

Genetics Project

During the 2006 reunion the HFA discussed how genetics could be used in genealogical research. This is more than just a simple paternity test. This is using genetics to determine a family connection over many generations.

Currently we use official records to determine most family connections. This approach is very reliable, especially when full names, dates, places of the parties involved are known and the appropriate records exist.

But what do you do when the records don't exist? What if the name is spelled slightly different but everything else seems to fall in place?

It turns out that DNA testing, specifically Y-DNA, is extremely reliable in proving family connections for men. This is because the Y chromosome is passed unaltered from one male to another. Women do not get this chromosome, and as a result MtDNA testing for women is less reliable and much more difficult.

So how can DNA testing be used by the HFA? Consider the following:

- We have always wondered whether William (1.1) was a son of Simon, perhaps thru an earlier marriage, or a cousin or nephew. Testing descendants of William and comparing their DNA to the DNA of the descendants of Christopher (1.2), Simon (1.3) or Thomas (1.4) should answer his question.
- Comparing the DNA of people in Appendix A and C (supposed descendants of Simon who cannot prove their connection) to the DNA of the descendants of Simon may help in determining where they fit in our family tree.
- Comparing the DNA of the descendants of Simon to the DNA of other male Huntingtons in England may help in identifying Simon's ancestry in England. This would require the English Huntingtons to have a proven pedigree back prior to Simon's as well as have lived in the same area as Simon.
- Some people who have a variation of the Huntington surname (e.g., Hunnington, Huntingdon, Huntingtonne, etc.) may have strong evidence they are descended from Simon. Comparing their DNA to the DNA of the descendants of Simon could help prove their connection.

The genetic test is simple. A test kit will be provided by the HFA to the participants. A cotton swab is used to obtain a saliva sample. The sample is sent to a lab where the results are compiled. There is no blood and no pain.

Our initial plan was to test two males from each of the four sons bearing the Huntington surname using a Y-DNA test. All subjects must be the same generation from Simon, but no closer than 5 generations to each other. We also planned to do one MtDNA test. Our primary goal was to determine the accuracy of the genetic test by comparing the relationship indicated by the test results to the known relationship based on our records. Our second goal is to determine the proper place of William in our family tree.

Further testing with members of Appendix A and C may be pursued once we complete the initial testing.

There are many questions one can ask. Can a DNA test be used to determine someone's family connection? Can it accurately determine a common ancestor? Can it accurately determine the number of generations back to that common ancestor? Is this data supported by our existing family records? Do I need a genetics scientist to interpret these results?

In 2007 we worked on selecting a service to do our genetic test. We have learned a few things in the process of talking to various companies. It seems the Y-Chromosome test cannot be used to identify a person's exact place in the family tree. It can be used to show people are closely related, but cannot state how many generations apart they are.

To test this, and to evaluate the service offerings from three popular DNA testing organizations, Greg Huntington (HFA President) and Charles Huntington Jr. (HFA Secretary-Treasurer) purchased DNA Test Kits from the following organizations:

- DNA Heritage
- Ancestry.com
- National Geographic Society (NGS)

To improve our odds of measuring the accuracy of DNA testing we chose only the Y-DNA test as it is deemed the most accurate. As a result only men bearing the surname Huntington can participate in this test. Both DNA Heritage and Ancestry.com offered 43 marker tests. The more markers the more accurate the results. At the time of the test the 43 marker test was the most accurate. DNA Heritage subsequently came out with a 58 marker test. NGS offers only a 12 marker test.

The test kits are pretty much the same. You get a couple vials and cotton swabs. You scrape the inside of your cheeks/lips with the swabs and then place them in the vials. Multiple samples are taken in case one sample doesn't have enough DNA. It is simple, painless, and quick. The vials are sealed in a prepaid addressed envelope and sent to a test lab. Your results are available online in anywhere from two to eight weeks.

Greg and Chuck posted their DNA results on the ancestry.com web site so it they could be compared to other DNA test results. We discovered Richard L. Huntington had posted his results there as well. The family ids for the three Huntingtons are:

Charles A. Huntington Jr.	1.3.10.2.3.6.3.11.1.1.1
Gregory G. Huntington	1.3.6.2.1.5.1.4.3.1.3.3.4
Richard L. Huntington	1.4.1.2.1.3.1.1.2.3.3

Greg and Chuck share a common ancestor (1.3) ten generations ago for Chuck and twelve generations ago for Greg. The only ancestor all three share is Simon the immigrant. Greg and Chuck have one genetic marker different and both have two genetic markers different from Richard. This may make sense given Richard is a 1.4 and both Greg and Chuck are 1.3. Yet the Ancestry.com site says all three have a common ancestor 6 generations ago. This is the one part of the test we were hoping would be accurate enough to use to connect families.

