



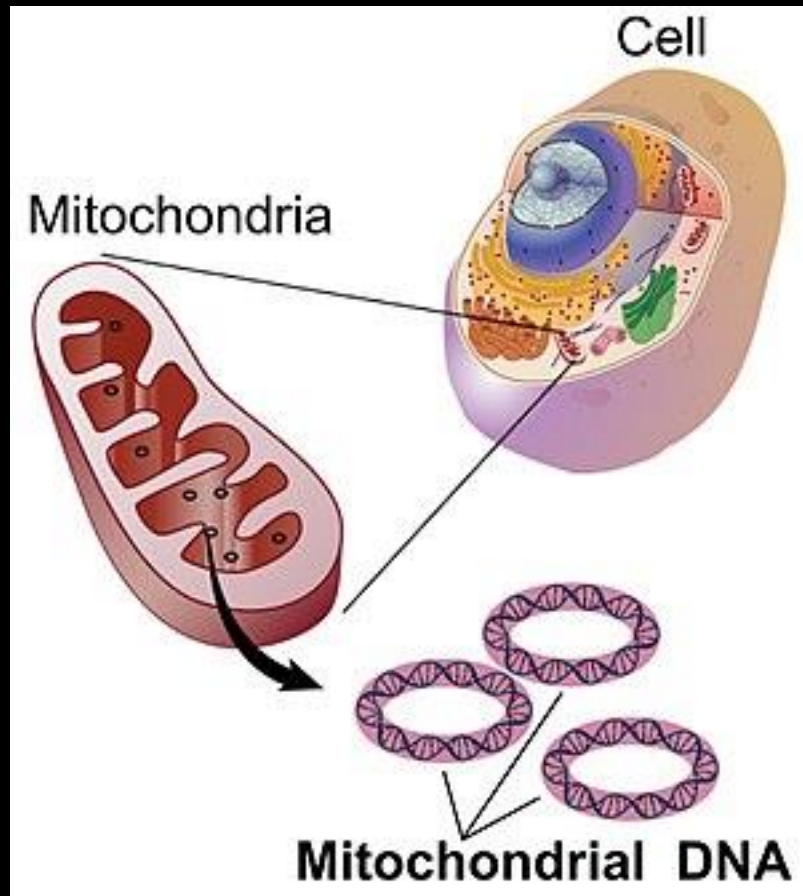
# THE BASICS OF DNA TESTING

By Jill Garrison, Genealogy Coordinator  
Frankfort Community Public Library

# TYPES OF TESTS

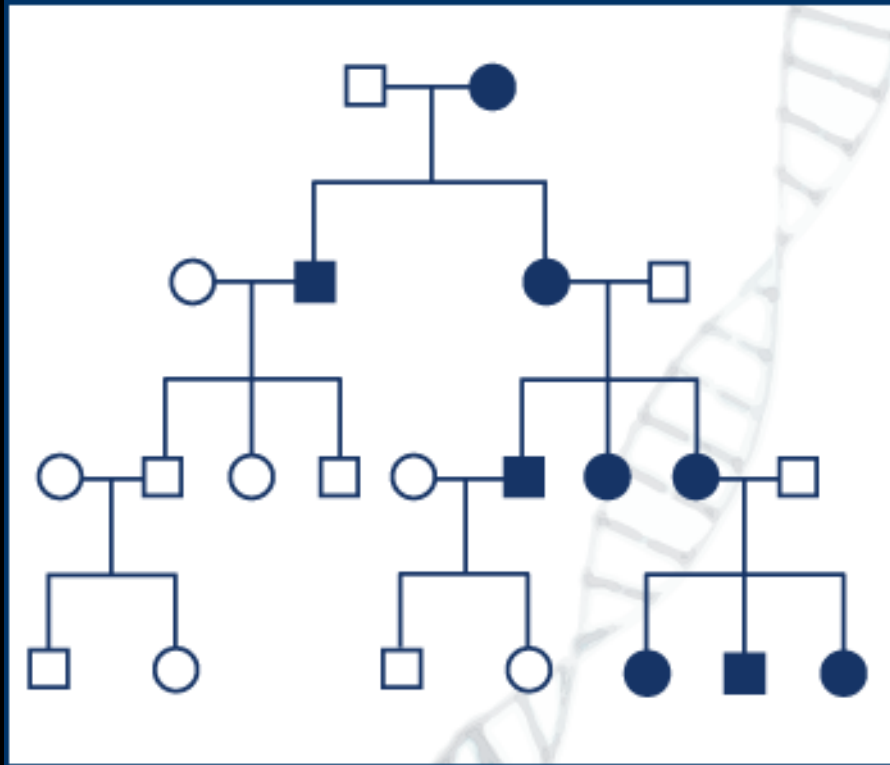
- Mitochondrial DNA (mtDNA/mDNA)
- Y-DNA
- Autosomal DNA (atDNA/auDNA)

# MITOCHONDRIAL DNA



- Found in the mitochondria of the cells
- Mitochondria convert the energy from food into a form that cells can use.
- Each cell contains hundreds to thousands of mitochondria.

