How to Use DNA in Your Genealogical Research

William Remus
Emeritus Professor of Information Technology Management
University of Hawaii
Honolulu, HI 96822
Email: Remus@hawaii.edu
www.remus.shidler.hawaii.edu/

Remus?

- Rem (pronounced Rehm) = Saxon clan name for those who punch holes (in people using spears). Lots of Rem in Bavaria and Saxony from 1300.
- -us A Latin suffix added by those associated with the Catholic church around 1500 (very fashionable then)

What Genealogical Questions Can Be Answered Using DNA Analysis?

A. Gaps in family records

- Missing and destroyed church books and civil records
- No records exist at all

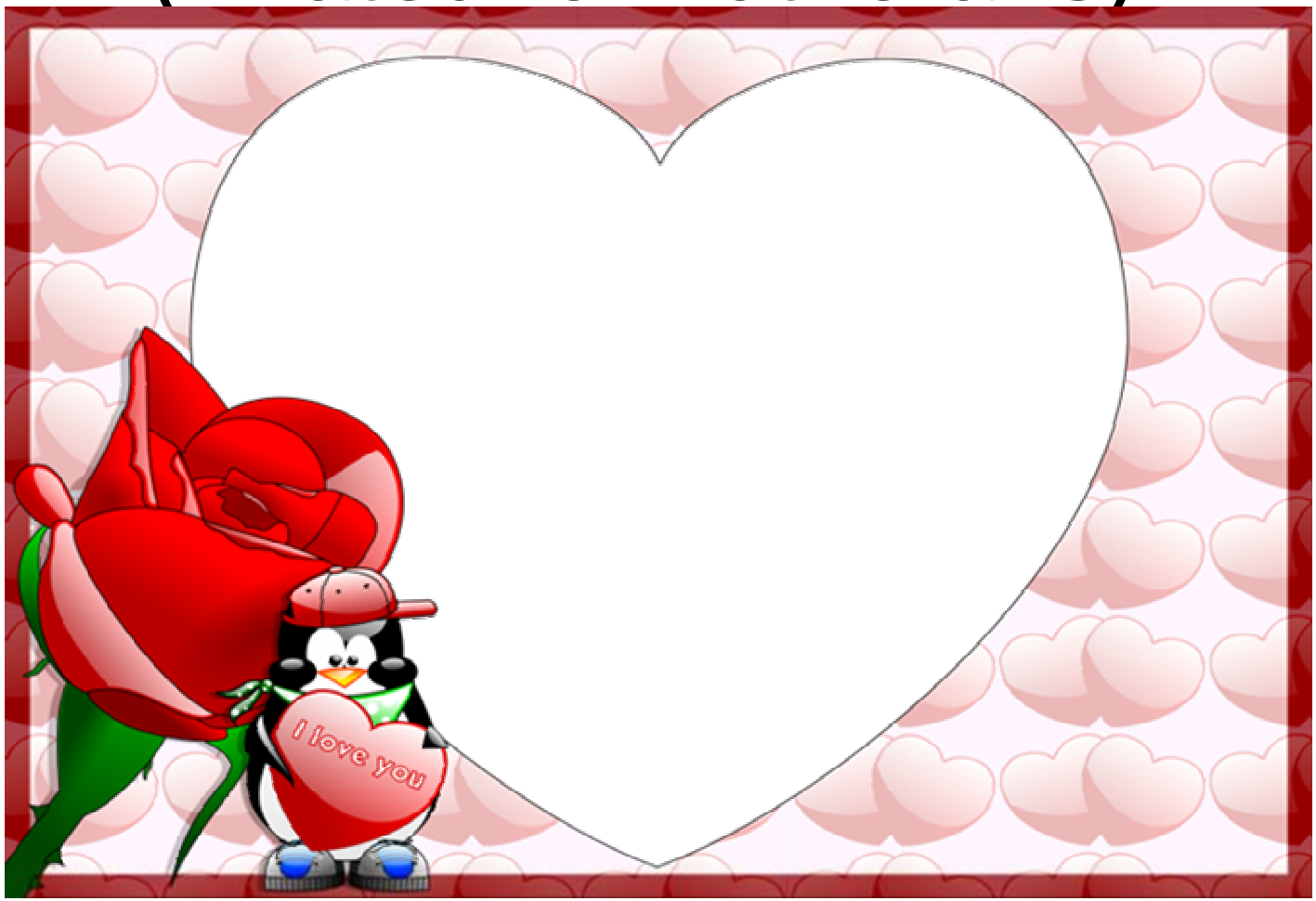
B. Finding if you are related to others with the same or a similar surname

- If you cannot cross the Atlantic with your and their documentation, DNA will do it and find out if there is a common ancestor

C. Solving various family mysteries

- Natural or adopted?
- American Indian roots?
- Famous relative?

