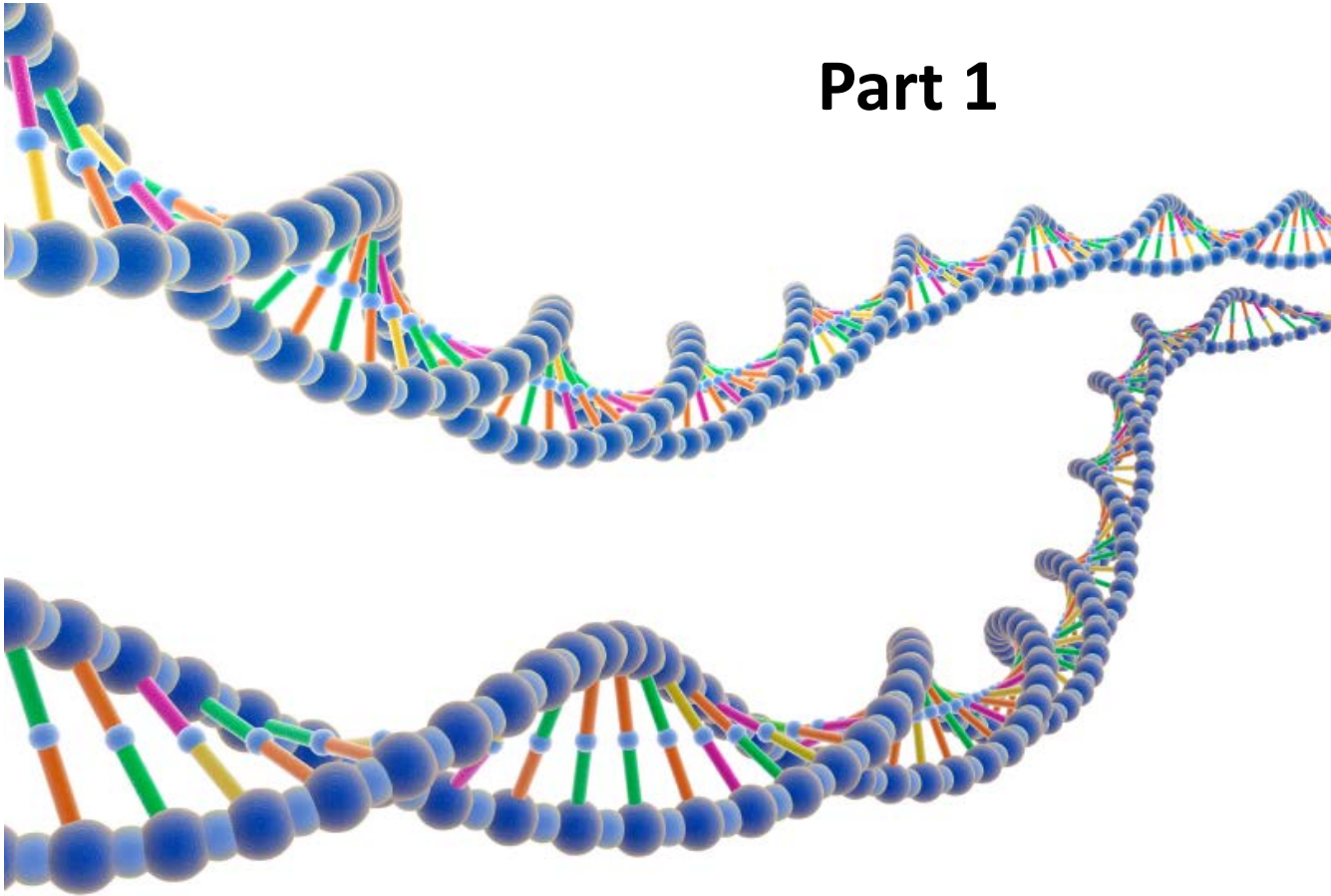


DNA and Genealogy

Part 1

Earl Schultz

(Some slides by
Willi H. Wiesner, Ph.D.)



