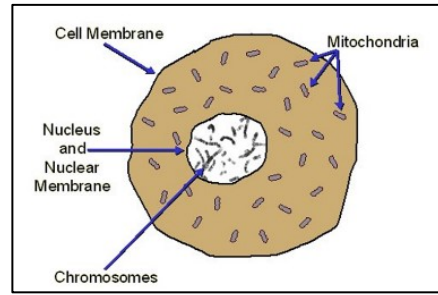


DNA Testing 101

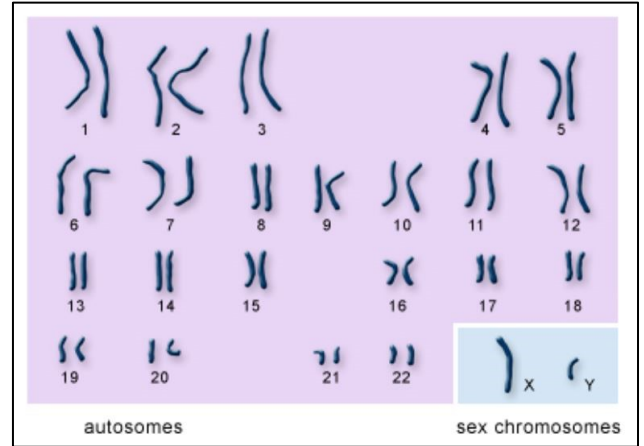
Cells

- We each have about three billion cells
- Inside the nucleus is our chromosomes
- Outside of the nucleus is our hundreds of copies of our *mitochondria* DNA (mtDNA)



Chromosomes

- We have 22 pairs of *autosomes* that are numbered by their size and the sex chromosomes
- The mom passes her X to her children, both son and daughter
- The dad passes on his Y **or** his X and that determines the sex (either son or daughter)



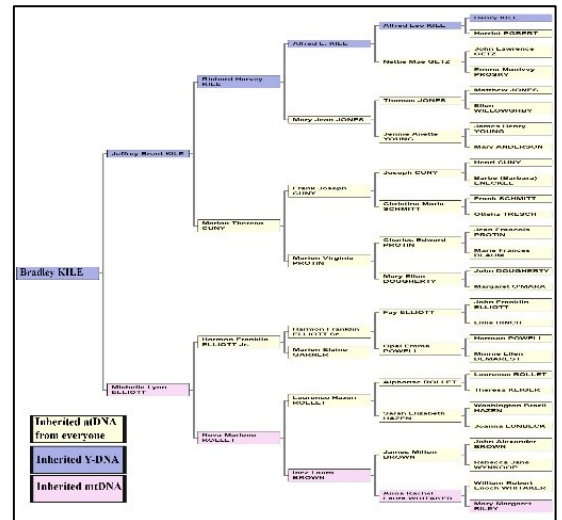
Autosomal Testing (atDNA) <\$100

- We inherit random 50% from each parent, who inherited from their parents
- We don't get exactly 50% of each pair of chromosomes
- Autosomal traces all branches of family tree
- Reliable for 5 to 6 generations
- Tested by almost all companies

| Relationship | Generation | Approx % of their DNA we carry | How Many Individuals |
|--------------|------------|--------------------------------|----------------------|
| GGG Grand | 5 | 3.13 | 32 |
| GG Grand | 4 | 6.25 | 16 |
| G Grand | 3 | 12.5 | 8 |
| Grand | 2 | 25 | 4 |
| Parents | 1 | 50 | 2 |

Y-DNA Testing

- Tests the Y Chromosome
- Traces father's, father's, father's line
- Test just for men (females don't have Y Chromosome)
- Tested by Family Tree DNA Company
- Cost/markers tested (\$169/37 \$268/67 \$359/111)
- Stable for thousands of years – might have a few mutations

