains.



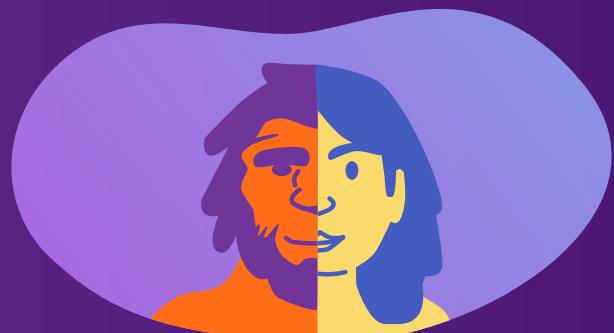
FINDING COMMON GROUND

The Neanderthal genome revealed that we have a lot in common, including a common ancestor, *Homo heidelbergensis*, who lived over 550,000 years ago and gave rise to three lineages: humans in Africa, Neanderthals in Europe and West Asia, and Denisovans in Asia.



SWEET REUNION

Around 60,000 years ago, a group of humans left Africa and interbred with Neanderthals in western Asia. If we were to add up all of the Neanderthal DNA preserved in the entire human population today, we could piece together around 40% of the Neanderthal genome.



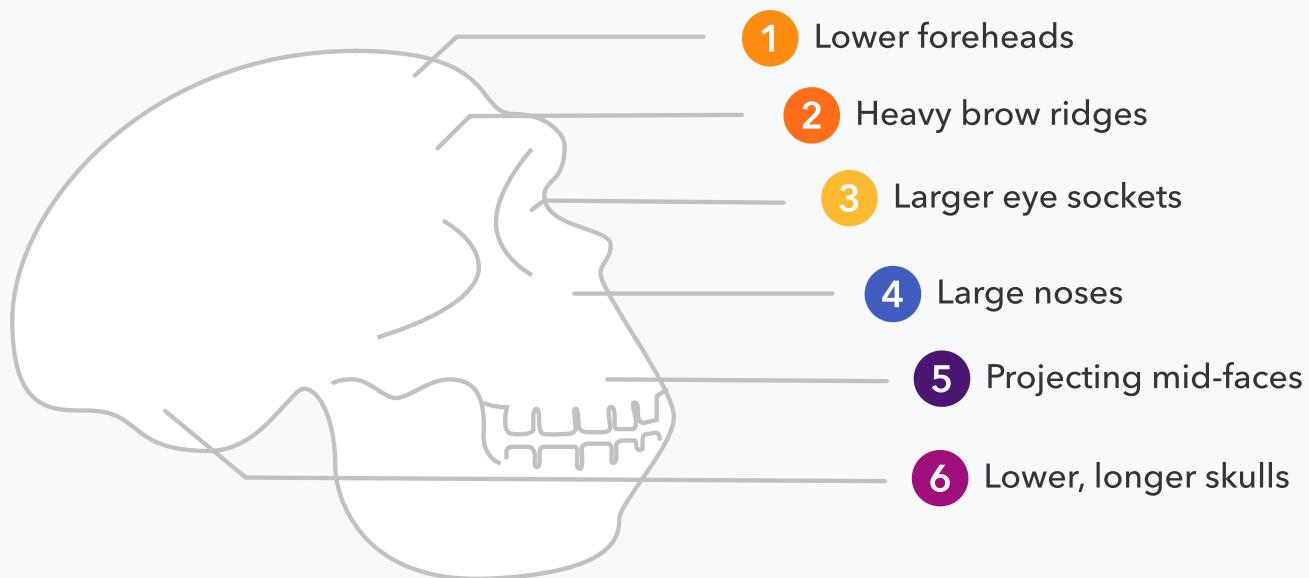
END OF AN ERA

What happened to the Neanderthals? Researchers think climate change, a violent lifestyle, disease, or decreasing fertility could have played a role in their extinction around 40,000 years ago. It's also possible Neanderthals were simply absorbed into the human population.



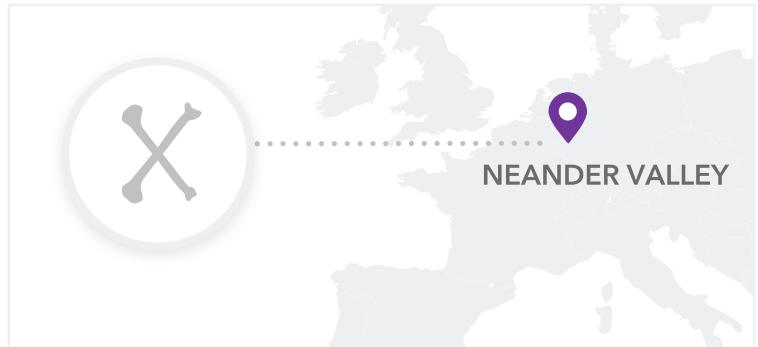
WHAT DID THEY LOOK LIKE?

Neanderthals were similar to modern humans in many ways, but their skeletal remains reveal a handful of differences, particularly in the face and head. Where modern humans have a relatively flat face and round skull, Neanderthals had a sloping forehead, elongated skull, heavy brow ridge, projecting midface, and almost no chin. Neanderthals also had a more robust body with a “barrel-shaped” chest and thicker bones. Fun fact: the tallest Neanderthal ever found was around 5’10” — a whopping five inches taller than the average Neanderthal male.



