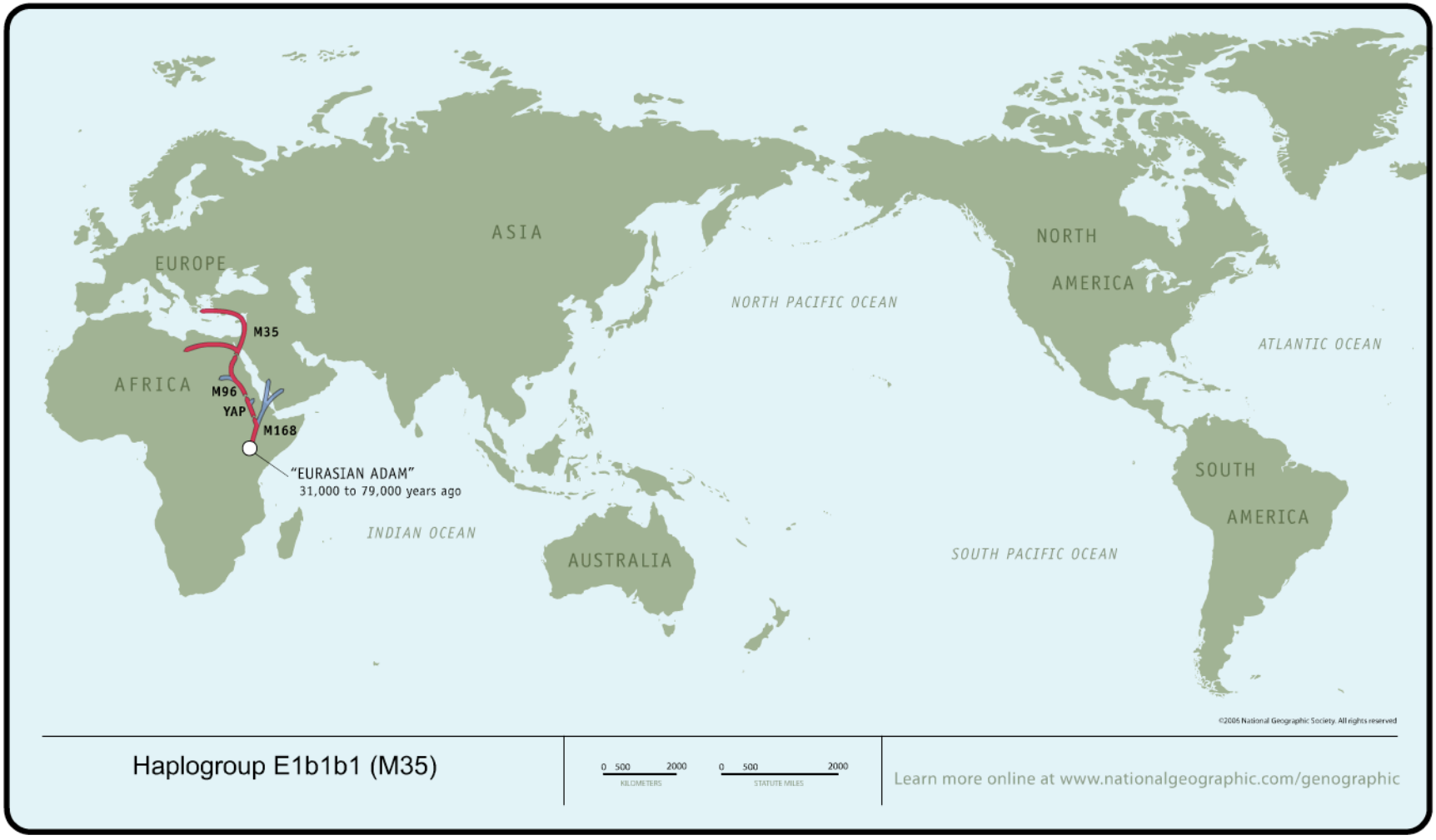
THE GENOGRAPHIC PROJECT

MIGRATION ROUTES: LOUIS F. DELL'OSSO



Haplogroup E1b1b1 (M35)

0 500 2000 KILOMETERS

0 500 2000 STATUTE MILES

Learn more online at www.nationalgeographic.com/genographic

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Certificate of Y-chromosome DNA testing

In recognition of your participation in the Genographic Project, we hereby certify that

LOUIS F. DELL'OSSO

belongs to:

Haplogroup E1b1b1 (M35)

The designations for all twelve loci examined for this purpose are listed here, along with the Short Tandem Repeats (STRs) outcome for each.