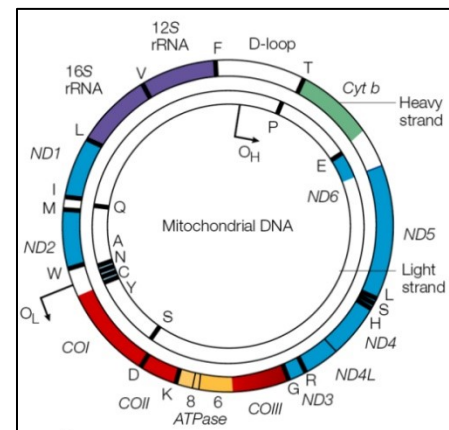


X-DNA Testing

- This is usually tested when we get our Autosomal testing done.
- We can view it with:
 - ◆ 23andMe
 - ◆ Family Tree DNA,
 - ◆ And when we move it to Gedmatch.com
- Neither Ancestry nor MyHeritage have chromosome browsers which allow you to the X chromosome

Mitochondria DNA (mtDNA)

- Tests the Mitochondria DNA
- Traces mother's, mother's, mother's line
- Both male and female can test
- Tested by Family Tree DNA
- Stable for thousands of years – might have a few mutations
- Good test if confusion between children from different wives in previous generation



Testing for Ethnic Heritage

- All companies do this test and usually the results will be different for each one
- None of it is very reliable
- Using their database, they make inferences about our “Deep Ancestry”
This is hundreds or thousands of years in the past
- This testing will continue to improve with time as each company gathers more data

DNA Testing Timeline

| | |
|------|--|
| 1984 | DNA Profiling began |
| 1998 | DNA testing for criminals started |
| 1999 | Y-DNA testing by some companies |
| 2005 | mtDNA testing began |
| 2009 | atDNA testing began |
| 2012 | DNA started to be used by genealogists |

Inherited Factors

- This chart is a simplified image but it shows that siblings have different DNA structure
- Child 1 might match with 3rd and 4th cousins that child 2 does not
- The reverse is also true

5 Major atDNA Testing Companies per ISOGG (International Society of Genetic Genealogy)

Check their website for the details
https://isogg.org/wiki/Autosomal_DNA_testing_comparison_chart

- 23andMe
- FamilyTree DNA
- Ancestry.com
- National Geographic
- MyHeritage

We can also check out the articles below

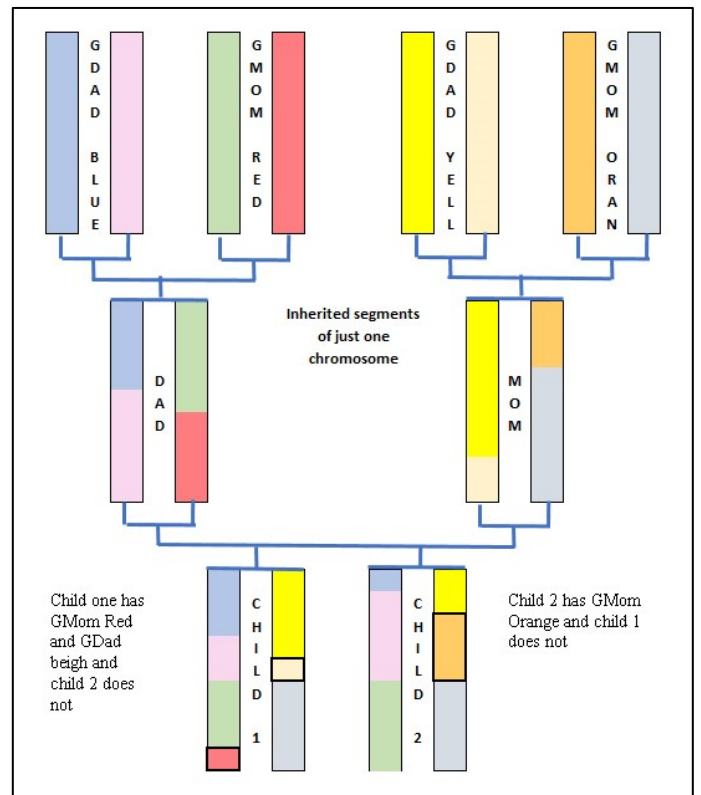
<https://dna-explained.com/2017/04/24/which-dna-test-is-best/>
<http://blog.kittycooper.com/dna-basics/dna-testing/>