Where does the word “Neanderthal” come from?

The word “Neanderthal” is a nod to a 17th-century German theologian named Joachim Neander and the secluded valley (Thal) he loved to visit. Nearly 200 years after Neander’s death, peculiar bones were found in the valley — initially believed to belong to a human with bone deformities (it was, in fact, a Neanderthal). It wasn’t until 1886, when two nearly complete Neanderthal skeletons were found in Belgium, that the scientific community recognized the remains for what they were — a unique flavor of human.



Does everyone have Neanderthal ancestry?

European, Asian, and indigenous American populations today have between 1-2 percent Neanderthal DNA, but Sub-Saharan African populations have virtually none.

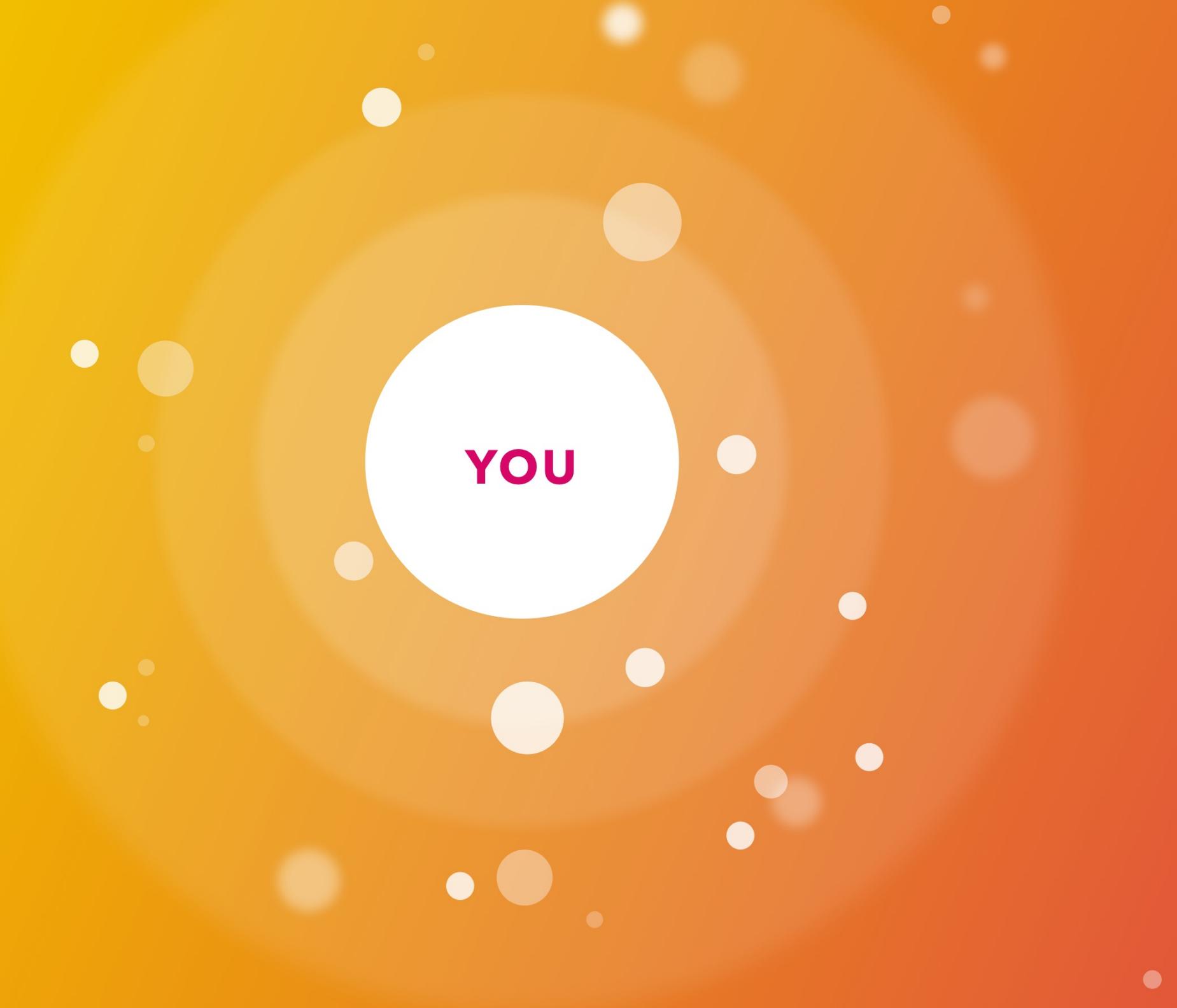
Were Neanderthals intelligent?

While they may have looked a little different, Neanderthals were probably a lot like us. They tended to have slightly larger brains than modern humans, and shared many of our capabilities. They made fire. They used tools and they could probably speak. There’s also evidence that they created jewelry and art. For example, the earliest European art — red-pigment paintings that decorate the walls of caves throughout the continent’s southwest — may have been created by Neanderthals 20,000 years before modern humans arrived in Europe.