- Genetic Genealogy, The Basics and Beyond – Emily Aulicino
- International Society of Genetic Genealogy:
www.isogg.org
- Genetic Genealogy blogs



DNA Testing

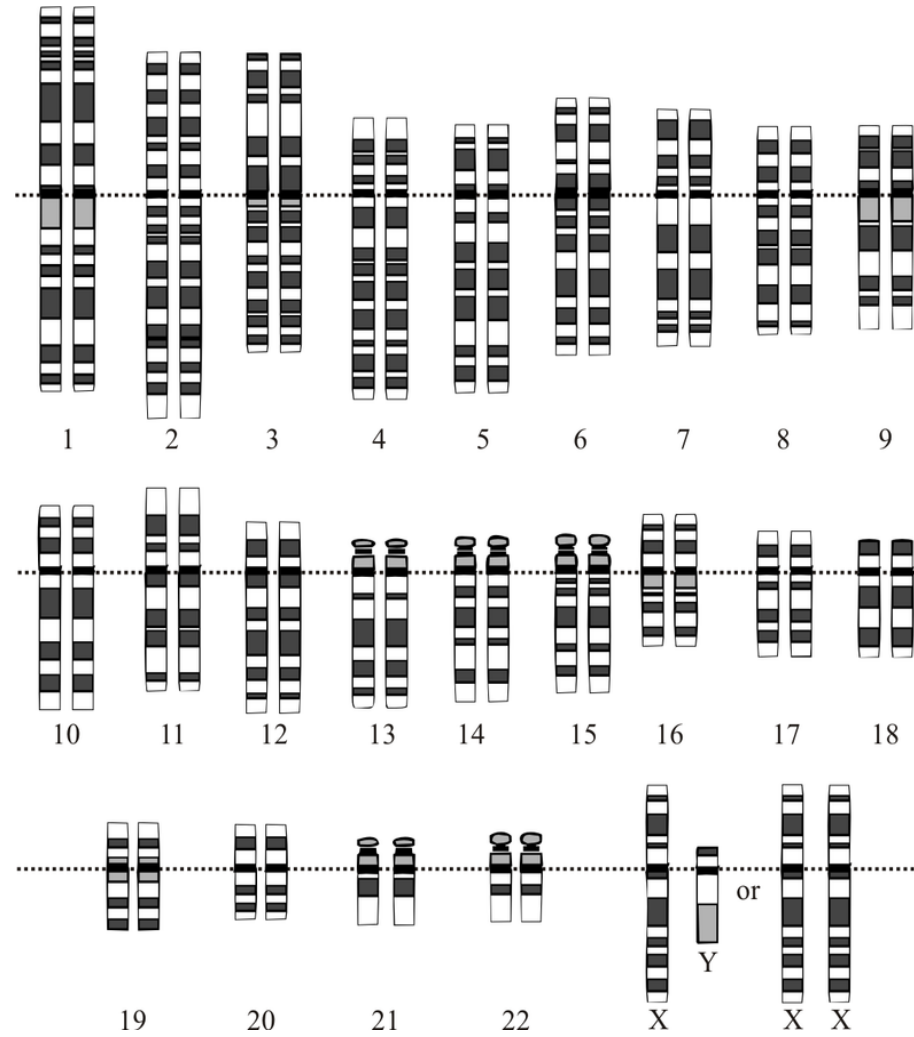
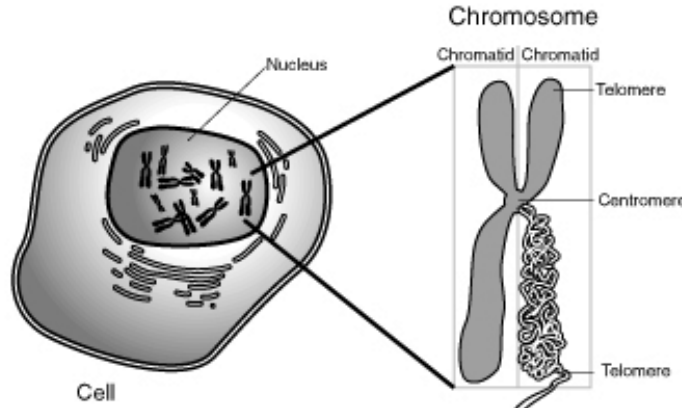
Why?

