

Genetics and Genealogy

A presentation to NBGS Capital Branch

September 10, 2016

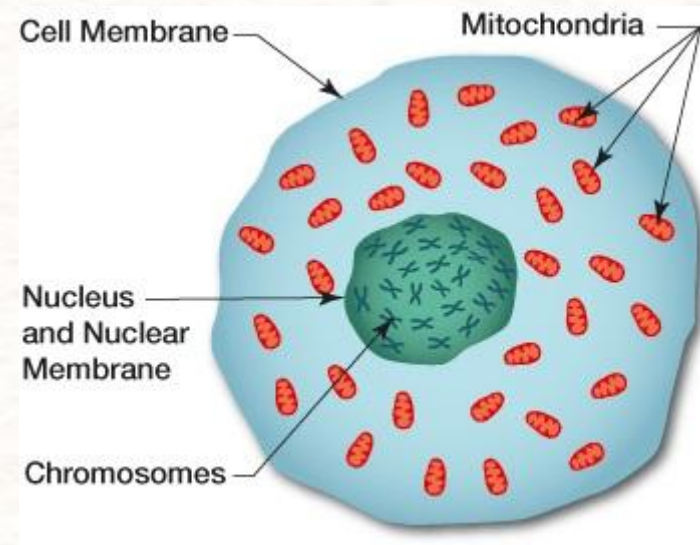
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Objectives and Agenda

- The objective of this presentation is to explain my family's experience with DNA testing and to try and remove some of the mystery around what can be a dauntingly complex science
- This presentation should help you decide if DNA testing is right for you
- Agenda
 - DNA for Genealogists
 - Our Brick Wall - Are Peter and David Cassidy related?
 - Our DNA Testing Experience at Family Tree DNA (FTDNA)
 - DNA Test Results and Tour of the FTDNA Website
 - Conclusion
 - Questions?

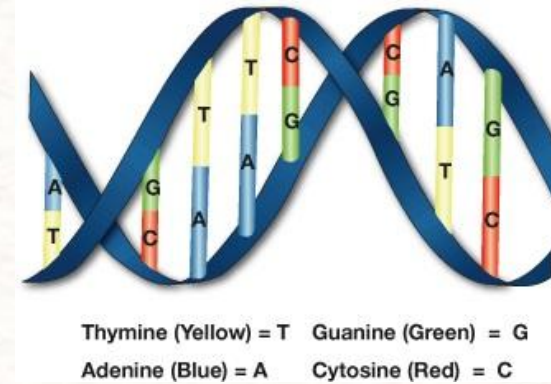
DNA and Chromosomes

- DNA contains genetic information passed from generation to generation
 - The genetic code is very similar for closely related people
- We all have 23 pairs of chromosomes within a cell nucleus
 - The 23rd chromosome is the sex chromosome
 - Of each pair, one is inherited from the mother and one from the father
 - The mother's contribution is always X
 - The father's contribution is X or Y
 - If X, then XX becomes a girl
 - Girls do not have a Y chromosome
 - If Y, they XY becomes a boy
 - Boys have both X and Y chromosomes