Neanderthal Cave Art

Human Cave Art



YOU

YOUR DNA RELATIVES

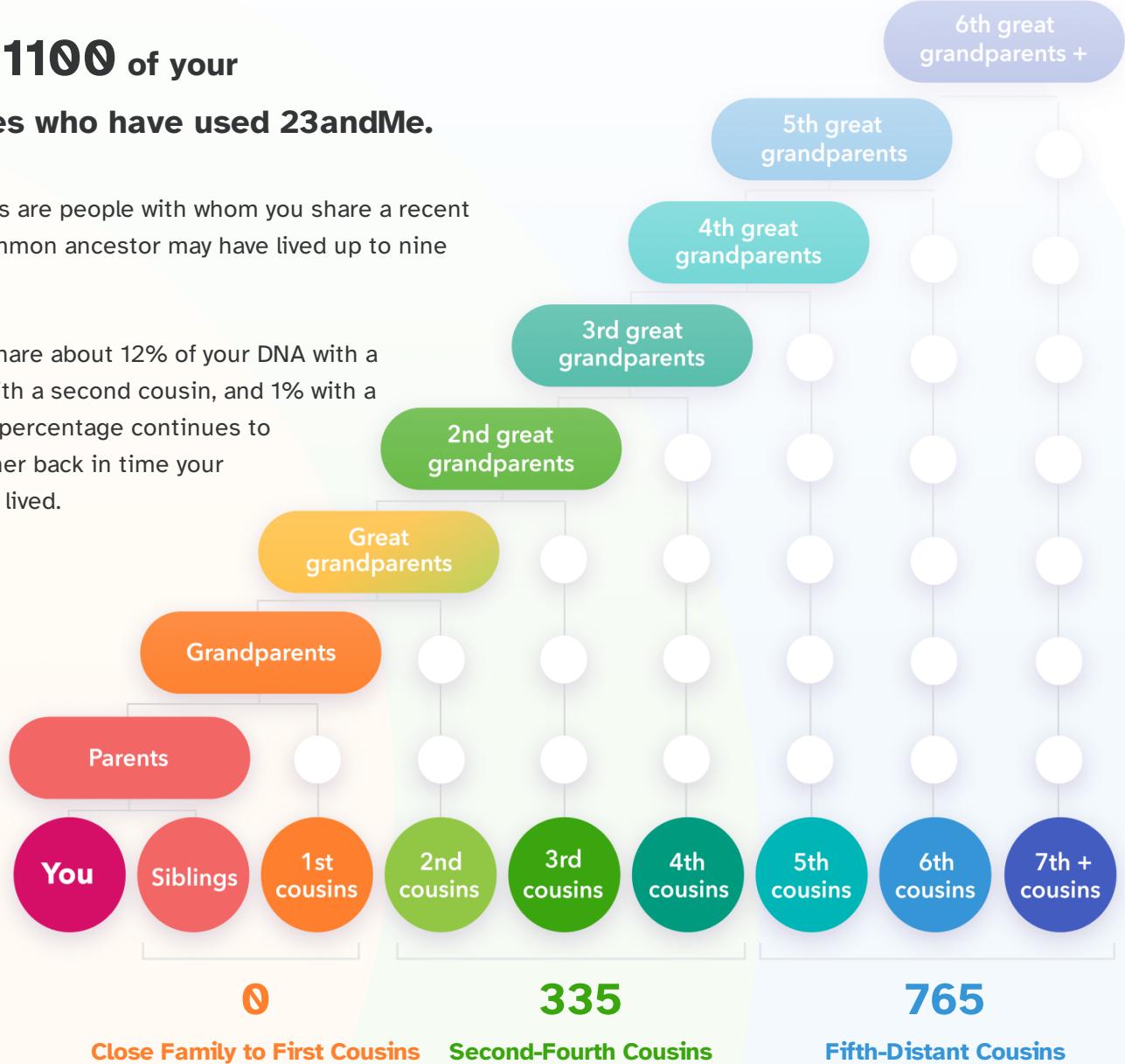
So far, your reports have looked to the past, tracing your DNA across continents and millennia. The origins of your DNA link you to a growing number of genetic relatives, many of whom are alive today and hold clues about your common ancestors.

YOUR DNA RELATIVES BY THE NUMBERS

We've found **1100** of your
DNA Relatives who have used 23andMe.

Your DNA Relatives are people with whom you share a recent ancestor. This common ancestor may have lived up to nine generations ago.

For context, you share about 12% of your DNA with a first cousin, 3% with a second cousin, and 1% with a third cousin. This percentage continues to decrease the further back in time your common ancestor lived.



WHAT WILL YOU DO WITH YOUR DNA?

We've provided a few insights into the incredible story your genome can tell about your ancestry. Now, how will you continue to explore who your ancestors were and the legacy they've left you?

Get creative in the kitchen.

Try some new recipes inspired by your ancestry, using food blogs or cookbooks that align with your ancestry composition.

Learn a new language.

If you choose to meet your distant cousins in person, correspond through 23andMe, or travel to your ancestral countries, a new language can open doors.

Root for your roots!

Follow new sports teams from your countries of genetic origin. Soccer, cricket, rugby, tennis, track, and field...

Start grooving.

Use your favorite music streaming service to curate a playlist of genres and artists inspired by your ancestry.

Plan an ancestry field trip.

Visit a library, history museum, or art museum to learn about the migratory patterns, historic events, and cultural movements connected to your ancestry. Many public archives offer searchable databases of immigration records.

Stock your bookshelves.

Visit your local library to create an ancestry-inspired reading list that can help illuminate key historic moments, cultural traditions, and aspects of identity.