# MITOCHONDRIAL DNA



- Passed on from the mother to her children ( both male and female) with very few mutations
- Mitochondrial DNA testing uncovers one's mtDNA haplogroup, the ancient group of people from whom one's maternal line descends.

# WHY MTDNA TESTING?

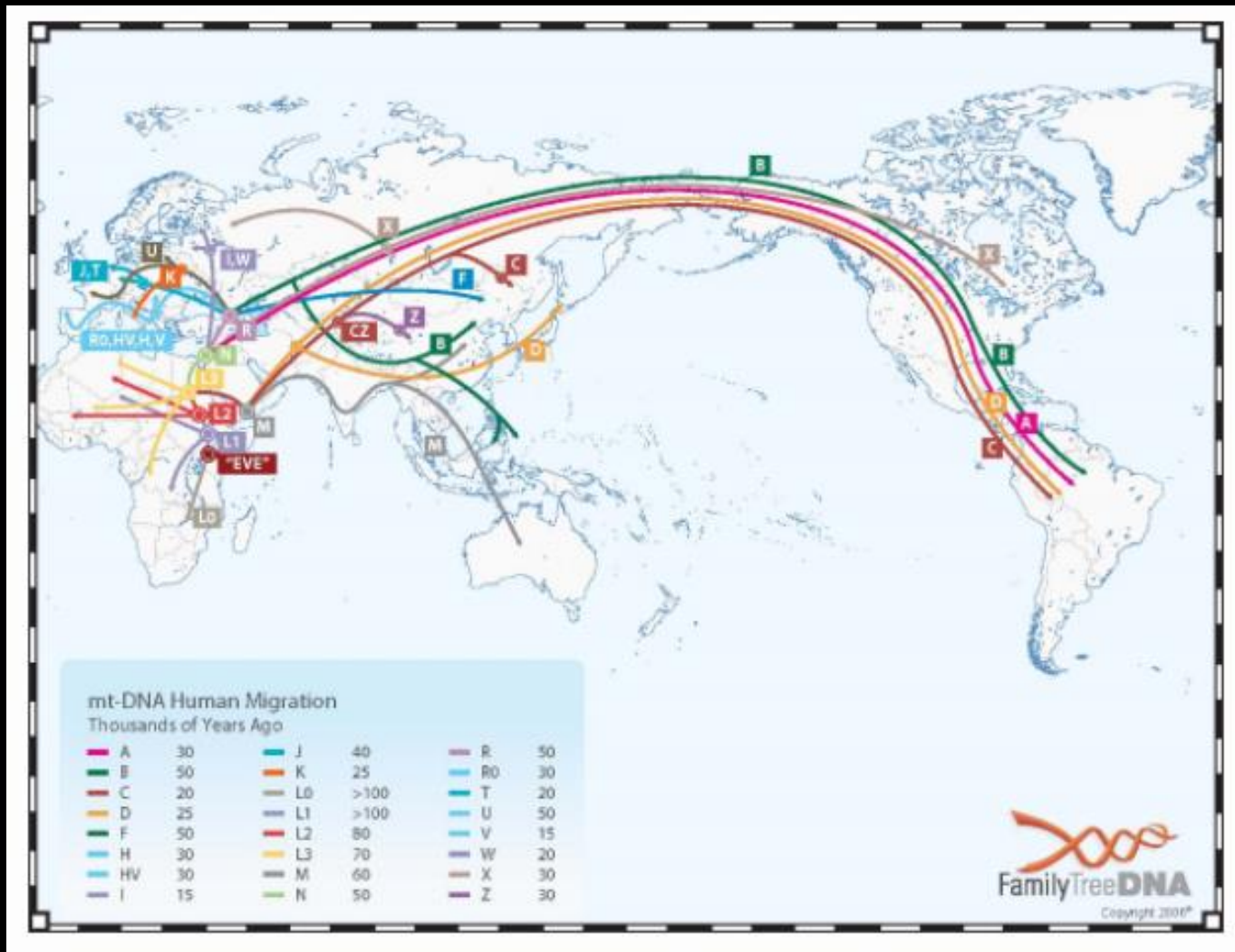
- Traces the direct maternal line
- Provides an ancestral migration route of your direct maternal line stretching back thousands of years
- Rule out a shared maternal ancestor
- Provides a list of matches who share common direct maternal ancestry within 52 generations

