

Your Ancestral Journey

The origin of our species lies in Africa: It's where we first evolved and where we've spent the majority of our time on Earth. We have since migrated to every corner of the globe, a journey that is written in our DNA.

With the sample you sent us, we ran a comprehensive analysis to identify thousands of genetic markers—breadcrumbs—in your DNA, which are passed down from generation to generation. By looking at the order in which these markers occurred over time, we can trace the journey of your ancestors out of Africa. Furthermore, with these markers we have created a human family tree. Everyone alive today falls on a particular branch of this family tree. We have examined your markers to determine which branch you belong to. The results of our analysis—your personal journey—are outlined below.

Your Regional Ancestry (500 Years to 10,000 Years Ago)

We are all more than the sum of our parts, but the results below offer some of the most dramatic and fascinating information in your Geno 2.0 test. In this section, we display your affiliations with a set of nine world regions. This information is determined from your entire genome so we're able to see both parents' information, going back six generations. Your percentages reflect both recent influences and ancient genetic patterns in your DNA due to migrations as groups from different regions mixed over thousands of years. Your ancestors also mixed with ancient, now extinct hominid cousins like Neanderthals in Europe and the Middle East or the Denisovans in Asia. If you have a very mixed background, the pattern can get complicated quickly! Use the reference population matches below to help understand your particular result.

What Your Results Mean

We compared your DNA results to the reference populations we currently have in our database and estimated which of these populations were most similar to you in terms of the genetic markers you carry. This doesn't necessarily mean that you belong to these groups, but that these groups were a similar genetic match, and can therefore be used as a guide to help determine why you have a

certain result. Remember, this is a mixture of recent (past six generations) and ancient patterns established over thousands of years, so you may see surprising matches. Read each of the population descriptions below to better interpret your particular results.

Your First Reference Population: German

This reference population is based on samples collected from people native to Germany. The dominant 46% Northern European component likely reflects the earliest settlers in Europe, hunter-gatherers who arrived there more than 35,000 years ago. The 36% Mediterranean and 17% Southwest Asian percentages probably arrived later, with the spread of agriculture from the Fertile Crescent in the Middle East over the past 10,000 years. As these early farmers moved into Europe, they spread their genetic patterns as well. Today, northern and central European populations retain links to both the earliest Europeans and these later migrants from the Middle East.

GERMAN	%	YOU	%
Northern European	46%	Northern European	44%
Mediterranean	36%	Mediterranean	35%
Southwest Asian	17%	Southwest Asian	19%

Your Second Reference Population: British (England)

This reference population is based on samples collected from populations in the United Kingdom. The dominant 49% Northern European component likely reflects the earliest settlers in Europe, hunter-gatherers who arrived there more than 35,000 years ago. The 33% Mediterranean and 17% Southwest Asian percentages arrived later, with the spread of agriculture from the Fertile Crescent in the Middle East, over the past 10,000 years. As these early farmers moved into Europe, they spread their genetic patterns as well. Today, northern European populations retain their links to both the earliest Europeans and these later migrants from the Middle East.

BRITISH (ENGLAND)	%	YOU	%
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Northern European	49%	Northern European	44%
Mediterranean	33%	Mediterranean	35%
Southwest Asian	17%	Southwest Asian	19%

Your Deep Ancestry (1,000 Years - 100,000 Years Ago)

Introduction to Your Story

We will now take you back through the stories of your distant ancestors and show how the movements of their descendants gave rise to your lineage.

Each segment on the map above represents the migratory path of successive groups that eventually coalesced to form your branch of the tree. We start with the marker for your oldest ancestor, and walk forward to more recent times, showing at each step the line of your ancestors who lived up to that point.

What is a marker? Each of us carries DNA that is a combination of genes passed from both our mother and father, giving us traits that range from eye color and height to athleticism and disease susceptibility. As part of this process, the Y-chromosome is passed directly from father to son, unchanged, from generation to generation down a purely male line. Mitochondrial DNA, on the other hand, is passed from mothers to their children, but only their daughters pass it on to the next generation. It traces a purely maternal line.

