

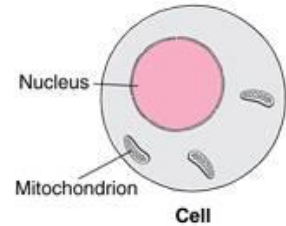


DNA Testing Basics

One of the most common DNA questions asked is What DNA test should I take?

Here are some basics that might help.

In humans, most of the DNA is in the form of tightly coiled strands called chromosomes, found inside the cell nucleus. There are 46 chromosomes in a human cell arranged in 22 autosomal (non-sex chromosome) pairs and two sex chromosomes (XY for males and XX for females). If you unwind each chromosome and place them end-to-end, you will have a long, double-stranded DNA helix that is about 3 meters in length—all from one microscopic human cell.^[i]



Every cell has a nucleus and mitochondria, chromosomes sit within the cell's nucleus and mitochondria and DNA sits within the chromosomes.

Males have an X and Y chromosome
Females have two X chromosomes.

The Y chromosome is one of the two sex chromosomes in humans (the other is the X chromosome). The sex chromosomes form one of the 23 pairs of human chromosomes in each cell. The Y chromosome spans more than 59 million building blocks of DNA (base pairs) and represents almost 2 percent of the total DNA in cells.

Each person normally has one pair of sex chromosomes in each cell. The Y chromosome is present in males, who have one X and one Y chromosome, while females have two X chromosomes. (U.S. National Library of Medicine)^[ii]

As females have two X chromosomes, they cannot take Y-DNA tests. Only males who have the Y chromosome are able to take the Y-DNA tests.

DNA Test Type	Line that will be matched	Definition	Who can take this test?
mtDNA	Maternal Line	Your direct maternal lineage is the line that follows your mother's maternal ancestry. This line consists entirely of women, although both men and women have their mother's mitochondrial DNA (mtDNA). This means that fathers do not pass on their mtDNA to their children. Your mtDNA can trace your mother, her mother, her mother's mother, and so forth and offers a clear path from you to a known or likely direct maternal ancestor. (Family Tree DNA) ^[iii]	Males & Females
Y-DNA	Paternal Line	Y-DNA follows the direct paternal line. Your Y-chromosome DNA (Y-DNA) can trace your father, his father, his father's father, and so forth. It offers a clear path from you to a known, or likely, direct paternal ancestor. (Family Tree DNA) ^[iv]	Only Males

DNA Test Type	Line that will be matched	Definition	Who can take this test?
Autosomal DNA	Maternal & Paternal	This test is designed to find relatives on any of your ancestral lines within the last five generations. Family Finder uses autosomal DNA, which is the mixture of DNA you received from both parents (about 50% from your mother and about 50% from your father). Because autosomal DNA is a mixture of your mother's and father's DNA, it is unique to each person. Both men and women can complete this test. (Family Tree DNA) [v]	Males & Females

Who or what information you are looking for will help determine what test you should take. Here are some examples;

Looking for information about your maternal great grandmother	mtDNA
A male adoptee looking for a genetic father	Y-DNA
A female adoptee looking for a genetic father	Autosomal DNA

DNA tests measure results in centimorgans.

In genetics, a centimorgan (abbreviated cM) or map unit (m.u.) is a unit for measuring genetic linkage. It is defined as the distance between chromosome positions (also termed loci or markers) for which the expected average number of intervening chromosomal crossovers in a single generation is 0.01. It is often used to infer distance along a chromosome. However, it is not a true physical distance. (Wikipedia)[\[vii\]](#)

It sounds complicated because it is. If you don't want to know all of the science behind it just know that the higher the centimorgan number the closer the match is between you and the other person.

Here are some examples;

Relationship	Average cM	cM Range (low-high)
Parent	3487	3330-3720
Sibling	2629	2209-3384
Half Sibling	1783	1317-2312
First cousin	874	553-1225
Second cousin	233	46-515
Grandparent	1766	1156-2311
Great grandparent	881	464-1486

There is a full table of this information available at https://thegeneticgenealogist.com/wp-content/uploads/2017/08/Relationship_Chart_FINAL_August_2017.jpg.

Remember that your DNA matches rely on other people doing DNA tests as well. If your relatives have not tested, you won't get matches.



Genealogy SA
Helping find your family history

201 Unley Rd, Unley SA 5061
PO Box 3114, Unley SA 5061
(08) 8272 4222
<https://genealogysa.org.au>
saghs.admin@saghs.org.au

- [\[i\]](#) The Molecular Biology Revolution, p212, by Fritz Dufour
- [\[ii\]](https://ghr.nlm.nih.gov/chromosome/Y) <https://ghr.nlm.nih.gov/chromosome/Y>
- [\[iii\]](https://www.familytreedna.com/learn/dna-basics/mtdna/) <https://www.familytreedna.com/learn/dna-basics/mtdna/>
- [\[iv\]](https://www.familytreedna.com/learn/dna-basics/ydna/) <https://www.familytreedna.com/learn/dna-basics/ydna/>
- [\[v\]](https://www.familytreedna.com/learn/dna-basics/autosomal/) <https://www.familytreedna.com/learn/dna-basics/autosomal/>
- [\[vi\]](https://en.wikipedia.org/wiki/Centimorgan) <https://en.wikipedia.org/wiki/Centimorgan>