APPENDIX: ANCESTRY POPULATIONS

African Hunter-Gatherer: African hunter-gatherer populations — including the Pygmy and San peoples of central and southern Africa — represent some of the oldest and most genetically distinct branches in the human family tree. The historically semi-nomadic San peoples of the Kalahari and the closely-related Khoe herders in Namibia, Botswana, and South Africa, speak languages characterized by click consonants rarely found in other language families. Pygmy peoples of the central African rainforests, on the other hand, have lost their distinct linguistic heritage, but have preserved many unique cultural traditions.

Anatolian: Anatolia, a fertile peninsula above the eastern Mediterranean, has served as a genetic bridge between Asia and Europe for over 40,000 years. Early Anatolian farmers laid the groundwork for powerful civilizations like the Bronze Age Hittite Empire, followed by centuries of Persian, Greek, and Roman rule. The Eastern Roman Empire, Byzantium, survived in various forms until falling in the 15th century to the Ottoman Turks, who introduced a Central Asian-like genetic signature.

Angolan & Congolese: Beginning around 3,000 years ago, the genetic tapestry of the western Congo basin was transformed by the influx of Bantu-speaking peoples from the highlands of what is today Nigeria and Cameroon. More recently, Bantu speakers in the western Congo region established the historical Kingdom of Kongo, which flourished for over 500 years until its collapse at the hands of colonial powers in 1914. Today, Bantu-speaking peoples (such as the Kongo, Teke, Mbochi, and Sangha) are significant majorities in the countries bordering the Congo River.

Ashkenazi Jewish: Ashkenazi Jewish people settled in Central and Eastern Europe in the late Middle Ages, but their modern descendants remain genetically more similar to other Jewish populations than to their European neighbors, reflecting shared western Asian origins. In the twentieth century, many Ashkenazi Jewish people immigrated to Israel or to the Americas in search of greater cultural and religious acceptance. Today, over five million ethnic Ashkenazi Jewish people live in the U.S.

Bengali & Northeast Indian: The people of Bangladesh and northeast India share an ancient genetic history in the region where the Ganges and Brahmaputra rivers meet. Tens of thousands of years ago, hunter-gatherers arrived from the west. Later migrations of Austro-Asiatic, Tibeto-Burman, Dravidian, and Indo-European-speaking groups brought additional genetic and linguistic diversity to the region. Compared to other South Asian populations, the people of Bangladesh and northeast India generally have more East Asian ancestry, reflecting the region's role as a genetic crossroads.

British & Irish: The British Isles have been continuously occupied by humans for the last 11,000 years, but more recently, the people of the Isles have left their genetic fingerprints around the world, following centuries of nautical exploration, colonization, and immigration. In the early 20th century, the Republic of Ireland won its independence from the United Kingdom, but the people of these nations share a common genetic heritage rooted largely in Celtic, Anglo-Saxon, and Viking migrations from northwestern Europe.

Broadly Arab, Egyptian & Levantine: The region bordering the Red Sea and the eastern Mediterranean has served as an important crossroads of human migration out of Africa over the last 100,000 years. More recently, the Arab conquests of Egypt and the Levant have reinforced this shared genetic heritage, making it difficult to assign some DNA to just one population with confidence.

Broadly Central & South Asian: Central & South Asia are represented here by diverse populations from India and Sri Lanka in the south to Kazakhstan and Uzbekistan in the north. Some Central & South Asian DNA is difficult to assign confidently to one population and receives a 'broadly' designation.

Broadly Central Asian, Northern Indian & Pakistani: The people of northern India, Pakistan, and Central Asia have a shared genetic history influenced by the southward migration of peoples from Central Asia around 4,000 years ago. This shared history can make it difficult to assign some DNA to just one population.

Broadly Chinese & Southeast Asian: From the expansive plains of central Asia to the islands of eastern Indonesia, the people of China and Southeast Asia share genetic similarities dating back to the arrival of humans in the region over 40,000 years ago. Broadly Chinese & Southeast Asian DNA – likely driven in part by the spread of agriculture within the last few thousand years – matches several specific populations and is difficult to assign to just one.

Broadly Congolese & Southern East African: Starting around 3,000 years ago, Bantu speakers carried metallurgy and agriculture from the highlands of Nigeria and Cameroon in two major streams – one southward and one eastward – resulting in ancestry that transcends geopolitical borders. "Bantu" is a term widely used to describe the largest of Africa's ethnolinguistic families. Likely as a result of these rapid and widespread expansions across Central and Eastern Africa, it is difficult to assign a specific location within Sub-Saharan Africa to some chromosomal segments with a high degree of confidence.

Broadly East Asian & Native American: The peoples of East Asia and the Americas have a shared genetic history. Their common ancestors left western Asia over 50,000 years ago, migrating east across the continent. The ancestors of Native Americans began to cross into the Americas 12,000 to 15,000 years ago. Broadly East Asian & Native American DNA is a relic of this ancient population split, and reflects shared roots in central and northern Asia.

Broadly European: Much of Europe was buried under miles of ice ten thousand years ago. As the glaciers receded over millennia, Neolithic farmers from western Asia joined Paleolithic hunter-gatherers to settle Europe. Some European DNA is difficult to assign confidently to one population and receives a 'Broadly' designation.