The DNA is passed on unchanged, unless a mutation—a random, naturally occurring, usually harmless change—occurs. The mutation, known as a marker, acts as a beacon; it can be mapped through generations because it will be passed down for thousands of years.

When geneticists identify such a marker, they try to figure out when it first occurred, and in which geographic region of the world. Each marker is essentially the beginning of a new lineage on the family tree of the human race. Tracking the lineages

provides a picture of how small tribes of modern humans in Africa tens of thousands of years ago diversified and spread to populate the world.

By looking at the markers you carry, we can trace your lineage, ancestor by ancestor, to reveal the path they traveled as they moved out of Africa. Our story begins with your earliest ancestor. Who were they, where did they live, and what is their story? Click "Next" to begin.

Branch: L3

Age: 67,000 Years Ago

Location of Origin: East Africa

This woman's descendants would eventually account for both out-of-Africa maternal lineages, significant population migrations in Africa, and even take part in the Atlantic Slave Trade related dispersals from Africa.

The common direct maternal ancestor to all women alive today was born in East Africa around 180,000 years ago. Dubbed "Mitochondrial Eve" by the popular press, she represents the root of the human family tree. Eve gave rise to two descendant lineages known as L0 and L1'2'3'4'5'6, characterized by a different set of genetic mutations their members carry.

Current genetic data indicates that indigenous people belonging to these groups are found exclusively in Africa. This means that, because all humans have a common female ancestor, and because the genetic data shows that Africans are the oldest groups on the planet, we know our species originated there.

Eventually, L1'2'3'4'5'6 gave rise to L3 in East Africa. It is a similar story: an individual underwent a mutation to her mitochondrial DNA, which was passed onto her children. The children were successful, and their descendants ultimately broke away from L1'2'3'4'5'6, eventually separating into a new group called L3.

While L3 individuals are found all over Africa, L3 is important for its movements north. Your L3 ancestors were significant because they are the first modern humans to have left Africa, representing the deepest branches of the tree found outside of that continent.

From there, members of this group went in a few different directions. Many stayed on in Africa, dispersing to the west and south. Some L3 lineages are predominant in many Bantu-speaking groups who originated in west-central Africa, later dispersing throughout the continent and spreading this L3 lineage from Mali to South Africa. Today, L3 is also found in many

African-Americans.

Other L3 individuals, your ancestors, kept moving northward, eventually leaving the African continent completely. These people gave rise to two important macro-haplogroups (M and N) that went on to populate the rest of the world.

Why would humans have first ventured out of the familiar African hunting grounds and into unexplored lands? It is likely that a fluctuation in climate may have provided the impetus for your ancestors' exodus out of Africa.

The African Ice Age was characterized by drought rather than by cold. Around 50,000 years ago the ice sheets of northern Europe began to melt, introducing a period of warmer temperatures and moister climate in Africa. Parts of the inhospitable Sahara briefly became habitable. As the drought-ridden desert changed to savanna, the animals your ancestors hunted expanded their range and began moving through the newly emerging green corridor of grasslands. Your nomadic ancestors followed the good weather and plentiful game northward across this Saharan Gateway, although the exact route they followed remains to be determined.

Point of Interest

The L branch is shared by all women alive today, both in Africa and around the world. The L3 branch is the major maternal branch from which all mitochondrial DNA lineages outside of Africa arose.

Branch: N

Age: About 60,000 Years Ago

Location of Origin: East Africa or Asia

Your next ancestor is the woman whose descendants formed haplogroup N. Haplogroup N comprises one of two groups that were created by the descendants of L3.

One of these two groups of individuals moved north rather than east and left the African continent across the Sinai Peninsula, in present-day Egypt. Also faced with the harsh desert conditions of the Sahara, these people likely followed the Nile basin, which would have proved a reliable water and food supply in spite of the surrounding desert and its frequent sandstorms.