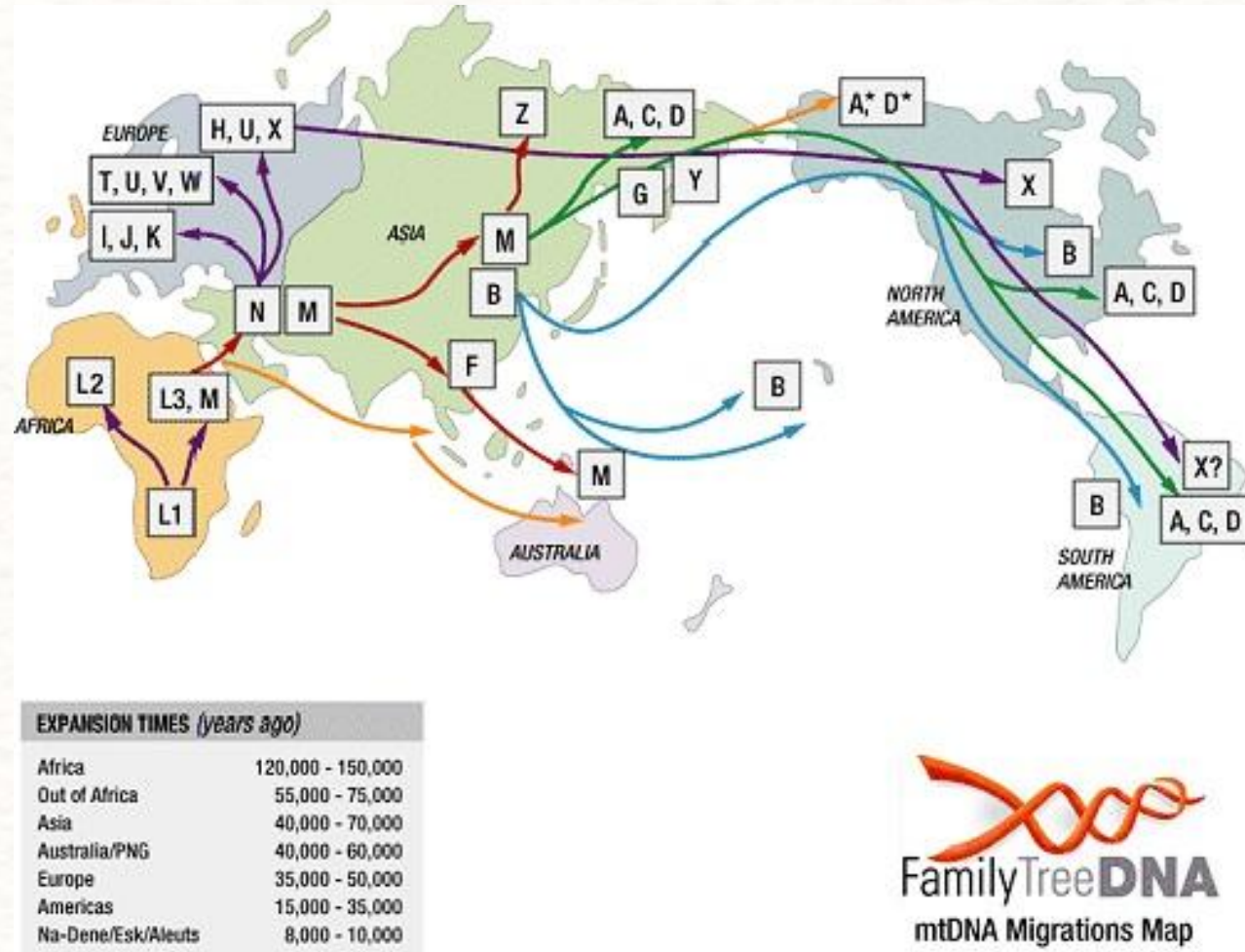


Y-Chromosome DNA, Markers and Haplogroups

- Only men have a Y chromosome
 - Passed from father to son
 - Provides information about the direct male line
- **Markers** are testing locations on the Y chromosome
 - Mutations are small changes in the DNA sequence
 - Take place at random intervals, typically once in 500 generations per marker
 - Helpful in identifying the ancient origin of one's population group
- **Haplogroups** are major population groups
 - Listed alphabetically (A, B, C etc.)
 - Examples: Europe, Africa, Asia, Pacific Islands, the Americas
 - Subgroups of haplogroups are called *subclades* and this can further refine one's ancestral origin



Haplogroups



Y-DNA Testing, STRs and Alleles

- Y-DNA testing is the most common form of genealogical DNA testing
 - This is the search for the MRCA (most recent common ancestor) in the direct male line
 - This test can predict your haplogroup
- It's key to success is the *close correlation between surnames and Y chromosomes*
- Male only testing since only men have a Y chromosome
- Markers (the testing points along the Y chromosome) have technical names like DYS#391 and DYS#439
- At each marker, a short DNA code repeats itself
 - This short section of code is called an *STR (short tandem repeat)*
 - The number of times an STR repeats is called the *allele value*