First Some Birds and Bees
(L rated for Lutherans)



And Soon …

Notice the variety in children…

- This is created when the mother and father's DNA merge to create the new child.
- Each merging of DNA is different than any other so couples get a variety of children.
- And since the DNA both the mother and father provide are from their ancestors each new child reflects in a different way their ancestors.

DNA Bottom Line

- Boys get their 23rd chromosome (the Y chromosome) from their father. So boy's Y chromosome traces their paternal line.
- Children get their mitochondrial DNA from their mother. So children's mitochondrial DNA traces their maternal line.

What the Birds and the Bees Can Tell You

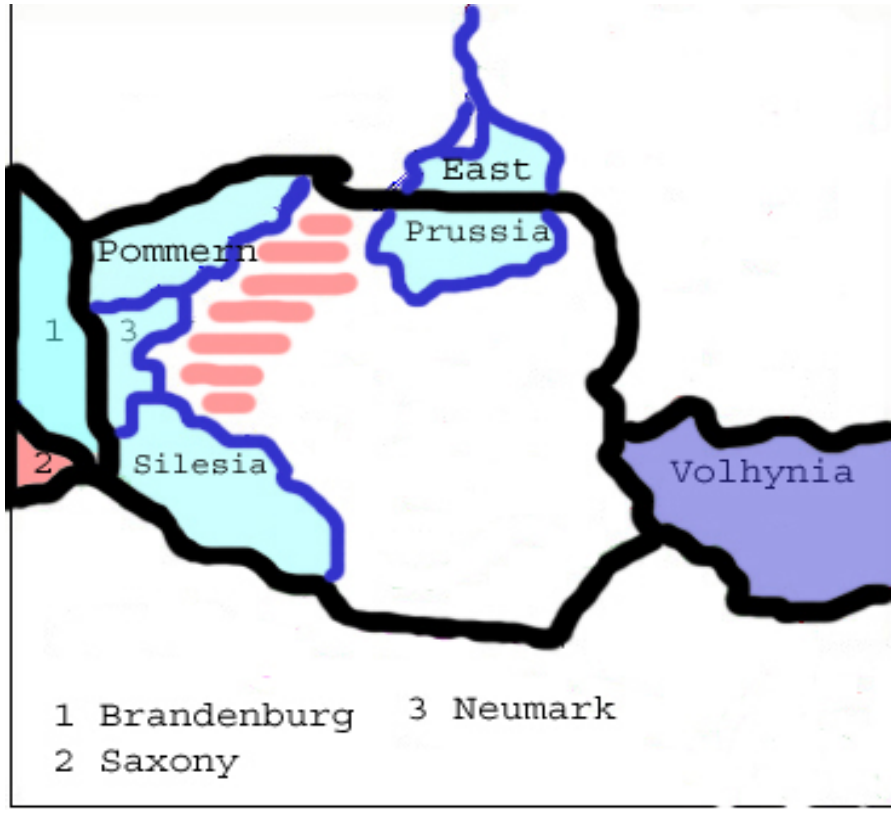
Case Study I: Who is Franz Remus' father?