Descendants of these migrants eventually formed haplogroup N. Early members of this group lived in the eastern Mediterranean region and western Asia, where they likely coexisted for a time with other hominids such as Neanderthals. Excavations in Israel's Kebara Cave (Mount Carmel) have unearthed Neanderthal skeletons as recent as 60,000 years old, indicating that there was both geographic and temporal overlap of these two hominids. This likely accounts for the presence of Neanderthal DNA in people living outside of Africa.

Some members bearing mutations specific to haplogroup N formed many groups of their own which went on to populate much of the rest of the globe. These descendants are found throughout Asia, Europe, India, and the Americas. However, because almost all of the mitochondrial lineages found in the Near East and Europe descend from N, it is considered a western Eurasian haplogroup.

After several thousand years in the Near East, members of your group began moving into unexplored nearby territories, following large herds of migrating game across vast plains. These groups broke into several directions and made their way into territories surrounding the Near East.

Today, haplogroup N individuals who headed west are prevalent in Turkey and the eastern Mediterranean, they are found further east in parts of Central Asia and the Indus Valley of Pakistan and India. And members of your haplogroup who headed north out of the Levant across the Caucasus Mountains have remained in southeastern Europe and the Balkans. Importantly, descendants of these people eventually went on to populate the rest of Europe, and today comprise the most frequent mitochondrial lineages found there.

Point of Interest

This line and its sister lineage are the only two founding lineages to expand out of Africa.

Notable People

Ann Curry of the Today Show belongs to this lineage.

Branch: R

Age: About 55,000 Years Ago

Location of Origin: West Asia

After several thousand years in the Near East, individuals belonging to a new group called haplogroup R began to move out and explore the surrounding areas. Some moved south, migrating back into northern Africa. Others went west across Anatolia (present-day Turkey) and north across the Caucasus Mountains of Georgia and southern Russia. Still others headed east into the Middle East, and on to Central Asia. All of these individuals had one thing in common: they shared a female ancestor from the N clan, a recent descendant of the migration out of Africa.

The story of haplogroup R is complicated, however, because these individuals can be found almost everywhere, and because their origin is quite ancient. In fact, the ancestor of haplogroup R lived relatively soon after humans moved out of Africa during the second wave, and her descendants undertook many of the same migrations as her own group, N.

Because the two groups lived side by side for thousands of years, it is likely that the migrations radiating out from the Near East comprised individuals from both of these groups. They simply moved together, bringing their N and R lineages to the same places around the same times. The tapestry of genetic lines became quickly entangled, and geneticists are currently working to unravel the different stories of haplogroups N and R, since they are found in many of the same far-reaching places.

Point of Interest

Descendants of this line dominate the European maternal landscape, making up 75 to 95 percent of the lineages there.

Branch: T

Age: About 25,000 Years Ago

Location of Origin: West Asia

Haplogroup T was a group of individuals who descended from a woman in the R branch of the tree. The divergent genetic lineage that constitutes haplogroup T indicates that these ancestors lived sometime around 25,000 years ago.

Haplogroup T has a very wide distribution, and is present as far east as the Indus Valley bordering India and Pakistan and as far

south as the Arabian Peninsula. It is also common in eastern and northern Europe. Although your haplogroup was present during the early and middle Upper Paleolithic, T is largely considered one of the main genetic signatures of the Neolithic expansions.

While groups of hunter-gatherers and subsistence fishermen had been occupying much of Eurasia for tens of thousands of years, around ten thousand years ago a group of modern humans living in the Fertile Crescent—present-day eastern Turkey and northern Syria—began domesticating the plants, nuts, and seeds they had been collecting. What resulted were the world's first agriculturalists, and this new cultural era is typically referred to as the Neolithic.

Groups of individuals able to support larger populations with this reliable food source began migrating out of the Middle East, bringing their new technology with them. By then, humans had already settled much of the surrounding areas, but this new agricultural technology proved too successful to ignore, and the surrounding groups quickly copied these new immigrants. Interestingly, DNA data indicate that while these new agriculturalists were incredibly successful at planting their technology in the surrounding groups, they were far less successful at planting their own genetic seed. Agriculture was quickly and widely adopted, but the lineages carried by these Neolithic expansions are found today at frequencies seldom greater than 20 percent in Europe, the Middle East, and Central Asia.