Broadly Japanese & Korean: The people of Japan and the Korean Peninsula share a genetic heritage that dates back to the first arrival of Stone Age hunter-gatherers from Siberia, and to later migrations of Iron Age rice farmers from the south. Broadly Japanese & Korean DNA is a remnant of this ancient population history and is difficult to assign to Korean or Japanese ancestry alone. More recently, the region has been shaped by a rich history of artistic, literary, architectural, and scientific exchange.

Broadly Melanesian: Melanesia was first peopled by seafaring voyagers over 45,000 years ago, when the ancestors of indigenous Australian and Papuan peoples reached Near Oceania from Indonesia. These early Melanesians interbred with a now-extinct hominin species – the Denisovans – and their descendants harbor traces of this ancient encounter in their DNA.

Broadly Northern Asian: Northern Asian ancestry reflects a history of rapid, widespread human migrations across the vast Central Asian plains, and along the plateaus and waterways of Siberia. Genetic markers associated with northern Asian ancestry may be relics of these far-reaching migrations, and cannot be confidently assigned to a specific region or group.

Broadly Northern East African: Northeast Africa, which here spans from Sudan in the northwest to Ethiopia and Somalia in the southeast, is home to both Afro-Asiatic and Nilo-Saharan ethnolinguistic groups. The entire region has a rich history of genetic and cultural exchange between indigenous East Africans and immigrants from the Arabian Peninsula. As a result of both ancient and recent migrations within the region, broadly Northeast African DNA may be difficult to assign to a specific location.

Broadly Northern West Asian: Roughly bounded by Anatolia in the east to Iran in the west, northern West Asia has a shared genetic heritage going back tens of thousands of years. Domestication of grains and livestock emerged 11,000 years ago in this region, sparking the agricultural revolution that spread to parts of Europe, Africa, and other parts of Asia. Broadly northern West Asian DNA matches several specific populations and is difficult to assign to just one.

Broadly Northwestern European: Northwestern European ancestry is represented by people from as far west as Ireland, as far north as Norway, as far east as Finland, and as far south as France. These countries rim the North and Baltic Seas, and have been connected throughout much of history by those waters. Broadly Northwestern European DNA matches several specific populations and is difficult to assign to just one. This shared heritage may be a result of extensive migration, possibly including the Germanic invasions of the early Middle Ages.

Broadly Southern South Asian: The genetic similarity within southern South Asia may be due in part to migrations of Dravidian-speaking peoples within the past few thousand years.

Broadly Southern European: Southern Europe, which includes the Iberian, Italian, and Balkan peninsulas as well as the island of Malta, is a region defined in great part by the Mediterranean Sea. The Mediterranean has provided transportation routes, keeping these regions connected culturally and genetically. Broadly Southern European DNA matches several specific populations and is difficult to assign to just one.

Broadly Sub-Saharan African: The genetic diversity of Sub-Saharan Africa reflects both the deep history of humans in the region and the recent migrations that have carried people from western Africa to both southern and eastern Africa. As a result of this ancient and complex population history, it is difficult to assign some DNA to a specific population within Sub-Saharan Africa.

Broadly West African: For over a millennium before European colonization and the Atlantic slave trade, West Africans were united under a series of powerful empires, resulting in broad similarities in music, clothing, art, and cuisine. A gradient of genetic similarity extending from Senegal to Nigeria reflects a richly complex population history in a region home to over 350 million people who form hundreds of distinct ethnic groups. Broadly West African DNA may match several populations, making it difficult to assign to just one.

Broadly Western Asian & North African: The peoples of western Asia and North Africa have not only genetic but also deep linguistic connections with one another. Broadly Western Asian & North African DNA reflects shared roots possibly dating back to some of the earliest migrations out of Africa. The spread of Islam in the past 1,400 years has also dramatically shaped the region's genetic landscape, making it difficult to assign some DNA to just one population.

Central Asian: For thousands of years, Central Asian peoples have lived at the crossroads between eastern and western Eurasia, and their genetics reflect that history. Bounded by the Caspian Sea and China's Taklamakan desert, the region has seen the empires of Alexander the Great, Genghis Khan, and Soviet Russia come and go. Today, Central Asia is home to over 100 million people, and their DNA contains varying degrees of similarity to East Asian, South Asian, or western Asian peoples.

Chinese: China is home to one of the world's earliest and most enduring civilizations, with over 50 officially-recognized ethnic groups. The Han ethnic group makes up 92% of the country's population, and includes nearly one-fifth of all humans in the world. Over 50 million ethnic Chinese live outside of China, with over 20 million in Thailand, Malaysia, and the United States alone.

Chinese Dai: The Dai people of southern China belong to the larger Tai ethnolinguistic group that currently lives in parts of China, Burma, Laos, Vietnam, and Thailand. In China, the Dai are one of over 50 officially recognized ethnic minority groups, and are united by unique cultural traditions anchored in Dai Folk Religion or Buddhism. Most Chinese Dai live in southern and western Yunnan Province, and are genetically more similar to their Vietnamese neighbors than they are to the Han Chinese.

Coptic Egyptian: Making up over 10% of Egypt's population, Copts are a Christian minority who share an ancient history with non-Coptic Egyptians that predates the first pharaohs. However, after the seventh-century conquest of Egypt by the Rashidun Caliphate, the Christian Copts began to become genetically distinct from the Muslim-majority population, while the Coptic language was replaced by Egyptian Arabic outside of a strictly religious setting. Today, most Copts live in Egypt or Sudan, but there are also large Coptic communities living in the United States, Australia, and Canada.

