

DNA and Genealogy = Genetic Genealogy

DNA analysis adds a powerful tool to your traditional genealogy. Using DNA from living test takers, you can find cousins who match your DNA from a greater to lesser degree. If your DNA matches, you can seek to find your **Most Recent Common Ancestor (MRCA)**. Your cousins may know more about this ancestor than you. They could find a gold mine of information about your ancestors.

Basics:

We have 23 pairs of chromosomes in the nucleus of our cells. The last pair determines our gender (XX= female, XY= male) We have other DNA called Mitochondrial DNA in our cells, outside the nucleus, too.

There are 5 major testing companies:

- National Geographic- studies migration patterns of our “deep ancestors”
- Family Tree DNA: offers Y DNA tests, Mitochondrial tests and autosomal DNA tests
- Ancestry: just offers autosomal tests
- 23& Me: just offers autosomal tests & health reports
- Living DNA: New company, based in Britain, claims more detail in ethnicity analysis, autosomal, Y DNA and mitochondrial. No matching yet.

4 types of tests

- Y DNA: follows the paternal line, only men can take it
- Mitochondrial: follows the maternal line, not very useful for genealogy, small data base
- Autosomal: men and women can take it, can find matches back to common ancestors 7-8-9 generations back
- X chromosome, one of the sex chromosomes, with unique characteristics

Recommendation: test at 3 testing companies (autosomal), and if studying a paternal line, test YDNA at least 37 markers. Join a FTDNA “project” for the appropriate surname if one is available.

The mitochondrial test, in my opinion, is not very useful. The National Geographic project is interesting, but does not give you data for your genealogy. Living DNA is new, unknown.

What Testing Company?

NB: Ancestry – requires an account

Ancestry DNA Test vs. Subscription Benefits			
Feature	AncestryDNA w/no subscription	Ancestry Insights Subscription w/AncestryDNA	Paid Subscriptions w/Ancestry DNA
DNA Ethnicity Results	✓	✓	✓
DNA Matches	✓	✓	✓
Relationship prediction for DNA matches	✓	✓	✓
Contact/Message DNA Matches	✓	✓	✓
Contact/Message any Ancestry Customer		✓	✓
View Cousins' Full Public Family Trees (with photos & Stories)		✓	✓
View Public family trees for any Ancestry customer		✓	✓
DNA Shared Ancestor Hints		✓	✓
Match Locations & Surnames		✓	✓
Ancestry Record Access			✓

Ancestry DNA: \$99 (watch for periodic sales.) Autosomal. You get an ethnicity profile, and DNA Matches with and without Hints, Genetic Communities, DNA Circles, New Ancestor Discoveries, and the ability to download raw data. Attach your test results to your on-line tree. Contact with matches is done through user name. This is a saliva test. If you test at Ancestry, you will need some sort of account (free/ Insights / or full).

Once you've tested at Ancestry or 23 and Me, you normally can upload your "raw data" to Family Tree DNA for free and see some of your matches in the FTDNA database. For a fee, you can enjoy all the matching and tools at FTDNA.

Family Tree DNA: \$89. Family Finder= Autosomal. You get My Origins, an ethnicity profile. You get a list of dna matches which show how much total dna is shared with each match, the size of the largest segment, ancestral names and e-mail addresses. FTDNA provides a chromosome browser, allows downloading of matches and chromosome information.

You can also get a Mitochondrial test (\$199) here and Y-DNA tests (\$169, discount if purchased through a "project"). These tests are cheek swab tests.

23&Me: Autosomal. \$99- \$199, depending on if you want health results too. You get an ethnicity profile. The Ancestry Composition feature shows % of dna shared with matches, locations of ancestors. It is a saliva test.

Living DNA: \$119, autosomal, YDNA, Mitochondrial, no matching yet.