Point of Interest

Although part of the Paleolithic period, population geneticists use this branch as a marker of the Neolithic expansions that introduced farming to Eurasia.

Branch: T2

Age: About 19,000 Years Ago

Location of Origin: West Asia

This point in your maternal ancestors' journey began in West Asia. The woman who had the genetic markers for this point was born about 20,000 years ago at the end of the Paleolithic period. From West Asia, her descendants spread across Anatolia and into much of Europe.

Today, this line is present most often in Iraq, where it is around 21 percent of maternal lineages. It is 16 percent of the population in Croatia and about 11 percent of the population in Greece. It is around 15 percent of the population in Belgium, around 13 percent of the population in Denmark, and around 11 percent of the population in Switzerland. It is between 9 and 10 percent of maternal lineages in Bulgaria, the Czech Republic, Wales, and Tunisia.

Note: This branch is not accompanied by a major movement on the map, and research on this branch is continuing.

Notable People

Russian Emperor Nicholas II and American outlaw Jesse James belonged to this lineage.

Branch: T2b

Age: 10,100 ± 1,610 Years Ago

Location of Origin: West Asia

Born at the beginning of the Neolithic Revolution, this lineage likely originated in West Asia.

Today, it is present at the highest frequencies in Croatia (12 percent), Tunisia (9 percent), and Greece (5 percent). In Iran, it is about 4 percent of maternal lineages, and it is about 3 percent of maternal lineages in Armenia. It is also part of some Jewish Diaspora population groups. It is about 7 percent of the population in Bulgaria. Elsewhere in Europe, this line is around 6 percent of the population in Germany and around 5 percent of the population in the British Isles, France, and the Netherlands.

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Heatmap for T2b

This next step in your journey is a map showing the frequency of your haplogroup (or the closest haplogroup in your path that

we have frequency information for) in indigenous populations from around the world, providing a more detailed look at where your more recent ancestors settled in their migratory journey. What do we mean by recent? It's difficult to say, as it could vary from a few hundred years ago to a few thousand years ago depending on how much scientists currently know about your particular haplogroup. As we test more individuals and receive more information worldwide, this information will grow and change.

The colors on the map represent the percentage frequency of your haplogroup in populations from different geographic regions—red indicates high concentrations, and light yellow and grey indicate low concentrations. The geographic region with the highest frequency isn't necessarily the place where the haplogroup originated, although this is sometimes the case.

The map for T2b shows that it is widespread in Eurasia. It originated in the Middle East during the Neolithic, around 10,000 years ago, it was during the spread of agriculture during the Neolithic that this lineage became much more widespread. Today it is found at highest frequencies in parts eastern and Central Europe, and has a spotty distribution in Central Asia that is probably the result of the subsequent spread of East Asian lineages throughout the region by the Turks and Mongols, swamping out the older Neolithic patterns.

Does this mean you're related to people in the areas highlighted on your map? Distantly, yes! We are all connected through our ancient ancestry. In order for us to learn more ancestry information about where haplogroups settled in more recent times, please choose to contribute your results to science (check the checkbox during Login or from the Account Settings tab of your Profile), and fill out your ancestry information in the Profile section of the site. Also be sure to tell your own story in the Our Story section.

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branch of the tree. We start with the marker for your oldest ancestor, and walk forward to more recent times, showing at each step the line of your ancestors who lived up to that point.

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Branch: P305

Age: More than 100,000 years old

Location of Origin: Africa

The common direct paternal ancestor of all men alive today was born in Africa between 300,000 and 150,000 years ago. Dubbed “Y-chromosome Adam” by the popular press, he was neither the first human male nor the only man alive in his time. He was, though, the only male whose Y-chromosome lineage is still around today. All men, including your direct paternal ancestors, trace their ancestry to one of this man’s descendants. The oldest Y-chromosome lineages in existence, belonging to the A00 branch of the tree, are found only in African populations.