$25.5 \text{ years/generation} \times 52 \text{ generations} = 1326 \text{ years}$

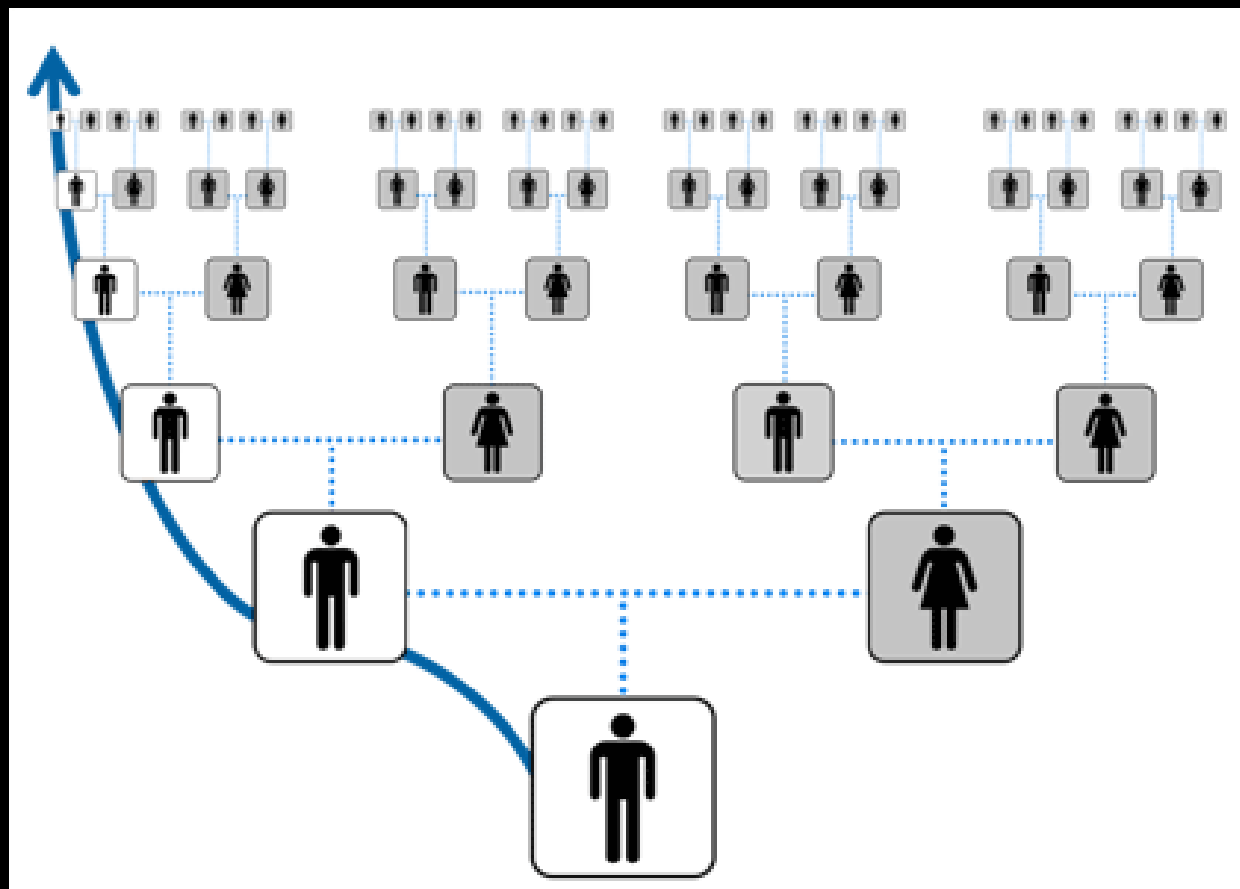
$2018 - 1326 = 692 \text{ A.D.}$



# MTDNA HAPLOGROUP MIGRATION MAP



# Y-DNA



