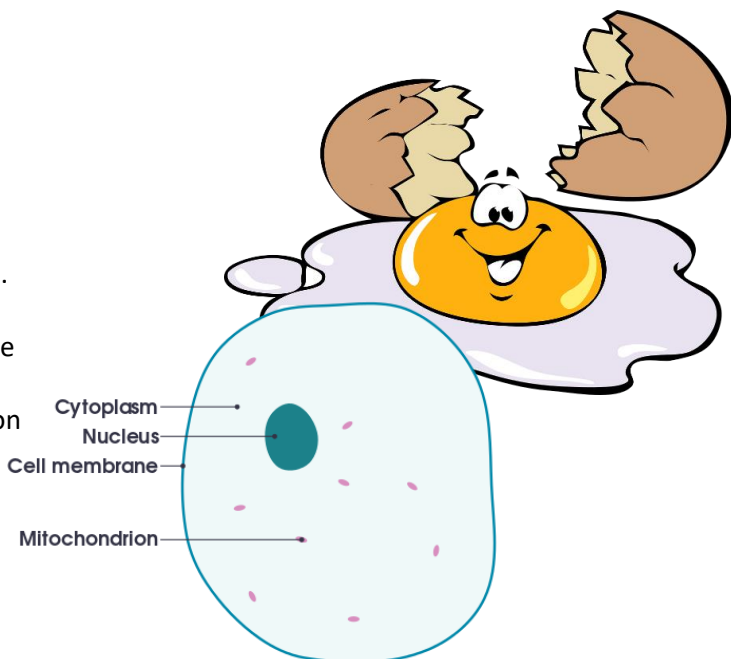


DNA Basics for Genealogy

by Heather Wright - heatherwrightvb@gmail.com

- Think of each of your cells as an egg.
- The shell is like your cell membrane, holds it all in.
- The yolk is like the nucleus, the brain of the cell. Autosomal DNA is here (including X and Y), it's the instruction book for your body.
- The white is like the cytoplasm, kind of like cushion and filler, it holds all the other little bits like the mitochondrion.
- Mitochondria are little power centers for the cell and hold the mtDNA.



Chromosomes and Gametes (sex cells)

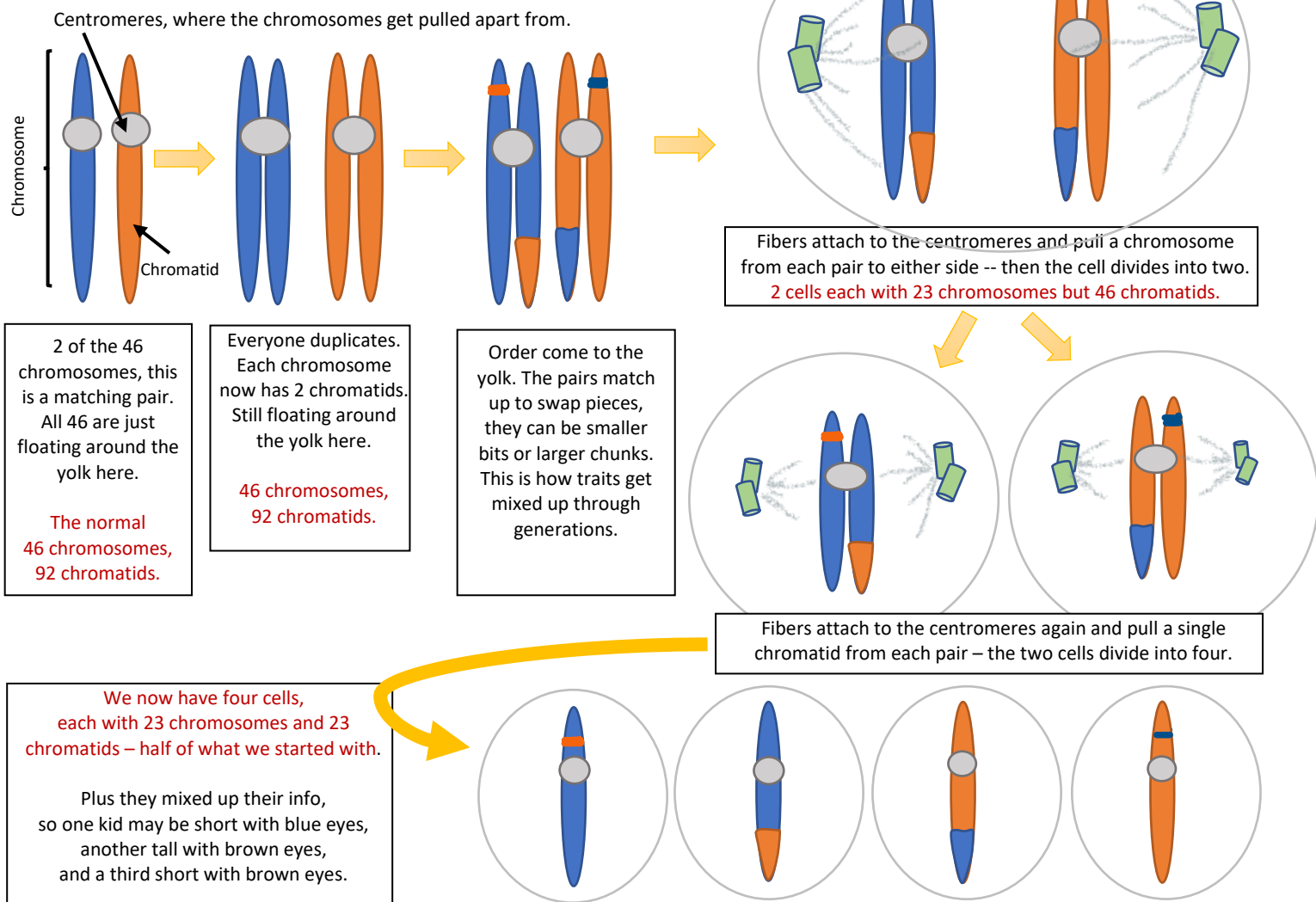
Each cell has 46 chromosomes, each matching another, making 23 pairs. (hence, 23andMe)