No matter what company you test at, upload your "raw data" to **Gedmatch.com**. It's free! See more below

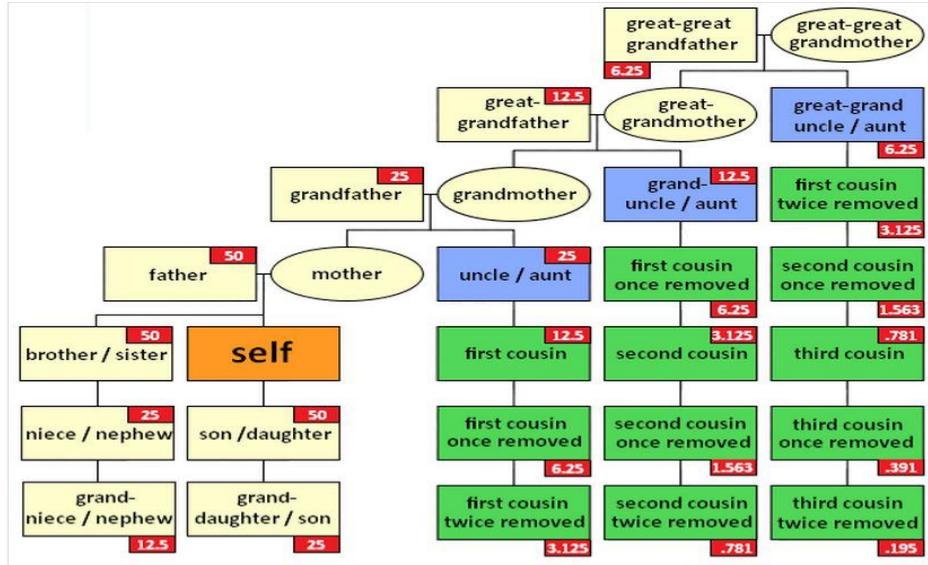
Get prepared:

Create a robust family tree, put it on line or have it available for matches. Alternatively, create a list of your ancestors and their locations. Get your oldest relatives tested asap. Learn to use spreadsheets. Start following blogs, Facebook pages, websites about genetic genealogy.

Create a standard introductory letter for your matches. Tell them that xyz testing company indicates your dna matches theirs. You could tell them what level cousinship is estimated by the company and how many CM you match. Tell them a little about your family (ie "my family is mostly from Europe...") and offer to share your tree. Ask them to collaborate with you and tell them you look forward to hearing from them. Get ready to communicate with matches!

Looking at your Results:

Your closest relatives will be your strongest matches. The amount of shared DNA will decrease with each generation. Pay attention to how much DNA you share with someone. It will be key to figuring out your relationship with them. See the following 2 charts, the first one from ISOGG.org (International Society of Genetic Genealogists) :



Recent data: Baine Bettinger (The Genetic Genealogist) got data from 9,417 people. They reported on the actual # of cMs of dna they shared with actual relatives in which the relationship was known.

The Shared cM Project – Version 2.0
June 25, 2016
Blaine T. Bettinger
www.thegeneticgenealogist.com
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3 rd -Great-Grandparents						5C	Avg: 17 cM 0 – 42 cM
2 nd -Great-Grandparents					Great Grand Aunt/Uncle	5C1R	Avg: 14 cM 0 – 41 cM
Great-Grandparents			Great Grand Aunt/Uncle	1C3R	5C2R	Avg: 16 cM 0 – 41 cM	
Avg: 850 cM 547 – 1110 cM			Avg: 434 cM 214 – 580 cM	1C2R	2C2R	Avg: 81 cM 0 – 201 cM	
Avg: 235 cM 27 – 413 cM			Avg: 857 cM 521 – 1138 cM	2C1R	3C1R	Avg: 56 cM 0 – 156 cM	
Avg: 1765 cM 1272 – 2365 cM			Avg: 512 cM 115 – 753 cM	3C	4C	Avg: 31 cM 0 – 90 cM	
Avg: 238 cM 43 – 504 cM			Avg: 1744 cM 1301 – 2193 cM	4C1R	6C	Avg: 9 cM 0 – 21 cM	
Avg: 129 cM 0 – 325 cM			Avg: 3471 cM 3266 – 3720 cM	6C1R	6C2R	Avg: 9 cM 0 – 19 cM	
Avg: 869 cM 513 – 1379 cM			Half-Sibling	6C2R	7C	Avg: 11 cM 0 – 29 cM	
Avg: 238 cM 43 – 504 cM			Sibling	7C	8C	Avg: 7 cM 0 – 10 cM	
Avg: 238 cM 43 – 504 cM			SELF	8C		Avg: 9 cM 0 – 16 cM	
Avg: 238 cM 43 – 504 cM			Child				
Avg: 512 cM 115 – 753 cM			Half Niece/Nephew				
Avg: 129 cM 0 – 325 cM			Niece/Nephew				
Avg: 56 cM 0 – 156 cM			Grandchild				
Avg: 235 cM 27 – 413 cM			Great Niece/Nephew				
Avg: 81 cM 0 – 201 cM			Grand-Niece/Nephew				
Avg: 36 cM 0 – 82 cM			Grand-Niece/Nephew				
Avg: 14 cM 0 – 27 cM			Grand-Niece/Nephew				