Around 100,000 years ago the mutation named P305 occurred in the Y chromosome of a man in Africa. This is one of the oldest known mutations that is not shared by all men. Therefore, it marks one of the early splits in the human Y-chromosome tree, which itself marks one of the earliest branching points in modern human evolution. The man who first carried this mutation lived in Africa and is the ancestor to more than 99.9% of paternal lineages today. In fact, men who do not carry this mutation are so rare that its importance in human history was discovered only in the past two years.

As P305-bearing populations migrated around the globe, they picked up additional markers on their Y chromosomes. Today, there are no known P305-bearing individuals without these additional markers.

Branch: M42

Age: About 80,000 Years Ago

Location of Origin: East Africa

Around 80,000 years ago, the BT branch of the Y-chromosome tree was born, defined by many genetic markers, including M42. The common ancestor of most men living today, some of this man's descendants would begin the journey out of Africa to the Middle East and India. Some small groups from this line would eventually reach the Americas, while other groups would settle in Europe, and some would remain near their ancestral homeland in Africa.

Individuals from this line whose ancestors stayed in Africa often practice cultural traditions that resemble those of the distant past. For example, they often live in traditional hunter-gatherer societies. These include the Mbuti and Biaka Pygmies of central Africa, as well as Tanzania's Hadza.

Point of Interest

The M42 branch is shared by almost all men alive today, both in Africa and around the world.

Branch: M168

Age: About 70,000 years ago

Location of Origin: East Africa

When humans left Africa, they migrated across the globe in a web of paths that spread out like the branches of a tree, each limb of migration identifiable by a marker in our DNA. For male lineages, the M168 branch was one of the first to leave the African homeland.

The man who gave rise to the first genetic marker in your lineage probably lived in northeast Africa in the region of the Rift Valley, perhaps in present-day Ethiopia, Kenya, or Tanzania. Scientists put the most likely date for when he lived at around 70,000 years ago. His descendants became the only lineage to survive outside of Africa, making him the common ancestor of every non-African man living today.

Your nomadic ancestors would have followed the good weather and the animals they hunted, although the exact route they followed remains to be determined. In addition to a favorable change in climate, around this same time there was a great leap forward in modern humans' intellectual capacity. Many scientists believe that the emergence of language gave us a huge advantage over other early humanlike species. Improved tools and weapons, the ability to plan ahead and cooperate with one another, and an increased capacity to exploit resources in ways we hadn't been able to earlier allowed modern humans to rapidly migrate to new territories, exploit new resources, and replace other hominids such as the Neanderthals.

Point of Interest

This male branch is one of the first to leave the African homeland.

Branch: P143

Age: About 60,000 years old

Location of Origin: Southwest Asia

This mutation is one of the oldest thought to have occurred outside of Africa and therefore marks a pivotal moment in the evolution of modern humans. Moving along the coastline, members of this lineage were some of the earliest settlers in Asia, Southeast Asia, and Australia.

But why would man have first ventured out of the familiar African hunting grounds and into unexplored lands? The first migrants likely ventured across the Bab-al Mandeb strait, a narrow body of water at the southern end of the Red Sea, crossing into the Arabian Peninsula and soon after developing mutation P143—perhaps 60,000 years ago. These beachcombers would make their way rapidly to India and Southeast Asia, following the coastline in a gradual march eastward. By 50,000 years ago, they had reached Australia. These were the ancestors of some of today's Australian Aborigines.

It is also likely that a fluctuation in climate may have contributed to your ancestors' exodus out of Africa. The African ice age was characterized by drought rather than by cold. Around 50,000 years ago, though, the ice sheets of the Northern Hemisphere began to melt, introducing a short period of warmer temperatures and moister climate in Africa and the Middle East. Parts of the inhospitable Sahara briefly became habitable. As the drought-ridden desert changed to a savanna, the animals hunted by your ancestors expanded their range and began moving through the newly emerging green corridor of grasslands.

Branch: M89

Age: About 55,000 Years Old

Location of Origin: Southwest Asia

The next male ancestor in your ancestral lineage is the man who gave rise to M89, a marker found in 90 to 95 percent of all non-Africans. This man was likely born around 55,000 years ago in Middle East.