- Brick Walls
- Confirm/Correct Relationships
- Find New Cousins
- Make New Discoveries
- Ancestry Composition (you might be surprised)
- Leave a Legacy

Why Not?

- Cost
- Privacy Concerns or Concerns About Misuse
- Don't Want to Know About Skeletons in the Closet
- Already Know Everything
- Don't Want New Cousins/Contacts

Human Chromosomes

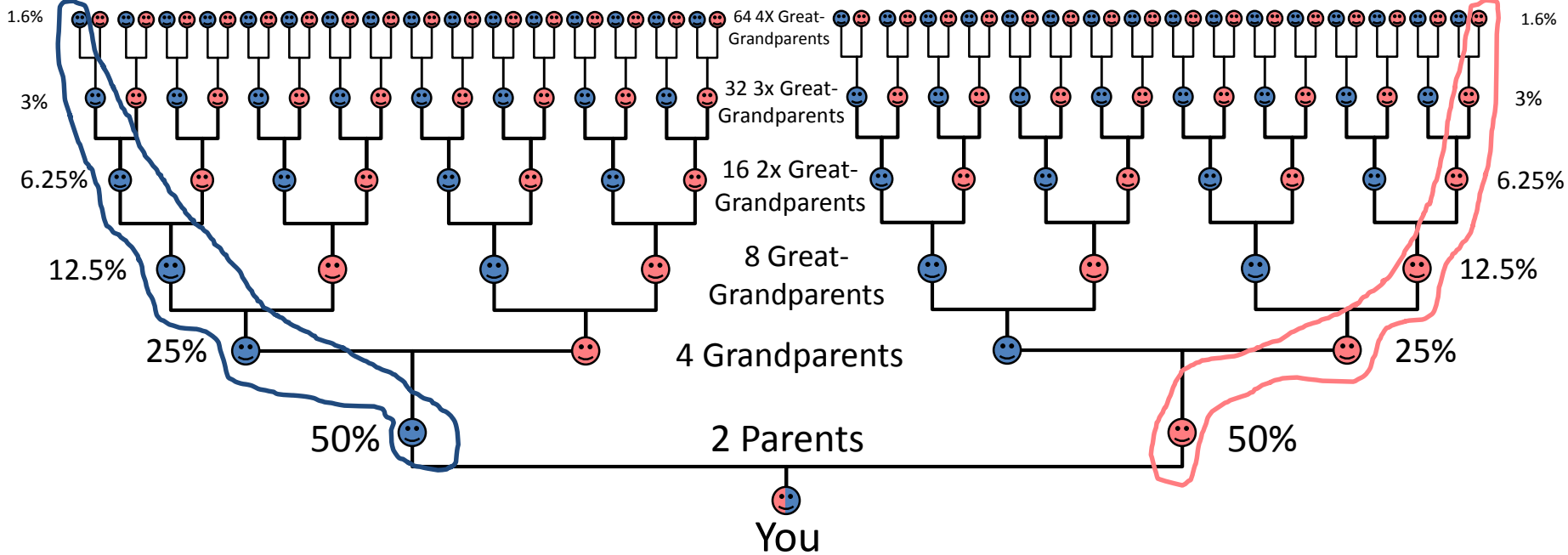


Kinds of DNA Tests

Y-DNA

Autosomal DNA

MtDNA





Main Testing Companies: FTDNA

Family Tree DNA (FTDNA) – cheek swab (over 800,000 cust.)