The Shared cM Project, Blaine Bettinger <http://www.thegeneticgenealogist.com/> updated June 26

DNA is measured in centiMorgans (cM). There is a random shuffling of DNA. Children inherit 50% of their dna from their mother and 50% from their father. The children don't look alike (unless identical twins) because of the random shuffling of dna.

GEDMATCH:

Gedmatch.com: upload your raw dna data from one of the dna testing companies to Gedmatch. Gedmatch has a chromosome browser, people who match one or both of two kits, Tier 1 Tools (for small \$ contribution), a triangulation tool. This site is free and is the genetic genealogist's best friend.

So why would you want to do upload your data to Gedmatch?

- You'll likely get different matches than you did with your original testing company
- You'll get more information about your matches, easier access to them
- You'll be able to start to play with information about chromosomes and find several people who may match on a single common ancestor.
- It would make for a more robust database at Gedmatch for other researchers

Organize your work:

What to do next: create a SYSTEM to log your work, contact names, e-mail, cousin level, correspondence, common ancestor. Many people use spreadsheets to organize their data, arranging their matches by dna segments chromosome #, start and stop location, size).

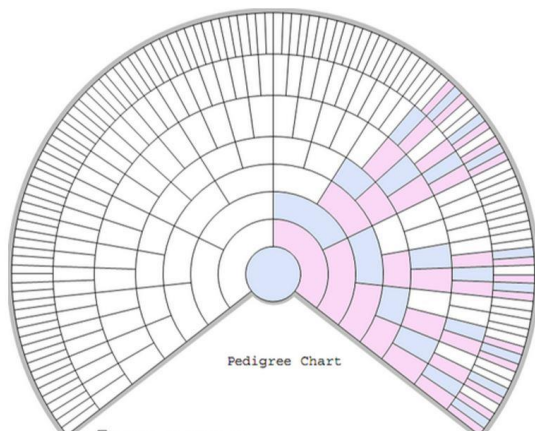
Triangulation- proving that a given ancestor is THE common ancestor between you and 2 other people.

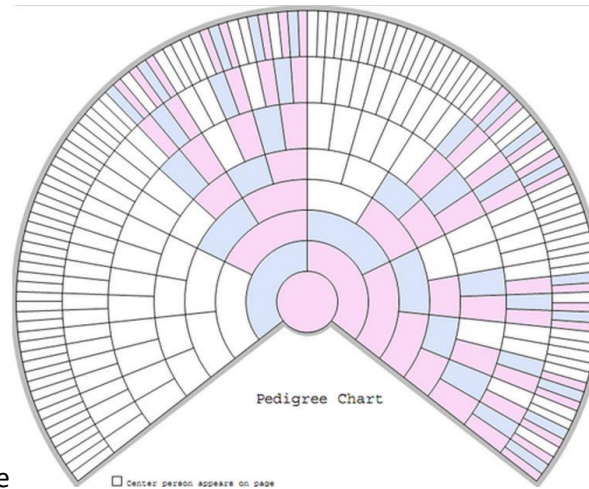
X Chromosome match?

There are Interesting inheritance patterns for the X chromosome:

All males have an X chromosome (inherited from their mother) and a Y chromosome (inherited from their father). Females have two X chromosomes, one from each parent. When someone matches you on the X chromosome, you can use these charts to see where the possible common ancestor resides on your fan chart. The chart can help you eliminate various lines.

X Matches- inheritance pattern can be useful in eliminating lines: MALE





FEMALE inheritance pattern for the X chromosome

Resources: Start reading about dna, go to conferences, seminars, and watch webinars.