While many of the descendants of M89 remained in the Middle East, others continued to follow the great herds of wild game through what is now modern-day Iran, then north to the Caucasus and the steppes of Central Asia. These semiarid, grass-covered plains would eventually form an ancient "superhighway" stretching from France to Korea. A smaller group continued moving north from the Middle East to Anatolia and the Balkans, trading familiar grasslands for forests and high country.

Branch: M578

Age: About 50,000 Years Old

Location of Origin: Southwest Asia

After settling in Southwest Asia for several millennia, humans began to expand in various directions, including east and south around the Indian Ocean, but also north toward Anatolia and the Black and Caspian Seas. The first man to acquire mutation M578 was among those that stayed in Southwest Asia before moving on.

Fast-forwarding to about 40,000 years ago, the climate shifted once again and became colder and more arid. Drought hit Africa and the Middle East and the grasslands reverted to desert, and for the next 20,000 years, the Saharan Gateway was effectively closed. With the desert impassable, your ancestors had two options: remain in the Middle East, or move on. Retreat back to the home continent was not an option.

Branch: M170

Age: About 20,000 Years Ago

Location of Origin: Europe

When the last glacial maximum ended, groups containing men from this line migrated across Europe from refugia near the Balkans.

Branch: M423

Age: 5,250 – 12,500 Years Ago

Location of Origin: Europe

With the population boom triggered by the Neolithic Revolution, groups containing this lineage expanded across Europe and

to the southern borders between Europe and West Asia.

Today, geneticists have found this lineage most often in Bosnia and Herzegovina (22 percent), Serbia (21 percent), and Croatia (6 percent). It is around 5 percent of male lineages in Slovenia, Bulgaria, and Macedonia. It is between 1 and 2 percent of the male population in Ukraine, Austria, Poland, Hungary, the Czech Republic, and Greece. Elsewhere in Europe, it is present in trace frequencies of less than 1 percent.

Note: This branch is not accompanied by a major movement on the map, and research on this branch is continuing.

Branch: L161

Age: To Be Determined

Location of Origin: Europe

Groups containing members of this lineage traveled north from Spain. They settled as they traveled.

Today, geneticists have found the lineage in Western and Central European populations at frequencies under 1 percent. It is present most often in Ireland, where it is 1 in 200 male lineages.

Note: This branch is not accompanied by a major movement on the map, and research on this branch is continuing.

Heatmap for M423

A heat map for your specific haplogroup is not yet available. We hope that as more people from around the world participate in the project we will be able to create a more specific map. We're showing you a heat map for an earlier branch in your path:

M423

This next step in your journey is a map showing the frequency of your haplogroup (or the closest haplogroup in your path that we have frequency information for) in indigenous populations from around the world, providing a more detailed look at where some of your more recent ancestors settled in their migratory journey. What do we mean by recent? It's difficult to say, as it

could vary from a few hundred years ago to a few thousand years ago, depending on how much scientists currently know about your particular haplogroup. As we test more individuals and receive more information worldwide, this information will grow and change.

The colors on the map represent the varying percentage frequencies of your haplogroup in populations from different geographic regions—red indicates high concentrations, and light yellow and grey indicate low concentrations. The geographic region with the highest frequency isn't necessarily the place where the haplogroup originated, although this is sometimes the case.

You may find that your map shows a wide distribution for your haplogroup, with large portions of the world highlighted, or unusual places far from where you live. Does this mean you're related to people in all of those places? Distantly, yes! We are all connected through our ancient ancestry.

In order for us to learn more ancestry information about where haplogroups settled in more recent times, please choose to contribute your results to science (check the checkbox during Login or from the Account Settings tab of your Profile), and fill out your ancestry information in the Profile section of the site. Also be sure to tell your own story in the Our Story section.

Your Hominin Ancestry (50,000 Years Ago and Older)

Your Hominin Ancestry



2.2%



1.8%
DENISOVAN

NEANDERTHAL