Although our initial test is disappointing, we feel it is worth conducting a few additional tests to see if we get consistent results. We also want to use this as an opportunity to continue to learn about what genetics offer the genealogist. Perhaps we can have a professional review our results.

We hope to enlist about six volunteers to provide DNA samples using only one testing organization. Once these additional tests are completed and the results assessed we can determine if the tests have any value establishing family connections. Our long term plan is to collect enough DNA samples from Huntington family members so anyone who wishes to prove a relationship to our family can prove a genetic connection, even if it does not show the exact place in our family tree. We will need significant participation by our oldest living Huntingtons as they represent our furthest reach back in our genetic tree.

The following is the report from Ancestry.com that accompanied our DNA test results. The report below should be applicable to any Huntington descended from one of the four sons of Simon.



YOUR GENETIC HISTORY

Your Y-chromosome results identify you as a member of **haplogroup R1b, M343 (Subclade R1b1b2, M269)**.

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 M343, the defining marker of Haplogroup R1b.

If you look at the map highlighting your ancestors' route, you will see that members of haplogroup R1b carry the following Ychromosome markers:

M168 > P143 > M89 > L15 > M9 > M45 > M207 > M173 > M343

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

Today, roughly 70 percent of the men in southern England belong to haplogroup R1b. In parts of Spain and Ireland, that number exceeds 90 percent.

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. This means 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.

Your Ancestral Journey: What We Know Now

M168: Your Earliest Ancestor

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.

M89: Moving Through the Middle East

Time of Emergence: 45,000 years ago
Place: Northern Africa or the Middle East
Climate: Middle East: Semiarid grass plains
Estimated Number of Homo sapiens: Tens of thousands
Tools and Skills: Stone, ivory, wood tools

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 born around 45,000 years ago in northern Africa or the Middle East.

The first people to leave Africa likely followed a coastal route that eventually ended in Australia. Your ancestors followed the expanding grasslands and plentiful game to the Middle East and beyond, and were part of the second great wave of migration out of Africa.

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, 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.

While many of the descendants of M89 remained in the Middle East, others continued to follow the great herds of buffalo, antelope, woolly mammoths, and other game through what is now modern-day Iran to the vast steppes of Central Asia.

These semiarid grass-covered plains formed an ancient "superhighway" stretching from eastern France to Korea. Your ancestors, having migrated north out of Africa into the Middle East, then traveled both east and west along this Central Asian superhighway. A smaller group continued moving north from the Middle East to Anatolia and the Balkans, trading familiar grasslands for forests and high country.

M9: The Eurasian Clan Spreads Wide and Far

Time of Emergence: 40,000 years ago
Place: Iran or southern Central Asia
Estimated Number of Homo sapiens: Tens of thousands
Tools and Skills: Upper Paleolithic

Your next ancestor, a man born around 40,000 years ago in Iran or southern Central Asia, gave rise to a genetic marker known as M9, which marked a new lineage diverging from the M89 Middle Eastern Clan. His descendants, of which you are one, spent the next 30,000 years populating much of the planet.

This large lineage, known as the Eurasian Clan, dispersed gradually over thousands of years. Seasoned hunters followed the herds ever eastward, along the vast super highway of Eurasian steppe. Eventually their path was blocked by the massive mountain ranges of south Central Asia—the Hindu Kush, the Tian Shan, and the Himalayas.

The three mountain ranges meet in a region known as the "Pamir Knot," located in present-day Tajikistan. Here the tribes of hunters split into two groups. Some moved north into Central Asia, others moved south into what is now Pakistan and the Indian subcontinent.

These different migration routes through the Pamir Knot region gave rise to separate lineages.

Most people native to the Northern Hemisphere trace their roots to the Eurasian Clan. Nearly all North Americans and East Asians are descended from the man described above, as are most Europeans and many Indians.

M45: The Journey Through Central Asia

Time of Emergence: 35,000
Place of Origin: Central Asia
Climate: Glaciers expanding over much of Europe
Estimated Number of Homo sapiens: Approximately 100,000
Tools and Skills: Upper Paleolithic

The next marker of your genetic heritage, M45, arose around 35,000 years ago, in a man born in Central Asia. He was part of the M9 Eurasian Clan that had moved to the north of the mountainous Hindu Kush and onto the game-rich steppes of present-day Kazakhstan, Uzbekistan, and southern Siberia.

Although big game was plentiful, the environment on the Eurasian steppes became increasing hostile as the glaciers of the Ice Age began to expand once again. The reduction in rainfall may have induced desertlike conditions on the southern steppes, forcing your ancestors to follow the herds of game north.