Matching

- Each company compares our DNA with the other individuals in their pool of samples
- They do not share data amongst each other

Sharing Our Raw DNA Data with Other Companies

- Of the five major testing companies, we can upload our raw data to:
 - ◆ Family Tree DNA's Family Finder and
 - ◆ MyHeritage
- Both of these are free but with Family Tree DNA, we can spend \$19 to unlock some very useful tools.



- We can also upload the raw DNA data to
 - ◆ GEDMatch.com (free but we can \$10 for a month for their great tools to analyze our matches that we find there – if we want to use the tools another month, we can just pay another \$10 for that month)

Download and Upload to Other Companies

Once we have tested we can then download our results to our computer and then upload it for free to Family Tree DNA, MyHeritage and Gedmatch.

Either check the specific site or do a search for those instructions. This is not a file that we can actually read. If we are uploading to Gedmatch, they have specific instructions on downloading from other companies.



The more companies we have our DNA, the better chance we have at more matches.

GEDCOM

There are different thoughts on uploading a complete family tree. I don't list the names of the living people in my GEDCOM, so I don't have to worry about who will see this.

My siblings that I have died, I list them. If their spouse died, I list the spouse. For the living individuals, I do give the birth date and location. Instead of names, I give their order in the family tree: fourth son, third daughter, Gkid 1, Gkid 2, etc. I do show the last name.

My GEDCOM tree is my direct line up and down with just spouses included. I do not show any collateral lines for me. Since I manage my grandchildren's kits, I do show all of their direct lines as well (again pseudo names for living individuals.)

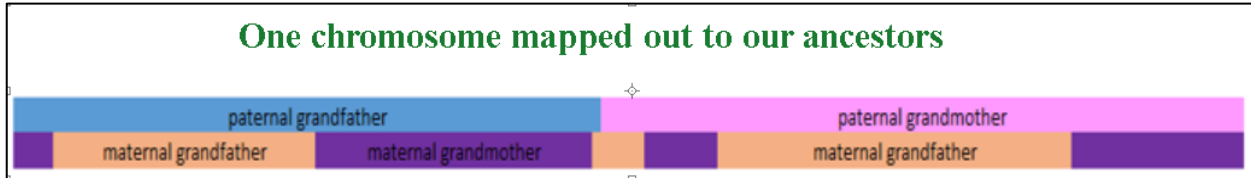
Ancestry DNA, MyHeritage, Family Tree DNA and Gedmatch allow GEDCOM uploads, so I upload the same tree to each. 23andMe allows us to key in limited relatives.

How Far Do We Want to Take This?

At some point, we will each have to decide how far we want to take these comparisons. By uploading to the different sites, we can find a lot of matches that we might have known so we can verify and some we didn't know that we can know check into further.

| Descendants |
|--------------------------------|
| 1-Frank Joseph Cuny |
| +Marion Virginia Protin |
| 2-Joseph Francis Cuny |
| +Jeanne G. Antz |
| +Jayne Lee Childers |
| 2-Paul Gabriel Cuny |
| 2-Francis Gerard Cuny |
| 2-Fourth Son Cuny |
| 2-Fifth son Cuny |
| +Velma Ann Sochovka |
| 2-First Daughter Cuny |
| +Richard Lee Maier |
| 2-Christina Clare Cuny |
| 2-Louis Anthony Cuny |
| 2-Third daughter Cuny |
| 2-Seventh Son Cuny |
| 2-Marian Theresa Cuny |
| +Marians Husband Kile |
| 3-Marians son Kile |
| +Marians daughterinlaw Elliott |
| 4-Gkid 1 Kile |
| 4-Gkid 2 Kile |
| 4-Gkid 3 Kile |
| 4-Gkid 4 Kile |
| 3-Marians Daughter Kile |
| +Marians soninlaw Mahlke Jr. |
| 4-Gkid 5 Mahlke |
| 4-Gkid 6 Mahlke |