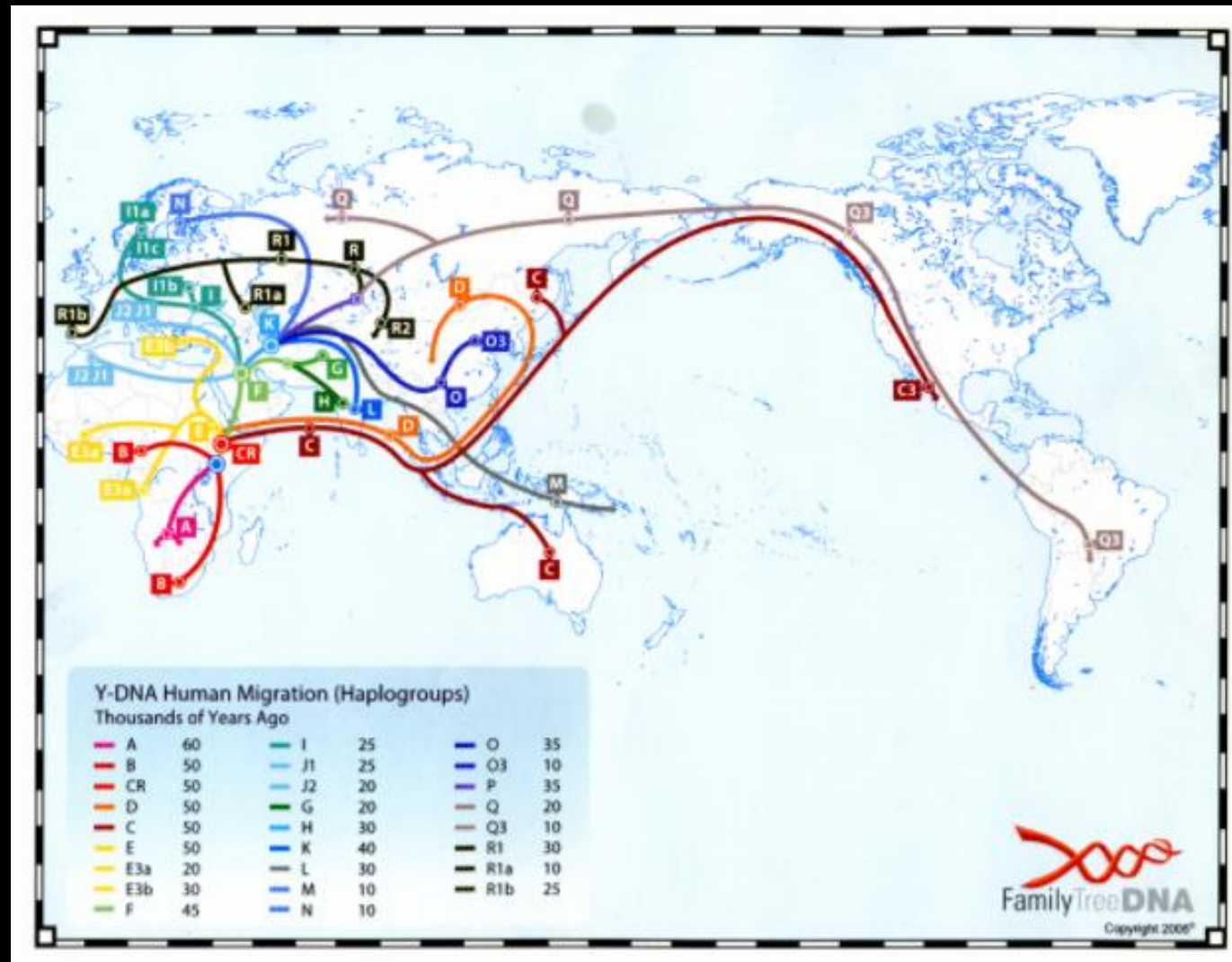
- Passed on from father to son with very few mutations
- Y-DNA testing uncovers one's Y haplogroup, the ancient group of people from whom one's paternal line descends.