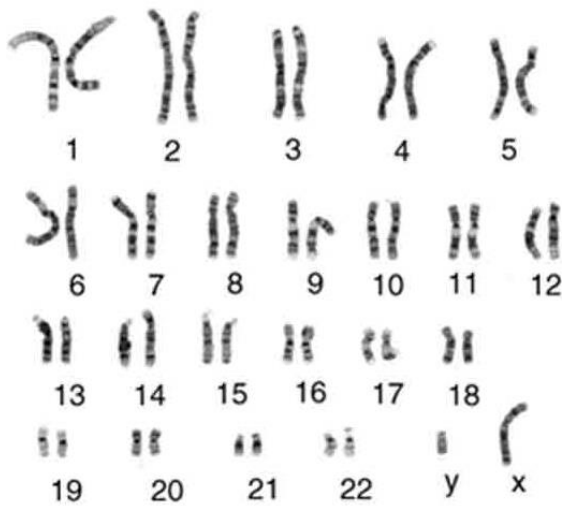
For a child to also have 46, parents need to give half. They don't just split in two though.

The gametes (sperm or eggs) double before they split, and then split again to make 4 cells.

The process is meiosis, this is the quickie version:

(If you want to see a fun little video explaining meiosis, [check this out.](#))





This is a karyotype, a picture of what those 46 chromosomes look like in their pairs. They are not doubled here, just single chromosomes like in the first step described above.

The 23rd pair is the x and y – females have xx, males xy.

Mothers always pass down an x. Fathers can give an x or y. If a father gives an x, a girl is born. If they give a y, a boy is born.

In males - when the first split happens one cell gets the x, the other the y. They split again, now two cells have x and two y.

(Yes, sometimes things go wrong. You can end up with extra or missing chromosomes. Down syndrome has three in pair 21 and Turner syndrome is missing an x.)

DNA testing

Autosomal – those 46 chromosomes

- The standard test done by testing companies
- Best to find cousins by

y-DNA – only looks at those little y chromosomes in pair 23

- A specialized test
- Only found in males
- Changes slowly
- Can help figure out where your paternal line is from and possible surname
- Not good for finding close cousins

mtDNA – looks at DNA in those little mitochondria

- A specialized test
- Found in everyone but...
- Only for maternal line – passed down through the egg, not the sperm
- Can help figure out where your maternal line is from and possible surname
- Not good for finding close cousins