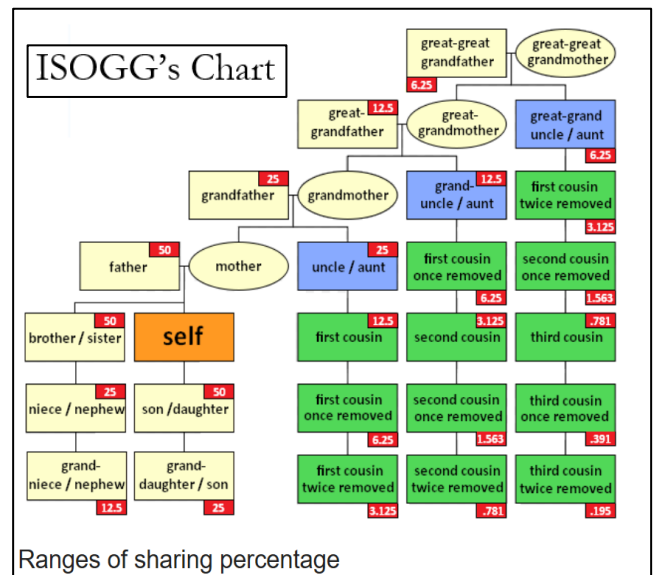
As we get matches and verify those relationships, we might be happy. If we want to take it all of the way, we will try to match out most of the segments **in all of the chromosomes** to our ancestors which allows us to match the distant cousins. It is complicated, takes a lot of time, but exciting.



Charts for Possible Relationship

All of the companies will display the matches. Some on the screen and others we need to run the reports. Some will show us possible relationships based on the percentage of centiMorgans. If they don't show the relationship, we can go to either of these charts.

- 1) https://isogg.org/wiki/Autosomal_DNA_statistics
Example: 12.5% equals first cousin
- 2) <https://thegeneticgenealogist.com/2017/08/26/august-2017-update-to-the-shared-cm-project/>



Organize

Like most of life, there are a lot of moving parts to DNA testing so I suggest that we get organized early. We might consider having one **DNA folder** with subfolders similar to this.

- Learning
 - ◆ Classes
 - ◆ Internet (In here, we can save off articles and we might have a document with useful links)
- Managing DNA Kits
 - ◆ Downloads
 - ◆ Emails
 - ◆ GEDCOMS
 - ◆ Reports

We might consider creating samples of our emails. I don't want to retype this each time.

On my dad's side, I have: Joseph **CUNY** born 1819 in France; Margaret **NOSAL** born 1815 in France, Andre **ENECKEL** born 1820 in France, Madeline **ROBACH** born 1822 in France, Johann **SCHMITT** born 1804 Germany, Catherina **MANNING** born 1808 Germany, Adam **TRESCH** born 1811 Germany and Ottelia **RUGGERT** born 1811 Germany.

We might also want a To Do List document in the Manage Kits folder. I'm managing a number of different kits so when I save anything, I always save it with last name, first name and then the item.

I also have a spreadsheet where I track all of the different kits I have for the folks I'm managing.

Chromosome Browser

This tool gives us a graphical comparison between one or more matches to see how much DNA is shared.

Family Tree DNA have this tool - if we uploaded to Family Tree, we will need to pay \$19 one time to use the browser.

23andMe has a limited version.

MyHeritage DNA has one in the works.

Ancestry DNA does not have it at all.

Gedmatch has a great browser and we can get additional tools for \$10 for 30 days.