Cypriot: An 11,000-year-old settlement on Cyprus's southern coast was home to some of the island's first people who processed grain, made jewelry, and lived with domesticated cats and dogs. By 3,000 years ago, Cypriots were speaking a form of Greek, which remains the language spoken across half of the island, even after long periods of Egyptian, Persian, Venetian, Ottoman, and British rule. In spite of a 1974 attempt to annex Cyprus to Greece and an invasion of the island by Turkish forces in response, most Greek and Turkish-speaking Cypriots remain genetically similar to one another.

Eastern European: Between the eighteenth and twentieth centuries, Eastern Europe was heavily influenced by Imperial (and then Soviet) Russia, but the genetic heritage of Eastern Europe traces back to peoples living southeast of the Baltic Sea as well as to a more recent influx of Slavic-speaking peoples from north of the Black Sea. After the collapse of the Soviet Union in 1991, millions of Eastern Europeans migrated west in search of economic opportunity. In the United States, Eastern European ancestry is most common in the Midwest.

Egyptian: Ancient Egyptians began harvesting crops over 7,000 years ago along the fertile banks of the Nile, relying on annual floods that were believed to be the tears of the goddess Isis. Following the Dynastic Period, Egypt was ruled at various times by Nubian, Persian, Greek, and Roman empires, though these centuries of foreign rule had little impact on Egyptian DNA. Since the seventh-century Islamic Expansion — which brought additional linguistic and genetic diversity to the Nile River basin — a uniquely Egyptian genetic signature emerged.

Ethiopian & Eritrean: Despite recent conflict, Eritreans and Ethiopians were united under the powerful Kingdom of Aksum for almost 1,000 years until its collapse in 940 CE, and their DNA reflects that shared history. The region has also served as a crossroads between Africa and the Arabian Peninsula for tens of thousands of years. Today, most Ethiopians and Eritreans have both East African and Arabian ancestry and speak Afro-Asiatic languages, including Oromo, Tigrinya, Arabic, and Amharic.

Filipino & Austronesian: Many indigenous Filipinos, including the Aeta, Batak, and Mamanwa peoples, are likely descended from one of the earliest dispersals of modern humans out of Africa. However, most Filipinos can trace their ancestry to a much more recent and widespread migration of Southeast Asian seafarers related to the indigenous people of Taiwan. Today, this genetic signature – called "Austronesian" (meaning "southern island") – is common across the islands of the Pacific, from the Philippine Sea to Hawaii, and can be found as far away as Madagascar.

Finnish: Finland was peopled by multiple waves of colonization, including a migration of early Uralic peoples from Eastern Europe or western Siberia. Modern Finns are genetically and linguistically distinct from their Nordic and Slavic neighbors, despite centuries of Swedish and then Russian rule. Today, there are up to seven million ethnic Finns worldwide, with over 600,000 living in the United States, concentrated in Minnesota and northwestern Michigan.

French & German: "French and German" people descend from ancient Alpine-Celtic and Germanic populations, and inhabit an area extending from the Netherlands to Austria – roughly corresponding to the extent of Charlemagne's Frankish Kingdom in the Middle Ages. Estimates place Charlemagne himself in the family trees of all modern Europeans, possibly many times over. Genetically and geographically, this population's people are at the heart of Europe.

Ghanaian, Liberian & Sierra Leonean: A continuum of genetic diversity stretches from Senegal to Nigeria, but the people of the coastal countries above the Gulf of Guinea — Sierra Leone, Liberia, Côte d'Ivoire, and Ghana — share a genetic similarity distinct from neighboring regions. The Temne people, who constitute the largest group in Sierra Leone, call this region home, as do the Mende people, who reside across West Africa. In neighboring Côte d'Ivoire and Ghana, the Akan peoples predominate.

Greek & Balkan: The Balkan Peninsula is nestled in the southeastern corner of Europe and serves as the geographic and genetic crossroads between Europe and western Asia. Despite broad cultural and religious diversity, Greek and Balkan people are genetically similar to one another, descending from early Mediterranean and Slavic peoples. Island Greeks lack this ancestral Slavic influence and are similar to southern Italians.

Gujarati Patidar: Gujarati Patidars are members of a genetically distinct community from western India who descend from primarily agricultural and merchant classes. Patel is the most common last name in this community and is related to the name Patidar, which means landowner. Over the centuries, as Patidars married within their community, a distinctive genetic heritage developed. Today, people with the last name Patel represent around 15% of the population of Gujarat and almost 10% of people of Indian descent in the United States.

Indonesian, Thai, Khmer & Myanma: From Myanmar to Indonesia, the people of Southeast Asia are genetically diverse, reflecting the legacies of several migrations beginning over 40,000 years ago. More recently, the region has been heavily influenced by Hindu, Buddhist, and Islamic cultures. Before its fall in the fifteenth century, the Khmer empire – encompassing modern-day Thailand, Laos, and Cambodia – was the largest land empire in the region's history.

