



DNA Ancestry Portrait™



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Your DNA Ancestry Portrait Explained

Thank you for purchasing your DNA Ancestry Portrait from DNA 11. Be prepared - your Portrait is the ultimate conversation piece, so this booklet will provide you with the knowledge to explain it deeper to friends and family.

The world of genomics will have an ever-increasing impact on our lives over the coming century. Just as art depicts particular eras in time, your DNA Ancestry Portrait will capture a period of time when humans started to unravel the very code of our existence – Our DNA.



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BACKGROUND

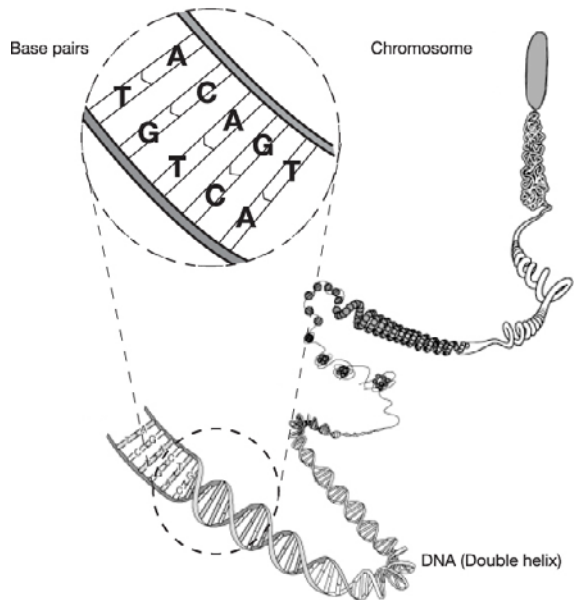
What is DNA?

Your story started when 23 chromosomes from your father and 23 chromosomes from your mother came together to create a cell which had all the information and instructions on how to create you. This one cell turned into 50 trillion cells, and almost every one of them contained the complete set of instructions for making you. This set of instructions, are coded in your DNA, which acts as your body's blueprint. DNA, which stands for Deoxyribonucleic Acid, is a long molecule made up of interlocking building blocks, called bases, that are referred to by the four letters in the DNA alphabet, A, T, C, G. So, just as software is a string of 0's and 1's, DNA is a string of A's, T's, C's and G's.

What is A,T,C and G?

A, T, C and G stands for Adenine, Thymine, Cytosine and Guanine. They are the base building blocks of DNA, called nucleotides. These bases are attached to one another to form a chain. Two of these chains are subsequently bonded together to create a double helix. A rule for how these two chains bond together is always followed: A's always bond with T's and C's always bond with G's.

Interesting Fact: the 11 in DNA 11 represents the two complementary strands of DNA in a double helix.



What are chromosomes?

The very long molecule of DNA in your cells are organized into small, highly packed units called chromosomes. Imagine very long strings of yarn, coiled around each other over and over again, to create a very highly compact shape to easily pack in a box. Humans have a total of 46 chromosomes, 23 pairs. Elephants have 56 (28 pairs) and chickens have 78 (39 pairs) – so it doesn't mean that the more complex of an organism you are the more chromosomes you have.

What are genes?

Chromosomes are broken down into short segments of DNA or units called genes. These units, contain a particular set of instructions, usually to create specific proteins. So, for example, if you have black hair, your genes are telling your hairs cells to produce more Eumelanin, one of the pigments which causes darker colored hair.

What are proteins?

Proteins are the product of genes. While there are 20 to 30 thousand genes, there are over 2 million proteins! So if the genes are looked at as the blueprint, the proteins are looked at as the actual end result - the building! Proteins are large complex molecules, which play many critical roles in the body. They do most of the work in our cells and regulate pretty much everything from a cell's structure to function.



What is Mitochondrial DNA:

Although most DNA is packaged as chromosomes in the nucleus of cells (described earlier), a group of molecular organelles called mitochondria have small amounts of their own DNA called Mitochondrial DNA (mtDNA). Each cell contains hundreds of thousands of mitochondria, whose primary use is to produce energy. Mitochondria is passed on by your mother, and the DNA remains unchanged, which lends itself well to ancestry studies (see figure 1 for structure of mtDNA)

What is DNA Ancestry?

DNA Ancestry is the application of genetics to traditional genealogy – also known as genetic genealogy. By using different types of genetic tests, we can establish the level of genetic relation between individuals and determine peoples' ancestral roots from tens of thousands of years ago.

How can ancestral roots be traced through DNA?

DNA studies have shown that we all share common ancestors who lived in Africa 50,000 to 200,000 years ago, and then migrated to other parts of the world. Over time, small changes occurred in their DNA that can be linked to a specific time and place in history. By analyzing specific areas of our DNA, we can determine linkages to specific groups and decipher the migration patterns of our ancestors.



How can Ancestry be determined by DNA Analysis?

DNA Ancestry is determined by analyzing two types of DNA – both of which remain unchanged when passed on from parents to child.

The first type is mtDNA (explained earlier), which is passed on by your mother. By studying a section of your mtDNA called Hypervariable Region 1 (HVR1), small sequence variations can be identified – the combination of which can place an individual into a specific mtDNA Haplogroup. This type of analysis determines your matrilineal or mother-line ancestry; in other words, where your mother's roots lie, where her mother's roots lie and so on. This is the type of DNA Ancestry test DNA 11 offers for its portraits as it can be used on both genders.