Book: Blaine Bettinger: [The Family Tree Guide to DNA Testing and Genetic Genealogy](#)

E-book, Blaine Bettinger, [I have the Results of my Genetic Genealogy test. Now What?](#)

<http://www.thegeneticgenealogist.com/wp-content/uploads/InterpretingTheResultsofGeneticGenealogyTests.PDF>

Facebook groups: DNA Newbies, DNA Detectives, DNA Tools, ISOGG

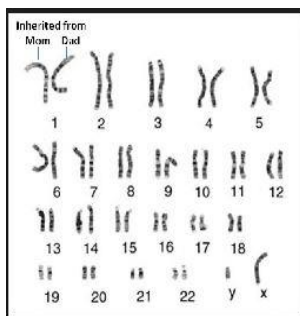
Blogs: Blaine Bettinger www.thegeneticgenealogist.com, Kitty Cooper blog.kittycooper.com

Roberta Estes DNA Explained <http://dna-explained.com>

ISOGG Wiki <http://www.isogg.org/wiki>

Ancestry.com/Academy DNA 101

www.GeneticGenealogyStandards.com (Standards for obtaining, using and sharing genetic genealogy test results. Also- Standards for the interpretation of genetic genealogy test results) Blaine Bettinger & CeCe Moore



GEDMATCH Upload: How to DOWNLOAD your raw (autosomal) DNA data from your testing company

1. From Ancestry

Click on "DNA" in the menu bar. From the drop down box, choose Your DNA Home page. Find your name/test on the left. To the right of that is a grey button called Settings. Click on it. In the next screen, under Actions, you'll see "Download your raw DNA data." Click on "Get Started." In the next pop-up box, you need to put in your Ancestry password again and hit Confirm. Go to your e-mail system. An e-mail from Ancestry should be there or come momentarily. Once you open the Ancestry e-mail entitled "Your request to download Ancestry DNA raw data," click on the orange button called "confirm data download." Now, the ancestry pop up screen asks for your Username or email and password again. (They're being very prudent) Fill in those 2 things. Next screen... click on the green "download DNA Raw data" button only once. At this point I get an orange rectangle at the bottom of the page asking me "do you want to open or save dna-data-2014-09-14.zip from dna.ancestry.com." I click Save. Then I get a white rectangle box that says "the dna-data-2014-09-14.zip download has completed." I click on open folder. At this point, my Downloads folder on my computer opens up and shows me all the downloaded files that I have accumulated over time. There is one highlighted... called "dna-data-2014-09-14." It shows a zipped file. I don't want to touch it at this point. I have successfully downloaded my dna raw data and it can sit there until I'm ready to upload it to getmatch.com. It does not have the name of the test taker on it so do this process one person at a time.

2. From 23 AND ME

If you have tested at 23 and Me and want to download your raw dna data, log into 23 and me, click on your profile in the upper right corner. Then, click on Browse Raw Data. Then, click on the word Download that appears in the upper right. You'll have to provide your password and answer a security question. The downloaded file will appear in your Downloads folder. Follow the upload procedure outlined above in the UPLOADING RAW DATA FILE TO GEDMATCH section.

3. From FAMILYTREEDNA

If you have tested at FTDNA and want to download your raw dna data, log into FTDNA and click on My DNA. Then, click on Family Finder. Then, click on "Download raw dna" and the file will appear in your Downloads folder. Follow the upload procedure outlined above in the UPLOADING RAW DATA FILE TO GEDMATCH section.

How to UPLOAD raw dna data to Gedmatch.com

First, you have to have a Gedmatch account. It's free, but needs a user name and password. Once you have that, you can proceed with the upload in this way. Log into Gedmatch, ... and upload your Ancestry raw data file. Gedmatch is a little tricky uploading files. Sometimes, it takes several attempts. Once you give Gedmatch the name and location of your zipped file, it will take some time to upload the file. Chromosome numbers appear on your screen as the data uploads: 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22. Then the upload is done.

Gedmatch then takes a day or so to "tokenize" your data. Until then, the kit number they give you will look like this A49380* with an * next to it. Once the tokenizing thing is done, you can run a "One to many" sort on your matches. You select your kit number and run it against their whole database. You can download the resulting data into a csv or Excel file. Your data here is very robust. You can also run a "one to one" sort, choosing your kit number and that of someone else you know. One of my kits number is A822290 in case you want to try out this feature and don't know anyone else.