Iranian, Caucasian & Mesopotamian: From Armenians and Assyrians to Kartvelians and Persians, the diverse people of Iran, the Caucasus, Eastern Anatolia, and Mesopotamia share an ancient genetic history dating back to some of the world's first farmers. Dominated at times by polytheistic, Zoroastrian, Christian, and Islamic beliefs, the region has seen powerful empires come and go. While most of this ancestry is native to western Asia, traces of Central and East Asian-like genetic signatures were introduced as a result of Turkic migrations and the 13th-century Mongol invasion. Today, there are significant Armenian, Iranian, and Assyrian communities around the world, including many in the United States.

Italian: The famously boot-shaped Italian peninsula has been home to modern humans for over 30,000 years. In the early Middle Ages, Germanic invaders brought about the fall of the Western Roman Empire, and a northern European genetic signature persists in modern Italians to this day. This influence is strongest in the north, while southern Italians share a rich genetic heritage with island Greeks. Over the millennia, a number of migrations from around the Mediterranean brought North African and Western Asian ancestry to Italy as well.

Japanese: The Japanese Archipelago, composed of a whopping 6,852 islands, was colonized by multiple waves of immigrants beginning as early as 30,000 BCE. Modern Japanese people can trace most of their ancestry to the Stone Age Jōmon and late Stone Age Yayoi cultures. Yayoi DNA is concentrated in the center of Japan, while Jōmon ancestry persists to the north and south among the culturally distinctive Ainu and Ryukyuan peoples.

Korean: The Korean peninsula was first inhabited by hunter-gatherers who were genetically similar to Stone Age peoples living near the Amur River in eastern Russia. These early Koreans were later joined by Bronze-Age rice farmers from southern China or Vietnam. By the tenth century, Korea was politically and culturally unified and remained so until the establishment of a communist north and a democratic south after the Second World War. Although North and South Koreans are politically divided, they remain genetically similar to one another.

Levantine: The Levant — comprised of modern-day Lebanon, Syria, Jordan, Israel, and Palestine — has been an artery of migration between Africa and Asia for over 100,000 years. By 2,500 years ago, the seafaring Phoenicians of the central Levant, whose script gave rise to most modern alphabets, founded coastal colonies across the Mediterranean. In the centuries since the fall of Phoenicia to the first Persian Empire, the expansions of Islam and the Ottoman Empire have brought additional genetic diversity to the region. Today, large Jewish, Lebanese, and Syrian diasporas are found beyond the Levant, from Turkey to South America.

Malayali Subgroup: Home to the Malayali (meaning “people of the mountains”), Kerala has been at the heart of a thriving international spice trade for millennia, becoming one of India’s most diverse and prosperous states. This genetic signature reaches high levels among Christian communities who live in Kerala, a large number of whom immigrated to the United States during the last century.

Manchurian & Mongolian: The Manchurian and Mongolian population includes ethnolinguistic minorities like the Daur — who speak a language related to Mongolian — and the Oroqen, who speak a Tungusic language and live near the Amur River basin. These groups reside at the juncture of the Central Asian plains, boreal forests, and the Gobi Desert. Linguistically distinct but genetically similar, Mongolian and Manchurian peoples generally practice shamanism and Tibetan Buddhism.

Native American: The first humans to reach the New World populated much of North, Central, and South America within just a few thousand years following their arrival from northeast Asia around 15,000 years ago. Despite drastic population losses over the past 500 years as a result of exposure to Old World diseases and genocide at the hands of European colonizers, the genetic legacy of these early American trailblazers persists to this day, primarily in Central and South America.

Nigerian: Nigeria’s population is the largest in Africa and one of the most diverse, with over 250 ethnic groups. The country’s arid north is home to people of mostly Hausa and Fulani descent, while the Yoruba are concentrated in the southwest, the Ijaw in the tropical south, and the Igbo in the southeast. As much as two thirds of African-Americans’ Sub-Saharan DNA may trace back to Nigerian ancestors, due to the disproportionate impact of the Atlantic slave trade on the people of the region.

North African: Humans lived along the southern shores of the Mediterranean as early as 300,000 years ago, but the genetic heritage of most North African people today reflects a mixture of North African, southern European, western Asian, and Sub-Saharan ancestry. Today, indigenous North African ancestry peaks in the Berber people of the Maghreb, while the genetic legacy of the Arab conquest of North Africa and the 16th-century expansion of the Ottoman Empire can be found throughout the region as well.

Northern Indian & Pakistani: Today, around one-seventh of the world’s people live along or near the basins of the Indus and Ganges Rivers. Most northern Indian and Pakistani people speak Indo-European languages brought to the region from Central Asia around 4,000 years ago during the decline of the Indus Valley civilization. More recently, this region was home to a series of powerful empires, including the Sikh, Gupta, and Mughal empires.

Peninsular Arab: For over 100,000 years, humans have lived in the Arabian Peninsula — a bridge between Africa and the rest of the world. Around the same time as the rise of dynastic Egypt, a handful of Arabian civilizations and kingdoms emerged, facilitating trade between Africa and Eurasia. But it wasn’t until the birth of Islam in western Arabia that the Arabic language — along with an Arab-like genetic signature — spread across much of western Asia and North Africa. Today, the peninsula is home to over 75 million people and the world’s second largest subtropical desert.

Sardinian: Sardinians are outliers in the genetic landscape of Europe, thanks to the geographic isolation of their rugged island home off of mainland Italy. Over the centuries, Sardinians resisted assimilation by occupying forces and have managed to preserve a few unique traditions, including “Cantu a Tenore,” a haunting style of overtone singing practiced to this day.