Single Tests – All USD Funds

- Family Finder (Autosomal) - \$99
- Y-DNA (37 – 111 markers) - \$169 - \$359
- MtDNA (Full Sequence) - \$199

Packages (no savings)

- Family Finder & Y37 - \$268
- Family Finder & MtDNA (full) - \$298
- Comprehensive Genome (Family Finder, Y67, MtDNA (full) \$566

Transfers from Ancestry or older 23andMe results

- Family Finder - \$39
- Y-DNA (+ Upgrade to Y37) - \$19 (\$58)

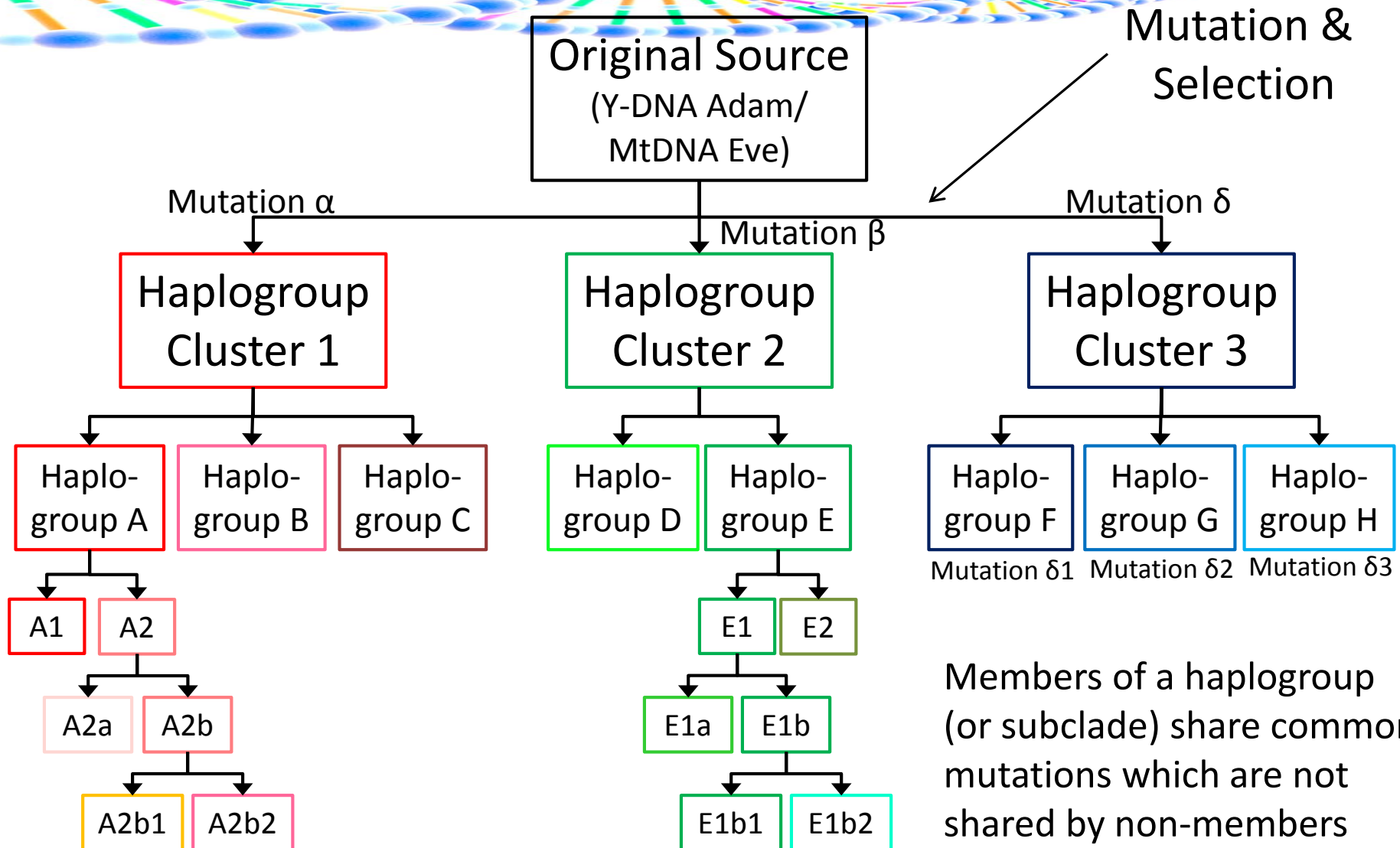
FTDNA has occasional sales



Main Testing Companies (Cont'd)