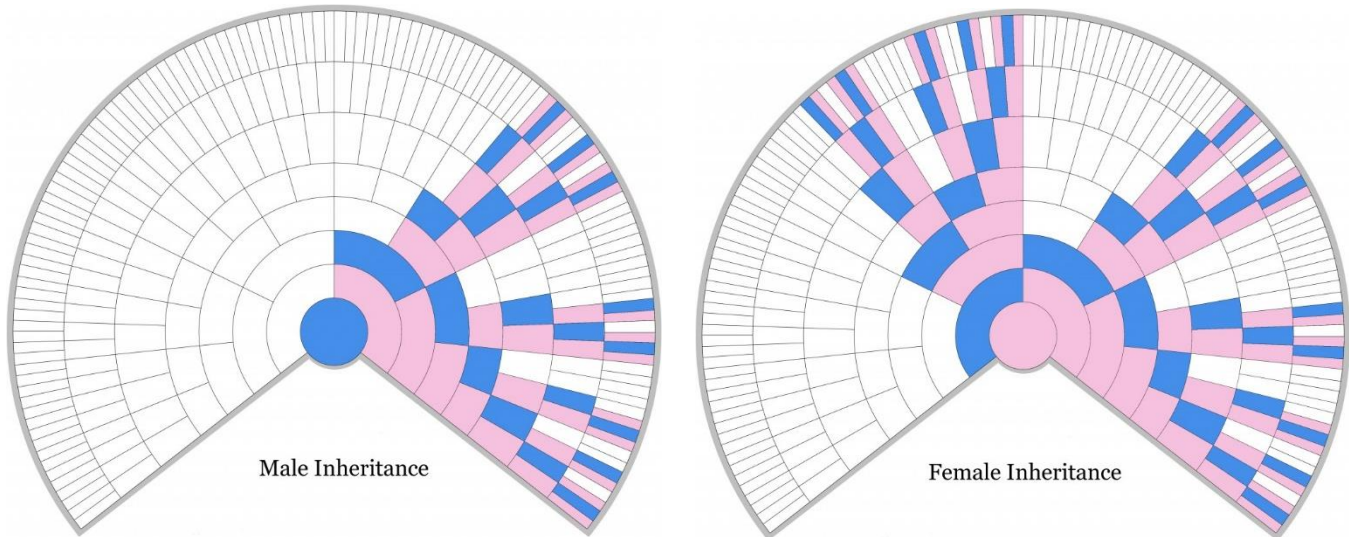
What Your Results Mean – Autosomal Test

If you match anywhere on chromosomes 1-22:

- It can be a maternal or paternal match, from any ancestor
- Look for common names/surnames in a match's list or tree
- Look for a common ancestral homeland in a match's list or tree
- Look for other people who match both you and the match you're looking at, see if there are common names/surnames between them (it may or may not be a name you are familiar with)
- Beware of tiny segment matches and pile up areas – you may not actually have common ancestors

If you match on an x chromosome:

- If you're a male – the match is only certain ancestors on your maternal side
- If you're a female – the match can be maternal or paternal, but still only certain ancestors
- It cuts out many lines of inheritance for both male and female testers
- Use same method, look for common names/surnames and common matches
- Charts [like these](#) help to visually narrow the search based on where a tester can inherit an x from:



charts accredited to [thegeneticgenealogist.com](#)

What Your Results Mean – y and mt DNA Tests

- Both types are very, very slow to change over the generations.
- Matches are qualified on how close the match is, the genetic difference.
- A difference of 0 means there is no difference between you and the match, you are more likely to share an ancestor with them than with someone that has a higher genetic difference.
- The common ancestor is usually further distant than with your autosomal matches.
- Still, look for common surnames, they may be ones you already know or maybe not (NPE!)
- y-DNA only passes from father to son
- mtDNA passes from mother to son or daughter
- Matches will be somewhere along the highlighted lines:

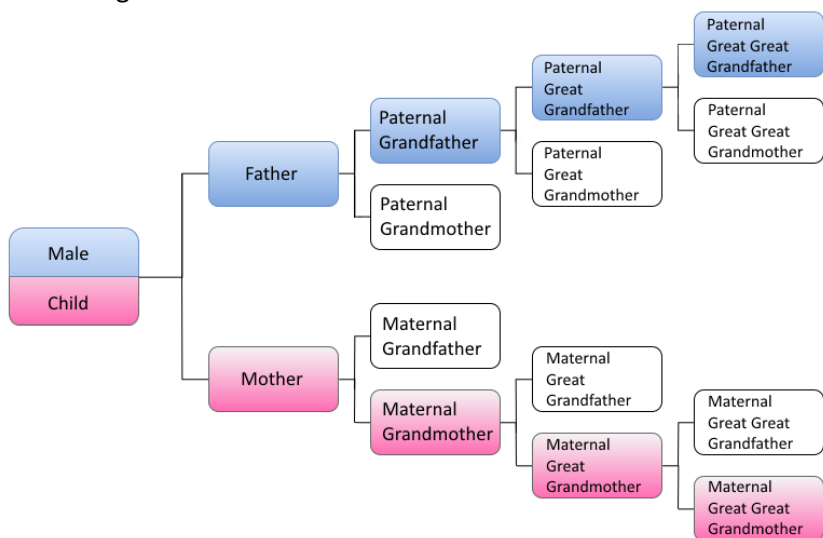


chart accredited to [issog.org](#)

Expanding your net to catch cousins

- Once you get tested you can transfer the raw data to other DNA sites.
- Typically the transfer is free but you may have to pay a fee to use certain features.
- This is an easy and cost-effective way to cast a wider net.

company	test	transfer out	transfer in
Ancestry	autosomal	yes	no
23andMe	autosomal	yes	no
FTDNA	autosomal, y, mt	yes	yes
GEDmatch	none	N/A	yes
MyHeritage	autosomal	yes	yes
Living DNA	autosomal	yes	yes

Also, those heritage estimates

Different sites will give you different percentages for your heritage composition.

This is because each bases their estimates on reference populations, so...

Different populations = different percentages.

When they update reference populations you may see an updated heritage composition.

It's a best guess, don't get hung up on it.