# WHY Y-DNA TESTING?

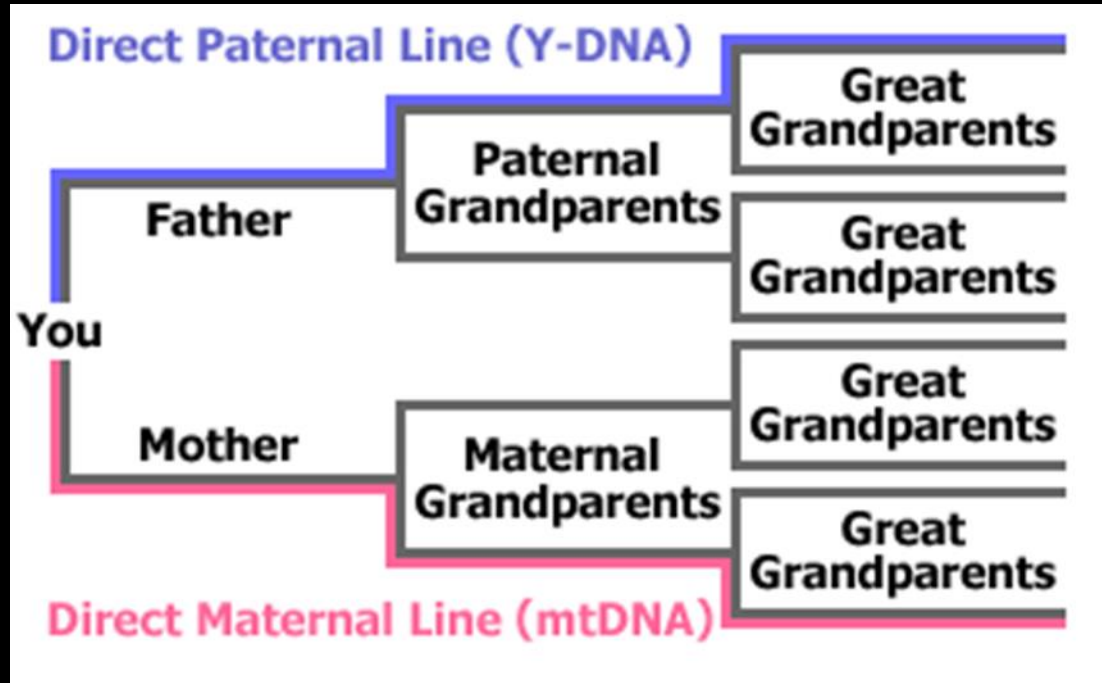
- Traces the direct paternal line
- Provides an ancestral migration route of your direct paternal line stretching back thousands of years
- Take part in a surname project
- Provides a list of matches who share common direct paternal ancestry within 25 generations
  - $25.5 \text{ years/generation} \times 25 \text{ generations} = 637.5 \text{ years}$
  - $2018 - 638 = 1380 \text{ A.D.}$



# Y-DNA HAPLOGROUP MIGRATION MAP



# REVIEW



- Both mtDNA and Y-DNA uncover deep ancestry.
- MtDNA testing goes straight back the direct female line.
- Y-DNA testing goes straight back the direct male line.

# AUTOSOMAL DNA



- Humans have 23 pairs of chromosomes (22 pairs of autosomes and one pair of sex chromosomes).
- Inherited from parents, grandparents, great-grandparents, etc.

# WHY AUTOSOMAL DNA TESTING?























































- Traces all ancestral lines
- Provides a percentage breakdown of the regions of the world from which your ancestors came
- Provides a list of matches who share common ancestors from any of your ancestral lines within the past 5 generations (great-great-great-grandparents)



# AUTOSOMAL DNA MAP



# AUTOSOMAL DNA MATCHES

All (3498)		Paternal (0)	Maternal (0)	Both (0)					
	Name	Match Date	Relationship Range	Shared Centimorgans	Longest Block	X-Match	Linked Relationship	Ancestral Surnames	
<input type="checkbox"/>	 Mr. Timothy A Garrison   	10/25/2016	Parent/Child	3,383	267	X-Match		Duval (Baltimore, MD) / Garrison (West Lebanon, IN)	
<input type="checkbox"/>	 Jennifer Jo [REDACTED]   	11/16/2016	2nd Cousin - 3rd Cousin	131	32				
<input type="checkbox"/>	 Doyne Leon [REDACTED]   	10/14/2016	3rd Cousin - 5th Cousin	102	16			Kropff (Germany) / Crum/Cron/Crom (Netherlands) / Stroop (Germany) /	
<input type="checkbox"/>	 James W [REDACTED]   	01/18/2018	3rd Cousin - 5th Cousin	76	16				
<input type="checkbox"/>	 Mr. james c [REDACTED]   	10/14/2016	2nd Cousin - 4th Cousin	76	33			taylor (missouri usa)	
<input type="checkbox"/>	 Karla McDonald [REDACTED]   	10/17/2016	2nd Cousin - 4th Cousin	74	40			Arnold (Texas, Arkansas) / Bailey (Texas, Georgia) / Caudle (Tennessee) /	
<input type="checkbox"/>	 John H. [REDACTED]   	10/14/2016	2nd Cousin - 4th Cousin	73	18			Cox / Braswell / Braswell / J / Brassil / Braswell / II / Cross / Durrant / Fereby /	
<input type="checkbox"/>	 Linda Denton [REDACTED]   	09/28/2017	3rd Cousin - 5th Cousin	71	16	X-Match		Booher (Virginia, USA) / Berry (Tennessee, USA) / Denton (Virginia, USA)	
<input type="checkbox"/>	 Mr. Donald Gordon [REDACTED]   	10/14/2016	2nd Cousin - 4th Cousin	68	27			Liles (AR) / Tollett (TX) / Edwards (TX) / Yarbrough (TX) / Carlisle (UNK)	