The second type of DNA Ancestry test is called Y-DNA analysis, which is based on the Y chromosome. This chromosome is only present in males and is passed on by your father. DNA 11 does not currently use this test as women would require their father's or brother's DNA sample in order to conduct this test.

However, if you have Y-DNA test results available, we can create a custom DNA Ancestry Portrait based on that data. Please email us for more information at art@dna11.com.

What is a Haplogroup?

A Haplogroup is defined as a group of Homo-Sapiens that share early migration patterns, usually associated with a geographic region. To better understand it, you can imagine a tree with several branches. The branches represent the different haplogroups, all originating from one base trunk.


MtDNA tests provide the ability to put humans in specific maternal haplogroups by analyzing sequence information and looking for similarities in that sequence.

What gets tested in your mtDNA to determine your haplogroup?

The sequence of your HVR1 DNA is compared to a reference sequence called the Cambridge Reference Sequence (CRS). The CRS is the first human mitochondrial DNA ever sequenced (belonging to a male European of Haplogroup H2A2), and the HVR1 area are the bases between position 16,000 and 16,569.

(see figure 1).

Structure of Mitochondrial DNA

 D-Loop (contains HVR1 and HVR2, does not contain functional genes)

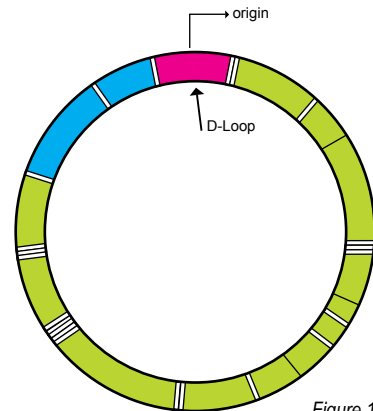
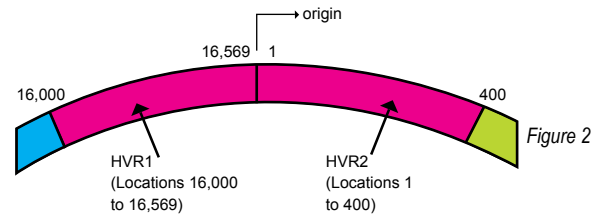


Figure 1



When compared to the CRS, deviations in your DNA are outlined as raw sequence data, which can be summarized into a series of numbers and letters. The number represents the position of your deviation or could be considered “the address” (between 16,000 and 16,569) when compared to the CRS – (See Figure 2). The letters represent the base that you have in that position that differs from the CRS.



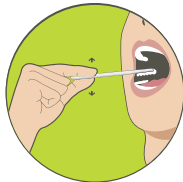
Example of Raw Data

Sample #	Deviation 1	Deviation 2	Deviation 3	Deviation 4	mtDNA Haplogroup
GRC783219	16129A	16187T	16223T	16519C	M

Position Base Change

How do we create your DNA 11 Ancestry Portrait using your mtDNA data?

Step 1 • First swab your mouth, and then send in your sample.



Step 2 • We create your unique URL using your sample number, your raw sequence data and your mtDNA haplogroup.

Sample #	Deviation 1	Deviation 2	Deviation 3	Deviation 4	mtDNA Haplogroup
GRC783219	16129A	16187T	16223T	16519C	M

www.dna11.com/Ancestry/GRC78321916129A16187T16223T16519CM

Step 3 • Using your URL data, your personalized 2D barcode is created (Quick Response - QR Code).



Step 4 • Your personalized QR barcode is printed on archival quality canvas, using UV and fade-resistant inks. It is then protected with a thick coat laminate, which will protect your portrait for years to come.

Step 5 • After framing, a scan test is done on your portrait to ensure it directs you to your personalized DNA 11 ancestry page, which contains an explanation of your haplogroup and the results of your mtDNA test. If you decide not to publish your page, we will send you a printed explanation of your results and a description of your haplogroup.





Dion Abbott DNA 11 Ancestry Portrait™

Dion Abbott is part of HAPLO Group H

Dion Abbott is part of mitochondrial haplogroup H, a predominantly European haplogroup that originated outside of Europe before the last glacial maximum (LGM). It first expanded in the northern Near East and southern Caucasus between 33,000 and 26,000 years ago, and later migrations from Iberia suggest it reached Europe before the LGM. It has also spread to Siberia and Inner Asia. Today, about 40% of all mitochondrial lineages in Europe are classified as haplogroup H. More information about haplogroup H and its branches can be found [here](#).

Specific mitochondrial haplogroups are typically found in different regions of the world, and this is due to unique population histories. In the process of spreading around the world, many populations—with their special mitochondrial haplogroups—became isolated, and specific haplogroups concentrated in geographic regions. Today, we have identified certain haplogroups that originated in Africa, Europe, Asia, the islands of the Pacific, the Americas, and even particular ethnic groups. Of course, haplogroups that are specific to one region are sometimes found in another, but this is due to recent migration.

[The DNA 11 Ancestry Portrait™ Explained e-Booklet](#)



[Click to enlarge](#)





Background on QR Codes:

A QR Code is a two-dimensional code readable by QR scanners, mobile phones with a camera, and smartphones. The code consists of modules arranged in a square pattern on a contrasting background. The information encoded can be text, URL or other data, and when scanned the code will lead to a related website with associated information.

QR Codes are increasingly becoming part of the augmented reality movement, whereby everyday items can be digitally scanned and linked to online websites and information.

DNA 11 has brought augmented reality to the art world by fusing aesthetic and personalization with genetics and technology.



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