393	19	391	439	389-1	389-2	388	390	426	385a	385b	392
13	13	10	12	13	18	12	25	11	16	18	11

May 22, 2010

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Haplogroup E1b1b1 (M35)

Your Y-chromosome results identify you as a member of **haplogroup *E1b1b1 (M35)***.

The genetic markers that define your ancestral history reach back roughly 60,000 years to the first common marker of all non-African men, *M168,* and follow your lineage to present day, ending with *M35,* the defining marker of haplogroup *E1b1b1.*

If you look at the map highlighting your ancestors' route, you will see that members of haplogroup *E1b1b1* carry the following Y-chromosome markers:

M168 > ***YAP*** > ***M96*** > *P147* > *P177* > *P2* > *M215* > ***M35***

(Less is known about some markers than others. What is known about your journey is reflected below.)

Today, the *E1b1b1* line of descent is most heavily represented in Mediterranean populations. Approximately 10 percent of the men in Spain belong to this haplogroup, as do 12 percent of the men in northern Italy, and 13 percent of the men in central and southern Italy. Roughly 20 percent of the men in Sicily belong to this group. In the Balkans and Greece, between 20 to 30 percent of the men belong to *E1b1b1*, as do nearly 75 percent of the men in North Africa. The haplogroup is rarely found in India or East Asia. Around 10 percent of all European men trace their descent to this line. For example, in Ireland, 3 to 4 percent of the men belong; in England, 4 to 5 percent; Hungary, 7 percent; and Poland, 8 to 9 percent. Nearly 25 percent of Jewish men belong to this haplogroup.

What's a haplogroup, and why do geneticists concentrate on the Y-chromosome in their search for markers? For that matter, what's 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. One exception is the Y-chromosome, which is passed directly from father to son, unchanged, from generation to generation.

Unchanged, that is 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 from the man in whom it occurred to his sons, their sons, and every male in his family for thousands of years.

In some instances there may be more than one mutational event that defines a particular branch on the tree. What this means is that any of these markers can be used to determine your particular haplogroup, since every individual who has one of these markers also has the others.

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.

A haplogroup is defined by a series of markers that are shared by other men who carry the same random mutations. The markers trace the path your ancestors took as they moved out of Africa. It's difficult to know how many men worldwide belong to any particular haplogroup, or even how many haplogroups there are, because scientists simply don't have enough data yet.

One of the goals of the five-year Genographic Project is to build a large enough database of anthropological genetic data to answer some of these questions. To achieve this, project team members are traveling to all corners of the world to collect more than 100,000 DNA samples from indigenous populations. In addition, we encourage you to contribute your anonymous results to the project database, helping our geneticists reveal more of the answers to our ancient past.

Keep checking these pages; as more information is received, more may be learned about your own genetic history.

Your Ancestral Journey: What We Know Now

***M168*: Your Earliest Ancestor**

Fast Facts

Time of Emergence: Roughly 50,000 years ago

Place of Origin: Africa

Climate: Temporary retreat of Ice Age; Africa moves from drought to warmer temperatures and moister conditions

Estimated Number of *Homo sapiens*: Approximately 10,000

Tools and Skills: Stone tools; earliest evidence of art and advanced conceptual skills

Skeletal and archaeological evidence suggest that anatomically modern humans evolved in Africa around 200,000 years ago, and began moving out of Africa to colonize the rest of the world around 60,000 years ago.

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, some 31,000 to 79,000 years ago. Scientists put the most likely date for when he lived at around 50,000 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.

But why would man 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. It was around 50,000 years ago that 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 a savanna, the animals hunted by your ancestors expanded their range and began moving through the newly emerging green corridor of grasslands. Your nomadic ancestors 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 human 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, all allowed modern humans to rapidly migrate to new territories, exploit new resources, and replace other hominids.