Scandinavian: The people of Norway, Sweden, Denmark, and Iceland share a genetic heritage that dates back to the arrival of Scandinavia's first hunter-gatherers over 11,000 years ago, but later migrations of Stone Age farmers and Metal Age herders left a larger footprint on the region's modern genetic landscape. Germanic-speaking tribes developed from the metalworking societies of southern Scandinavia around 500 B.C.E., and by the late 8th century C.E., the Vikings had begun a centuries-long maritime expansion, establishing settlements from the Black Sea to North America.

Senegambian & Guinean: The people of Senegal, The Gambia, Guinea, and Guinea-Bissau share many traditions related to the history of powerful empires in the region. In The Gambia, the Mandinka people are the largest group, with historical roots along the Niger River basin, while the Wolof people form the majority in neighboring Senegal. In Guinea and Guinea-Bissau the Fulani people predominate, and may have subtle genetic links to North Africa or western Asia. In the 18th century, around 400,000 people from this region were enslaved and transported to the Americas; nearly 50,000 disembarked in the United States alone.

Siberian: Many ethnolinguistic groups call the northern reaches of Asia home. Among them are the Yukaghir, the Nganasan, and the Turkic-speaking Yakuts, who migrated North and East from southern Siberia between 700-900 years ago to escape encroaching raiders. Today, the Yakuts are a large ethnic minority in northeastern Siberia and share genetic similarities with other indigenous groups in the region including the Evenks, Evens, and Buryats. Indigenous Siberians are often well adapted to climate extremes, as they face some of the largest annual temperature fluctuations in the world.

Somali: While modern humans have lived in East Africa for over 200,000 years, ethnic Somalis living in Somalia, Eastern Ethiopia and Kenya trace much of their genetic heritage and social structure to 9th century migrations from the Arabian Peninsula. Almost all ethnic Somalis belong to one of five major patrilineal clans and this clan structure is integral to the cultural and political fabric of Somali society. Many Somalis immigrated to North America, Europe, or Western Asia in response to civil war in the twilight of the 20th century.

Southern East African: Within the last 3,000 years, metallurgy and agriculture arrived in Southern East Africa with the migration of Bantu-speaking peoples from the highlands of what is today Nigeria and Cameroon. The historical center of this Eastern Bantu migration lies in the African Great Lakes region that runs along the Western edge of Kenya and Tanzania. Today, the largest ethnic groups in Burundi, Kenya, Rwanda, Tanzania, and Uganda all speak Bantu languages.

Southern Indian & Sri Lankan: Humans first arrived in Sri Lanka and the southern states of India as early as 70,000 years ago. Within the past two millennia, southern India saw great Hindu kingdoms come and go, including the Chola and Chera Dynasties as well as Vijayanagar — whose capital, Hampi, was among the largest cities of the medieval world. This genetic signature may be related to the spread of Dravidian languages, although the majority of Sri Lankans now speak Sinhalese, an Indo-European language.

Southern Indian Subgroup: The marriage restrictions imposed by a millennia-old caste system in India have resulted in a unique genetic landscape. There are many genetic clusters within India formed by caste, including groups in both northern and southern India who identify as Brahmin. Of these many groups, we were able to identify a genetic signature that reaches high levels among people with ancestry from southern India who say they are Brahmin. This group, labeled “Southern Indian Subgroup,” was probably identified in our Ancestry Composition analysis because members of these communities migrated to the United States at higher rates than others and are therefore more genetically represented in the 23andMe customer database. In the future, we hope to identify additional genetic communities within India that are more representative of the population as our database grows.

Spanish & Portuguese: The genetic landscape of the Iberian Peninsula – represented today by the people of Spain and Portugal – was influenced by several Mediterranean civilizations, including 800 years of Arabic North African rule. Now, a small North African genetic signature is present in Spanish & Portuguese DNA, and over eight percent of Spanish words carry Arabic origins. Conquistadors from Portugal and Spain colonized parts of Africa, Oceania, and the Americas, and this ancestry is now relatively common in Latino peoples from Central and South America.

Sudanese: Sudan and South Sudan share a distinct genetic heritage dating to early agricultural civilizations, including the Nubian Kingdoms of Kush and Meroë that once flourished along the banks of the upper Nile. Today, the people of Sudan and South Sudan are ethnically diverse, following a long history of intermarriage between indigenous East Africans and migrants from the Arabian peninsula. However, this Arabian genetic legacy is less common in the south of the region.

Unassigned: There is a wide range of human diversity in the world, and sometimes our algorithm is unable to match a region of your DNA to a specific population with confidence. Individuals whose ancestors came from multiple continents and who mixed many generations ago typically see more “unassigned” ancestry in their Ancestry Composition. Individuals whose ancestors came from just one continent (or individuals whose ancestors intermixed more recently) typically see less “unassigned” ancestry.

Vietnamese: Present-day Vietnam was the cradle of one of the world's earliest civilizations, and one of the world's first regions to develop rice-based agriculture. A tropical country on the Indochinese Peninsula, Vietnam is bordered by China to the north and by Laos and Cambodia to the west. The country has 54 ethnic groups, the largest being the Kinh, who make up more than 85% of the population.

Cheers to being 100%

Ziping Liu

Remember, your 23andMe results are a living analysis of your DNA. Visit your reports online, and you may notice more refined results over time.