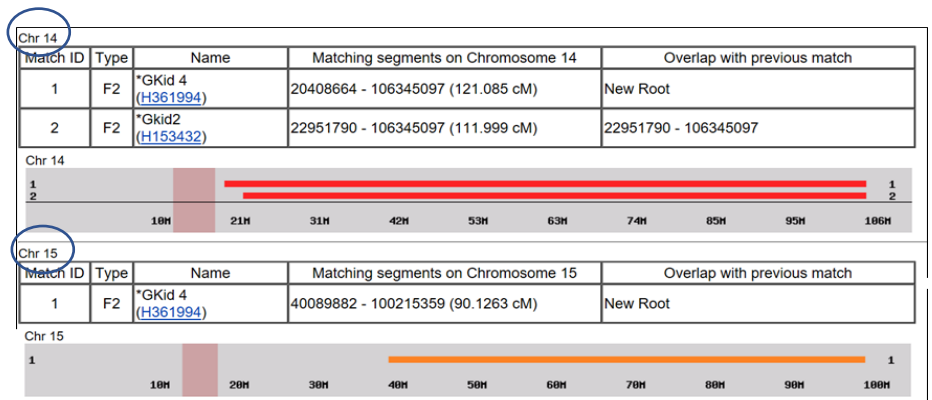
Genetic Genealogy

Genetic genealogy uses DNA testing to determine the genetic relationship between individuals. If we go into this in depth, it will take a lot of time, energy, and personal research. It can be a lot of fun but it can also be frustrating.



If we want to take this challenge, we first need to get as many of our close relatives to take the DNA tests and then get their kits uploaded to Gedmatch since they have the best tools.

We will find matches of individuals we don't know. In order to sort it all out, we need to have analyzed our living relative kits.



Gedmatch

This shows my kit compared to two of my grandchildren (brothers)
 Chromosome 14 – they both match a long segment with me.
 Chromosome 15 – Gkid4 matches a lot with me but Gkid2

Goal

If our goal is to map out all of our ancestors so we can identify the segments in all of the chromosomes, we to continue to study the different websites listed on the resource list in the prior handout.

We also need to learn how to use the different tools available. Each website has their own but some of them are similar. Most of the companies have help available and there is a lot available on the web.

There are also webinars and seminars.

So, no matter if we are going for the basic matches or trying for identifying our chromosome segment, we don't have to take it all on at once. We can take it step by step.

Resource List

- ◆ **International Society of Genetic Genealogy Wiki (ISOGG)** https://isogg.org/wiki/Wiki_Welcome_Page
in addition to the chart mentioned above, we might want to book mark their glossary
- ◆ **The NDA Detectives (CeCe Moore)**
<https://thednadetectives.com/>
- ◆ **DNA Explained (Roberta Estes)**
<https://dna-explained.com/>
on right side, click on "Follow" to also get emails
- ◆ **The Genetic Genealogist (Blaine Bettinger)**
<http://thegeneticgenealogist.com/>
- ◆ **The Legal Genealogist (Judy G. Russell)**
<http://www.legalgenealogist.com/blog/>
- ◆ **Kitty Cooper's Blog**
<http://blog.kittycooper.com/>
- ◆ **DNA Adoption**
<http://dnaadoption.com/>



DNA Facebook Closed

Groups: (We can set up shortcut for a group *)

ISOGG

DNA Detectives

FTDNA User Group

DNA Painter

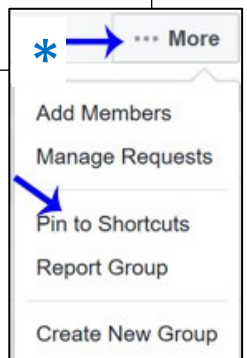
Ancestry-Gedmatch-

FTDNA-23&Me Genealogy

We can also follow:

DNAexplain

CeCe Moore Genetic
Genealogist



Jim Rader's 4 session Y-DNA classes
Sacramento Family Search Library - 2745 EASTERN AVE. 1-916-487-2090

Thursdays from 12:30 to 2:30 – Starting March 1st and going for four weeks

Call to register and then email Jim to get training materials at jim@rader.org