Finding a Match

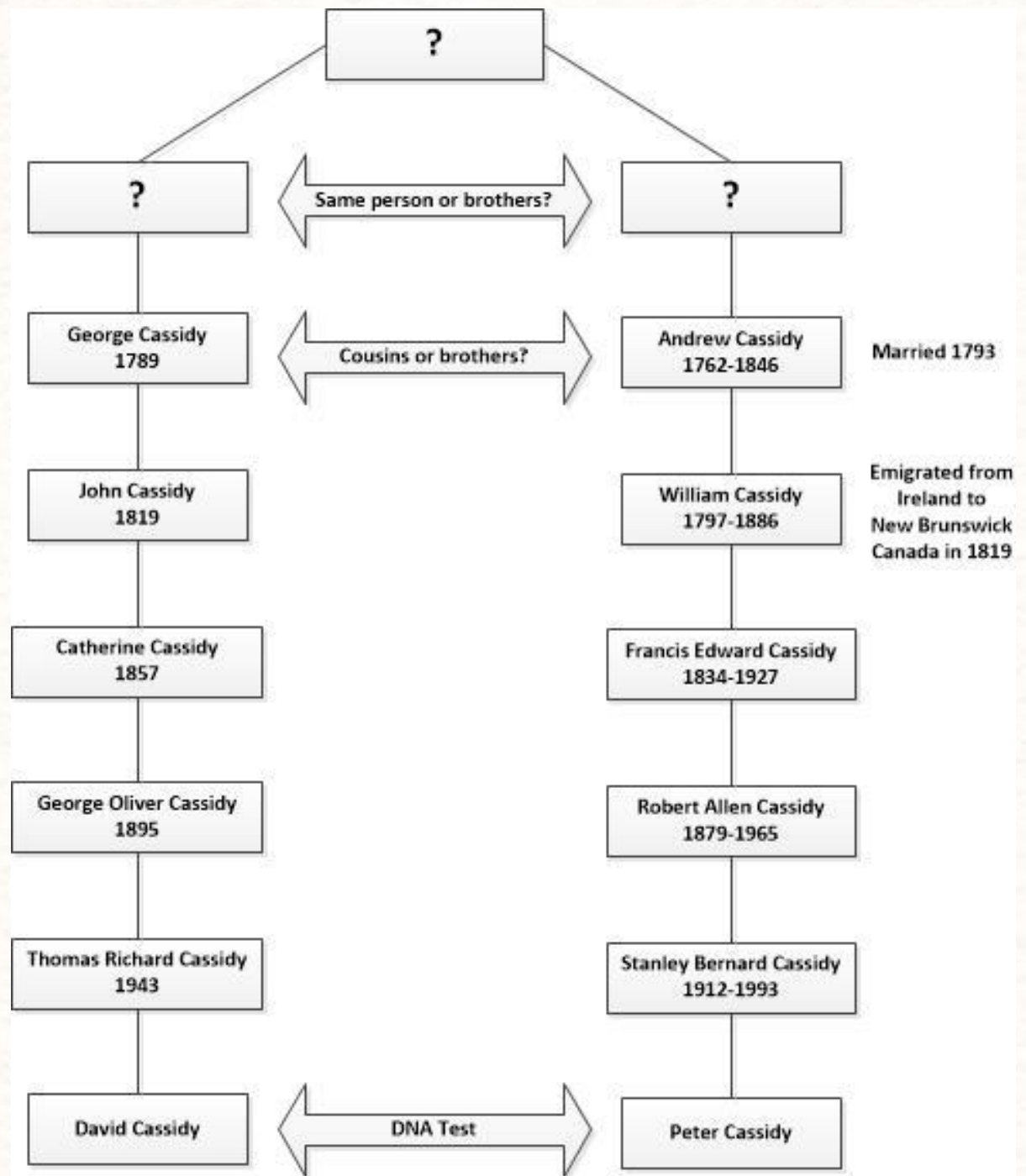
- The probability that two people are related is determined by comparing the allele values at each marker
- This matching service is provided by the DNA testing organization (in our case, FTDNA)
- The result is a comparison chart (called a Y-DNA TiP Report) showing generation by generation the probability that two people are related
- A *genetic distance* is assigned
 - Genetic distance is the number of differences or mutations between two sets of Y-chromosome DNA or mitochondrial DNA test results
 - The lower the genetic distance, the more likely two people are related
 - A person has a genetic distance of zero with their siblings (identical test results)