# TESTING COMPANIES



# ANCESTRYDNA PROS

- Has the largest database of DNA profiles

Date	Number of DNA Profiles
May 3, 2012	Launch
July 16, 2015	1 million
June 22, 2016	2 million
January 10, 2017	3 million
April 27, 2017	4 million
August 9, 2017	5 million
November 2, 2017	6 million

# ANCESTRYDNA PROS

- Largest database of DNA profiles (over 6 million)
- Migrations tool (formerly called Genetic Communities)
  - Identifies ancestors who are associated with one of more than 300 genetically based communities in the years between 1750 and 1850
  - Helps in the recognition of family migration patterns in the United States and overseas
  - Identifies your matches that are in the same migratory group

# ANCESTRYDNA PROS

- Ability to integrate genetic data with Ancestry's vast collection of digitized historical records and user-submitted family trees
- Frequent sales (regular price: \$79 since 7/12/2017)

# ANCESTRYDNA CONS

- Results from other companies cannot be uploaded to AncestryDNA.
- Test takers have the option to withhold their results from the match pool.
- Does not show that amount of shared DNA in centimorgans (cM)
- Lacking in genetic tools

# ANCESTRYDNA CONS

- Sometimes there are problems uploading AncestryDNA results to third-party tools.
- Matches cannot be contacted directly via e-mail.
- Subscription required for most analysis tools



# FAMILY TREE DNA PROS

- The only genetic genealogy company that offers a full range of mtDNA, Y-DNA, and autosomal tests.
- DNA results from other testing companies can be uploaded for free (\$19 charge to unlock the myOrigins ethnicity report)
- Offers a chromosome browser
- Identifies X-chromosome matches

# FAMILY TREE DNA PROS

- Shows the amount of shared DNA in cM
- Matches can be contacted directly via e-mail.
- The swab test is easiest for elderly people to use.
- The test taker can name a beneficiary.
- Take part in surname projects
- Frequent sales and bundles <https://www.familytreedna.com/products>

# FAMILY TREE DNA CONS

- Smallest database of DNA profiles (1 million for all DNA tests combined)
- Smallest number of ethnic population groups (24)

# 23ANDME PROS

- 2nd largest database (3 million)
- Offers a Health + Ancestry test
  - Genetic “Carrier” Status (40 conditions)
  - Wellness Reports (e.g., how your DNA influences your caffeine consumption, lactose digestion and muscle type)
  - Genetic Health Risk Reports (e.g., genetic variants for late-onset Alzheimer’s, Parkinson’s, and Celiac disease)
- Attracts a different clientele than the other companies because of its healthcare focus not just those interested in genealogy

# 23ANDME PROS

- New time and place table, which shows you when you might expect to find a common ancestor in a given place
- The Relatives in Common tool shows not only your relationship to your matches but your matches relationship to each other.
- Chromosome browser
- Now an ancestry only option is available.
- Ancestry reports also include the test takers mt- and Y-DNA haplogroups.

# 23ANDME CONS

- Doesn't have sales as frequently as the other two companies
  - Ancestry—\$99
  - Health + Ancestry—\$199
- The pedigree viewer is poor quality.
- Matches cannot be contacted directly via e-mail.
- Customer service is available only through e-mail.
- Low response rate from matches.



# TESTING WITH ALL THREE

- The experts recommend testing with all three companies because “fishing in all three pools” increases your likelihood of finding matches to help you with your genealogical brick walls.
- The most cost effective way to do this:
  - Test with AncestryDNA
  - Test with 23andMe
  - Upload results from AncestryDNA to Family Tree DNA
  - Upload results from either AncestryDNA or 23andMe to MyHeritage DNA