To exist in such harsh conditions, they learned to build portable animal-skin shelters and to create weaponry and hunting techniques that would prove successful against the much larger animals they encountered in the colder climates. They compensated for the lack of stone they traditionally used to make weapons by developing smaller points and blades—microliths—that could be mounted to bone or wood handles and used effectively. Their tool kit also included bone needles for sewing animal-skin clothing that would both keep them warm and allow them the range of movement needed to hunt the reindeer and mammoth that kept them fed.

Your ancestors' resourcefulness and ability to adapt was critical to survival during the last ice age in Siberia, a region where no other hominid species is known to have lived.

The M45 Central Asian Clan gave rise to many more; the man who was its source is the common ancestor of most Europeans and nearly all Native American men.

M207: Leaving Central Asia

Time of Emergence: 30,000
Place of Origin: Central Asia
Climate: Glaciers expanding over much of Europe and western Eurasia
Estimated Number of Homo sapiens: Approximately 100,000
Tools and Skills: Upper Paleolithic

After spending considerable time in Central Asia, refining skills to survive in harsh new conditions and exploit new resources, a group from the Central Asian Clan began to head west towards the European subcontinent.

An individual in this clan carried the new M207 mutation on his Y chromosome. His descendants ultimately split into two distinct groups, with one continuing onto the European subcontinent, and the other group turning south and eventually making it as far as India.

Your lineage falls within the first group, M173, and gave rise to the first modern humans to move into Europe and eventually colonize the continent.

M173: Colonizing Europe—The First Modern Europeans

Time of Emergence: Around 30,000 years ago
Place: Central Asia
Climate: Ice Age
Estimated Number of Homo sapiens: Approximately 100,000
Tools and Skills: Upper Paleolithic

As your ancestors continued to move west, a man born around 30,000 years ago in Central Asia gave rise to a lineage defined by the genetic marker M173. His descendants were part of the first large wave of humans to reach Europe.

During this period, the Eurasian steppelands extended from present-day Germany, and possibly France, to Korea and China. The climate fostered a land rich in resources and opened a window into Europe.

Your ancestors' arrival in Europe heralded the end of the era of the Neandertals, a hominid species that inhabited Europe and parts of western Asia from about 29,000 to 230,000 years ago. Better communication skills, weapons, and resourcefulness probably enabled your ancestors to outcompete Neandertals for scarce resources.

This wave of migration into Western Europe marked the appearance and spread of what archaeologists call the Aurignacian culture. The culture is distinguished by significant innovations in methods of manufacturing tools, more standardization of tools, and a broader set of tool types, such as end-scrapers for preparing animal skins and tools for woodworking.

In addition to stone, the first modern humans to reach Europe used bone, ivory, antler, and shells as part of their tool kit. Bracelets and pendants made of shells, teeth, ivory, and carved bone appear at many sites. Jewelry, often an indication of status, suggests a more complex social organization was beginning to develop.

The large number of archaeological sites found in Europe from around 30,000 years ago indicates that there was an increase in population size.

Around 20,000 years ago, the climate window shut again, and expanding ice sheets forced your ancestors to move south to Spain, Italy, and the Balkans. As the ice retreated and temperatures became warmer, beginning about 12,000 years ago, many descendants of M173 moved north again to repopulate places that had become inhospitable during the Ice Age.

Not surprisingly, today the number of descendants of the man who gave rise to marker M173 remains very high in Western Europe. It is particularly concentrated in northern France and the British Isles where it was carried by ancestors who had weathered the Ice Age in Spain.

M343: Direct Descendants of Cro-Magnon

Time of Emergence: Around 30,000 years ago
Place of Origin: Western Europe
Climate: Ice sheets continuing to creep down Northern Europe
Estimated Number of Homo sapiens:
Tools and Skills: Upper Paleolithic

Around 30,000 years ago, a descendant of the clan making its way into Europe gave rise to marker M343, the defining marker of your haplogroup. You are a direct descendent of the people who dominated the human expansion into Europe, the Cro-Magnon.

The Cro-Magnon are responsible for the famous cave paintings found in southern France. These spectacular paintings provide archaeological evidence that there was a sudden blossoming of artistic skills as your ancestors moved into Europe. Prior to this, artistic endeavors were mostly comprised of jewelry made of shell, bone, and ivory; primitive musical instruments; and stone carvings.

The cave paintings of the Cro-Magnon depict animals like bison, deer, rhinoceroses, and horses, and natural events important to Paleolithic life such as spring molting, hunting, and pregnancy. The paintings are far more intricate, detailed, and colorful than anything seen prior to this period.

Your ancestors knew how to make woven clothing using the natural fibers of plants, and had relatively advanced tools of stone, bone, and ivory. Their jewelry, carvings, and intricate, colorful cave paintings bear witness to the Cro-Magnons' advanced culture during the last glacial age.

This is where your genetic trail, as we know it today, ends.