Our Brick Wall

Are David and Peter Cassidy related?

Trying since 1995 to connect these two family trees

Can DNA testing help?



Y-DNA Testing at Family Tree DNA

- Peter Cassidy set up an account at familytreedna.com and ordered a Y-DNA37 kit (37 markers) on July 18, 2015
 - Kit consists of two cotton “toothed” swab kits
 - <https://www.youtube.com/watch?v=AN07Adpu7Bs> (You Tube – How to Test)
- Requested personal information included the name and location of the oldest known male ancestor (Andrew Cassidy 1762-1846 County Donegal, Ireland)
- Kit number 430909 was assigned by Family Tree DNA
- Results obtained September 18, 2015
 - The basic results are a Y-DNA Certificate showing the markers and allele values



Certificate – Y-DNA

This Certificate confirms that you have had your DNA analyzed by Family Tree DNA. The outcome from each of the thirty-seven Loci examined is reported in the table below.

For your benefit we have listed the Locus designation for all thirty-seven Loci utilized by the geneticists supporting our company. If your alleles for the thirty-seven Loci match another person exactly, then you share the same Haplotype.

Family Tree DNA is a genealogical tool designed to aid individuals wanting to “connect” to other relatives lost in time and where the paper trail no longer exists.

Peter Cassidy

Your Kit # **430909**

Allele	DYS393	DYS390	DYS19	DYS391	DYS385	DYS426	DYS388	DYS439	DYS389-I	DYS392	DYS389-II
	15	23	16	10	13-15	11	13	10	13	12	30
Allele	DYS458	DYS459	DYS455	DYS454	DYS447	DYS437	DYS448	DYS449		DYS464	
	16	8-10	11	11	26	16	20	30		12-15-15-15	
Allele	DYS460	GATA-H4	YCAII	DYS456	DYS607	DYS576	DYS570	CDY	DYS442	DYS438	
	10	11	19-21	16	14	18	17	34-39	13	10	

Test Results on FTDNA Website

- Login to FTDNA website with kit number and password
- Available Information and Activities
 - Print Y-DNA Certificate
 - View and/or download Y-STR results
 - *View close DNA matches with other persons in the FTDNA database*
 - View haplogroup information
 - View ancestor migration map
 - Link to FTDNA forums (Resources Menu)
 - Join a family project at World Families website (Projects Menu)
 - Peter has joined the Cassidy project at worldfamilies.net
- [FTDNA](#) website tour

Observations from Peter's Y-DNA37 Test

- Our haplogroup is I-M223 (Europe / Ireland)
- Peter and David Cassidy are almost certainly related within 6 or 7 generations
- It is worthwhile for both David and Peter to continue digging through ancestral records in an attempt to establish a hard connection
 - Our current research goes back only 5 generations
 - Adding even one more generation is very difficult because Ireland birth and death records from the early to mid 1700s are difficult to locate. Many such records were lost in the Dublin fires during the 1920s.
- Without a hard link between Peter and David, David's tree information cannot be added to our Cassidy Family database because our database system (PhpGedView) does not support *possible* relations.

Are We Related?