***YAP*: An Ancient Mutation**

Fast Facts

Time of Emergence: Roughly 50,000 years ago

Place of Origin: Africa

Climate: Temporary retreat of Ice Age; Africa moves from drought to warmer temperatures and moister conditions

Estimated Number of *Homo sapiens*: Approximately 10,000

Tools/Skills: Stone tools; earliest evidence of art and advanced conceptual skills

Sub-Saharan populations living today are characterized by one of three distinct Y-chromosome branches on the human tree. Your paternal lineage falls under one of these ancient branches and is referred to by geneticists as *YAP*.

YAP occurred around northeast Africa and is the most common of the three ancient genetic branches found in sub-Saharan Africa. It is characterized by a mutational event known as an Alu insertion, a 300-nucleotide fragment of DNA which, on rare occasion, gets inserted into different parts of the human genome during cell replication.

A man living around 50,000 years ago, your distant ancestor, acquired this fragment on his Y-chromosome and passed it on to his descendants. Over time this lineage split into two distinct groups. One is found primarily in Africa and the Mediterranean is defined by marker *M96*. The other group is found in Asia and defined by the *M174* mutation.

Your genetic lineage lies within the group that remained close to home, and was carried by men who likely played an integral role in recent cultural and migratory events within Africa.

***M96*: Moving Out of Africa**

Fast Facts

Time of Emergence: 30,000 to 40,000 years ago

Place of Origin: Africa

Climate: Dry Ice Age

Estimated Number of *Homo sapiens*: Tens of thousands

Tools/Skills: Upper Paleolithic

The next man in your ancestral lineage was born around 30,000 to 40,000 years ago in northeast Africa and gave rise to marker *M96*. The origins of *M96* are unclear; further data may shed light on the precise origin of this lineage.

What is known is that there were two great waves of migration out of Africa. The first small groups of people left around 60,000 years ago and followed a coastal route that eventually reached Australia. The second exodus occurred beginning around 50,000 years ago, heading north. The bulk of these travelers were descendants of a man born with marker *M89*, a group we'll call the Middle Eastern Clan. Some 90 to 95 percent of all non-Africans today are descendants of the Middle Eastern Clan.

You are descended from an ancient African lineage that chose to move north into the Middle East. Your kinsmen may have accompanied the Middle Eastern Clan as they followed the great herds of large mammals north through the grassy plains and savannas of the Sahara gateway.

Alternatively, a group of your ancestors may have undertaken their own migration at a later date, following the same route previously traveled by the Middle Eastern Clan peoples.

Beginning about 40,000 years ago, the climate shifted once again and became colder and more arid. Drought hit Africa and the grasslands reverted to desert; 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.

***M35*: Neolithic Farmers**

Fast Facts

Time of Emergence: 20,000 years ago

Place of Origin: Middle East

Climate: Ice Age

Estimated Number of *Homo sapiens*: Hundreds of thousands

Estimated Number of *Homo sapiens*: Hundreds of thousands

Tools/Skills: Upper Paleolithic-Neolithic

The final common ancestor in your haplogroup, the man who gave rise to marker *M35*, was born around 20,000 years ago in the Middle East. His descendants were among the first farmers and helped spread agriculture from the Middle East into the Mediterranean region.

At the end of the last ice age around 10,000 years ago, the climate changed once again and became more conducive to plant production. This probably helped spur the Neolithic Revolution, the point at which the human way of living changed from nomadic hunter-gatherers to settled agriculturists.

The early farming successes in the Fertile Crescent of the Middle East beginning around 8,000 years ago spawned population booms and encouraged migration throughout much of the Mediterranean world.

Control over their food supply marks a major turning point for the human species. Rather than small clans of 30 to 50 people who were highly mobile and informally organized, agriculture brought the first trappings of civilization. Occupying a single territory required more complex social organization, moving from the kinship ties of a small tribe to the more elaborate relations of a larger community. It spurred trade, writing, calendars, and pioneered the rise of modern sedentary communities and cities.

These ancient farmers, your ancestors, helped bring the Neolithic Revolution into the Mediterranean.

This is where your genetic trail, as we know it today, ends. However, be sure to revisit these pages. As additional data are collected and analyzed, more will be learned about your place in the history of the men and women who first populated the Earth. We will be updating these stories throughout the life of the project.