- **23andMe** – saliva sample (over 1,000,000 customers)
 - Y-DNA, MtDNA, Autosomal DNA, Health - \$249 CAD
 - Matches must be willing to share genomes to compare DNA segments using 23andMe's messaging system
- **Ancestry** – saliva sample (almost 1,000,000 customers)
 - Autosomal DNA - \$149 CAD (plus Ancestry subscription for some services)
 - No information about matching chromosome segments
 - Contact matches through Ancestry's messaging system
- **National Geographic Geno 2.0** – cheek swab (over 200,000)
 - Y-DNA, MtDNA, Autosomal DNA - \$149.95
 - DNA matches are not identified

Y-DNA and MtDNA: Simplified Haplogroup Trees





Using y-DNA to Uncover your Paternal Line

- Minimum 37 marker test
- If you have close matches or a common surname or a surname project exists, go to a higher marker test – 67 or 111 markers
- Y-DNA can take you back 1,000s of years, even back to Adam



Using mt-DNA to Uncover your Maternal Line

- mt-DNA FS (Full Sequence) is only one genealogically worthy
- mt-DNA does not mutate very fast so best used to solve maternal line problems
- If you have close matches (gd=0, ie. Genetic distance of zero), your common ancestor could still be 20 generations ago.
- mt-DNA can take you back 1,000s of years to Eve

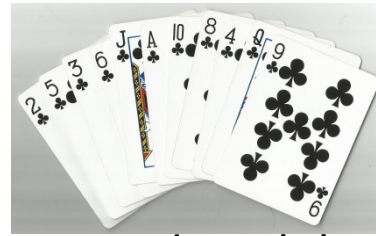
Autosomal DNA: Recombination of Your Ancestors