- Our family website: www.cassidys.ca
- The Genealogy Section has a Research Guide
- The Research Guide has an **Are We Related** section which helps people determine if their family may be related to ours
- The **Are We Related** section has been expanded to include information on DNA Matching (our experience and some general information on the subject)
- View the **Are We Related** page at our family [website](#)

Conclusions and Recommendations

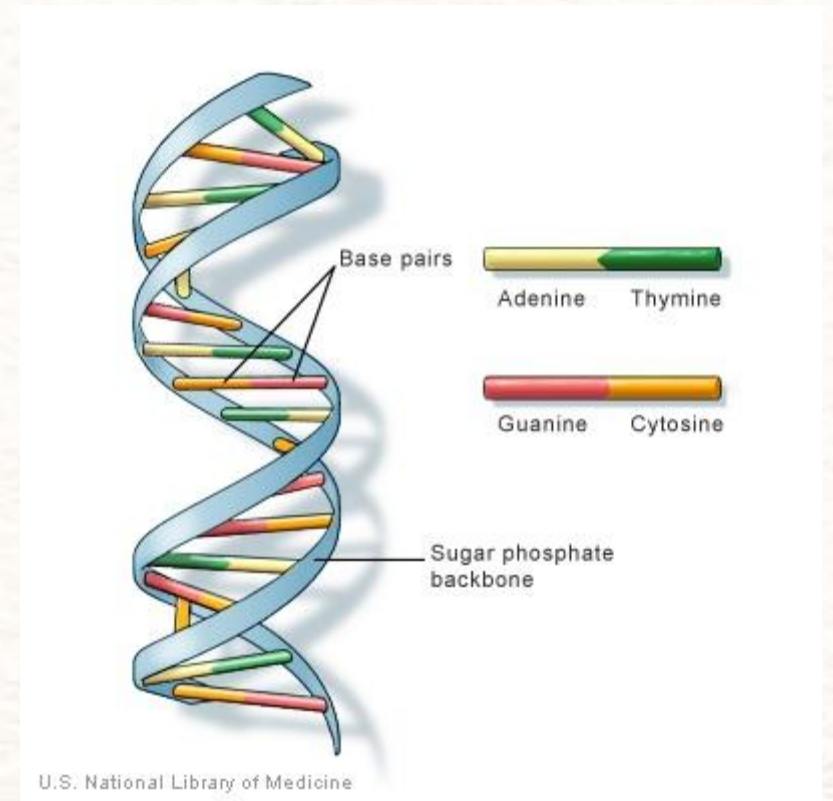
- DNA testing made it clear that it's worth digging through genealogical records to find a specific connection between Peter and David Cassidy since our MRCA is likely not more than 6 or 7 generations ago
- Now that Peter's DNA is registered with FTDNA, we expect to find other matches in the future as more people submit their DNA for testing
 - We can find out which relationships are worth pursuing
- The Y-DNA37 test (37 markers) is sufficient to establish family paternal (surname) relationships. The tests with 67 or 111 markers will give a closer match probability but they cost is significantly higher and we don't see the value for this type of work.
- We strongly recommend that people begin their DNA testing at the same time with another individual with whom you are trying to establish a relationship rather than waiting to see who is out there (in the FTDNA database) that might be related.
- The better one's family tree is known, the better chance of establishing a link to other family members who are also doing DNA testing

Conclusions and Recommendations

- We have found genealogical DNA testing to be educational, interesting and useful
- DNA testing may not break down your brick walls but it should put a crack in them
- DNA testing is yet another modern day tool in your genealogy toolkit

Sources, References and Credits

- Research Information
 - Family Tree DNA
 - DNA Testing
 - *Understanding DNA*
 - *Understanding your Y-DNA37 Results*
 - New England Historic Genealogical Society
 - *American Ancestors Newsletters* (various articles on DNA)
 - PANB Containers 26672 and 69193
 - International Society of Genetic Genealogy (ISOGG) (isogg.org)
- Photographs and Charts
 - Family Tree DNA
 - Getty Images
- Credits
 - New Brunswick Provincial Archives Staff
 - Peter Cassidy and David Cassidy (DNA contributors)



More Info and Questions

- An expanded version of this presentation is planned for the 2017 NBGS Spring Seminar Series. The proposed title of this presentation is: *Using DNA Testing to Explore One's Family History*.
- Questions?