Grandpa Spade



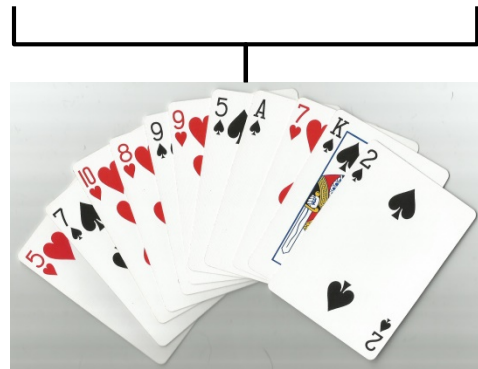
Grandma Heart



Grandpa Club



Grandma Diamond



Dad Spade



Mom Club



Brother



You



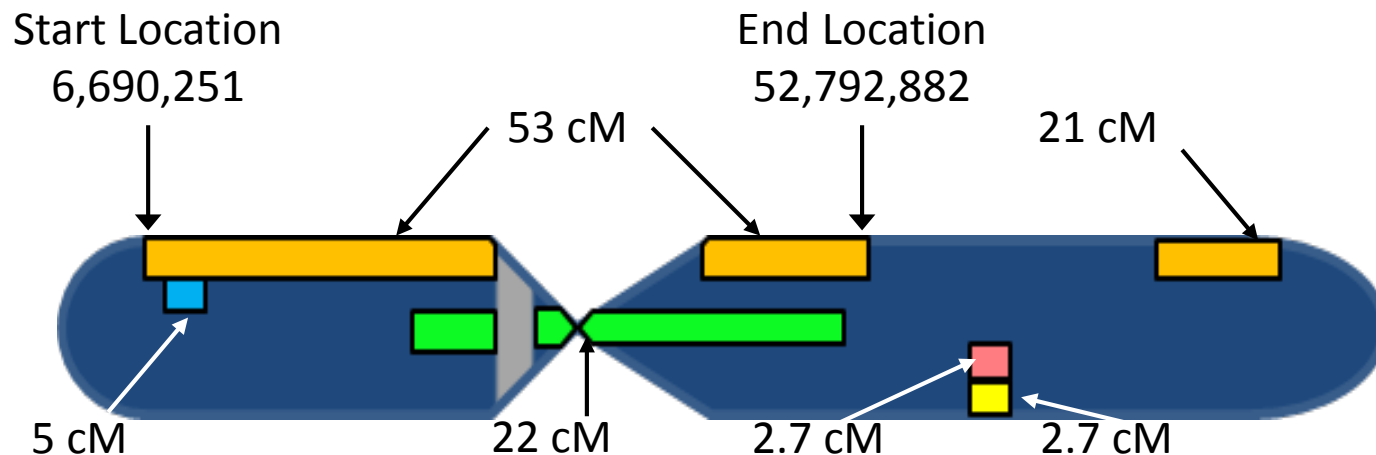
Sister

Centimorgan (cM)

CentiMorgan (cM) is a unit of recombinant frequency which is used to measure genetic distance. It is often used to imply distance along a chromosome but it takes into account how often recombination occurs in a region.

From: <http://www.isogg.org>

Example from FTDNA for Chromosome 16

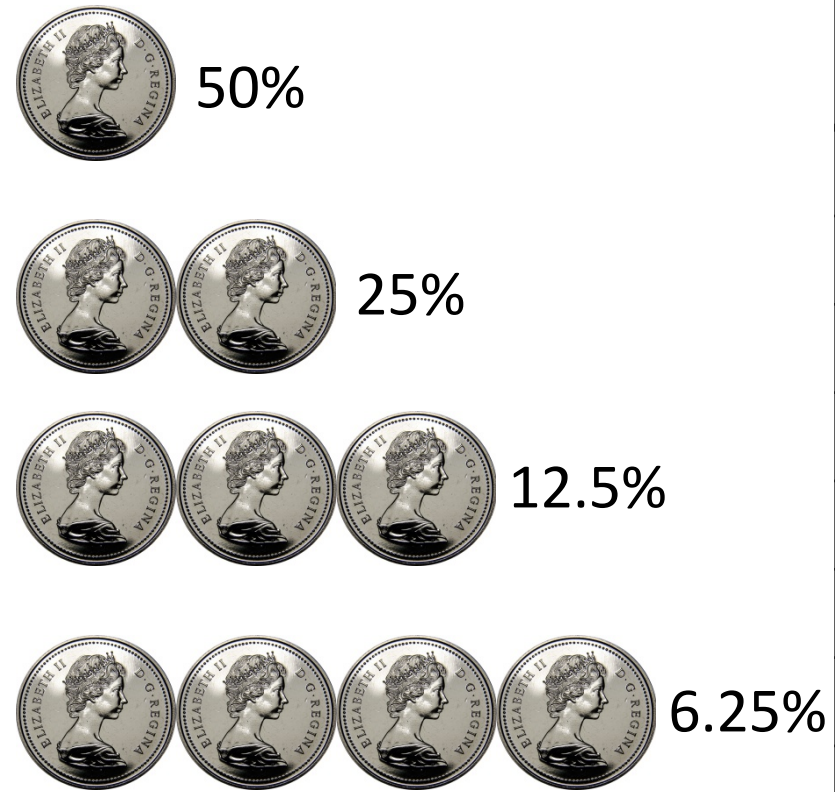


Probability of Identifying a True Match (IBD) Given the Thresholds Used

Relationship	Probability of Finding Match	Matches Missed (Type II Error)
1 st Cousin	100%	0%
2 nd Cousin	> 99%	≈ 1%
3 rd Cousin	>90%	≈ 10%
4 th Cousin	> 50%	≈ 50%
5 th Cousin	> 10%	≈ 90%
6 th Cousin or more distant	Typically < 2%	> 98%

From FTDNA FAQ

Probability of Multiple Matching Segments at 3.5 cM



Segments	IBS (by Chance)	IBD (Real Match)
1	67%	33%
2	45%	55%
3	30%	70%
4	20%	80%
5	14%	86%
6	9%	91%
7	6%	94%
8	4%	96%
9	3%	97%
10	2%	98%
11	1%	99%

Based on Durand, E.Y. et al. (2014)



FTDNA.COM

Let's look at my Dashboard in FTDNA.COM