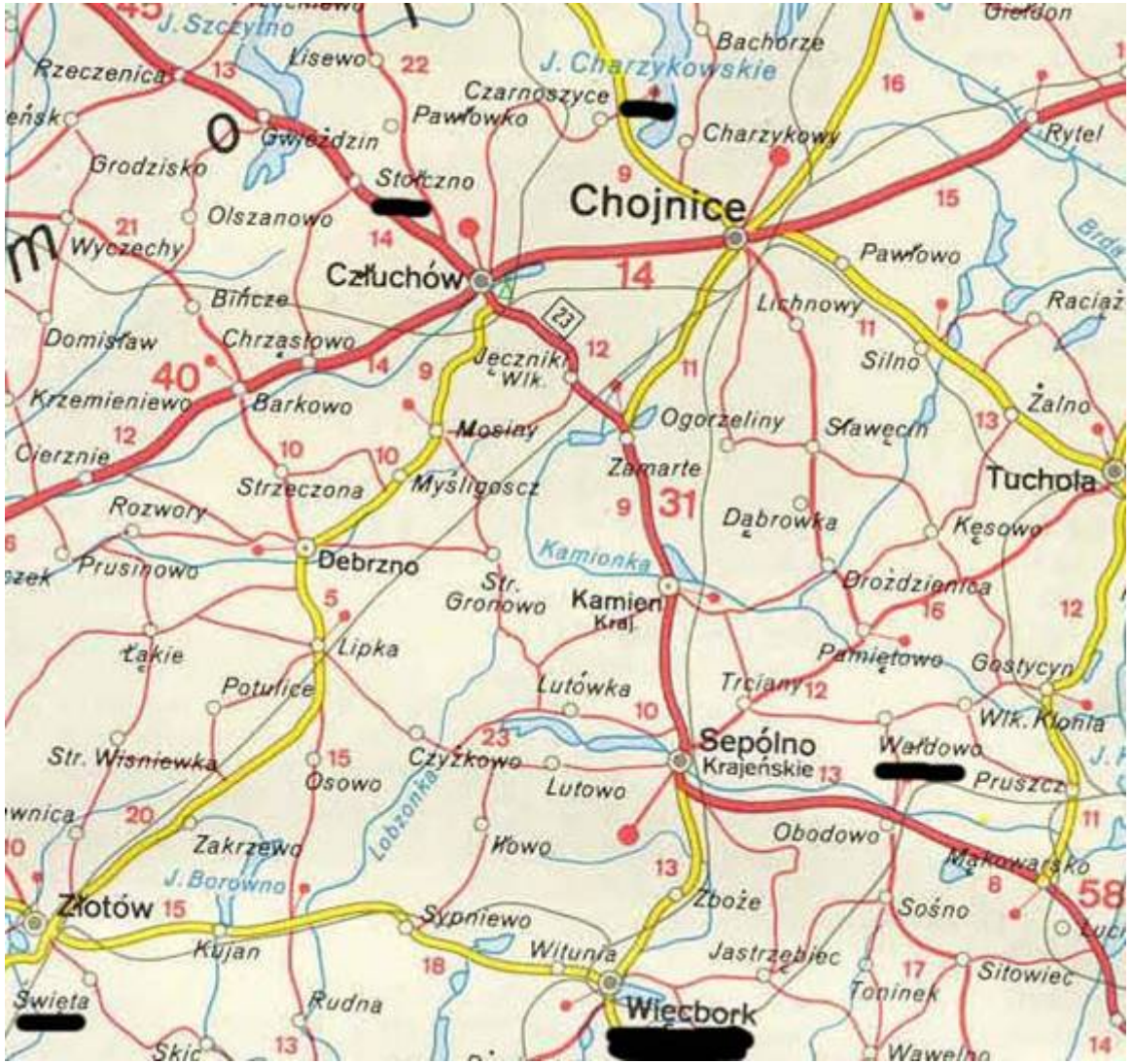
- Who is Franz Remus? Postmaster of Vandsburg born about 1755 (Deutsche Geschlechterbuch vol 62 from 1929)
- West Prussia 1772 Land Census gives us many Remus family members, three have sons name Franz born about the right time http://www.odessa3.org/collections/land/wprussia/

- Peter Remus the Shepherd in Waldowo?
- Franz Remus the wealthy farmer of Stretzin living with his daughter in Rotzellen?
- Martin Remus the village head of Schwente?

- First: What we know without DNA analysis
- Second: What DNA analysis tells us about this question

Migrations 1700 to 1772




J. Szczytno
Rzeczenica
Lisewo
Bachorze
J. Charzykowskie
Czarnoszyce
Pawłowko
Charzykowy
Rytel
Grodzisko
Gwiazdzin
Stoczno
Chojnice
Olszanowo
Wyczechy
Człuchów
Pawłowo
Racia
Bińcze
Lichnowy
Domisław
Chrząstowo
Jeczniki Wlk.
Silno
Krzemieniewo
Barkowo
Mosiny
Ogorzeliny
Sławęcin
Żalno
Cierznie
Zamarte
Tuchola
Strzeczona
Myślęgoscz
Rozwory
Dąbrowka
Kęsowo
Debrzno
Kamionka
Prusinowo
Str. Gronowo
Kamień Kraj.
Drożdzienica
Łąkie
Lipka
Pamiętowo
Gostycyn
Potulice
Lutówka
Trojany
Wlk. Klonia
Sepólno Krajeńskie
Waldowo
Str. Wisniewka
Czyżkowo
Osowo
Lutowo
Pruszcz
Obodowo
Zakrzewo
Kowo
Makowarsko
J. Borowno
Złotów
Zboże
Sośno
Sypniewo
Kujan
Witunia
Jastrzębiec
Sitowiec
Toninek
Swieta
Rudna
Więcbork
Wawelno

How would you approach this problem using DNA analysis?

Selecting the DNA Sample

- Peter the Shepherd – me
- Martin of Schwente – Horst Remus of IBM
- Franz of Stretzin – no known person

Is that all?

Selecting the DNA Sample

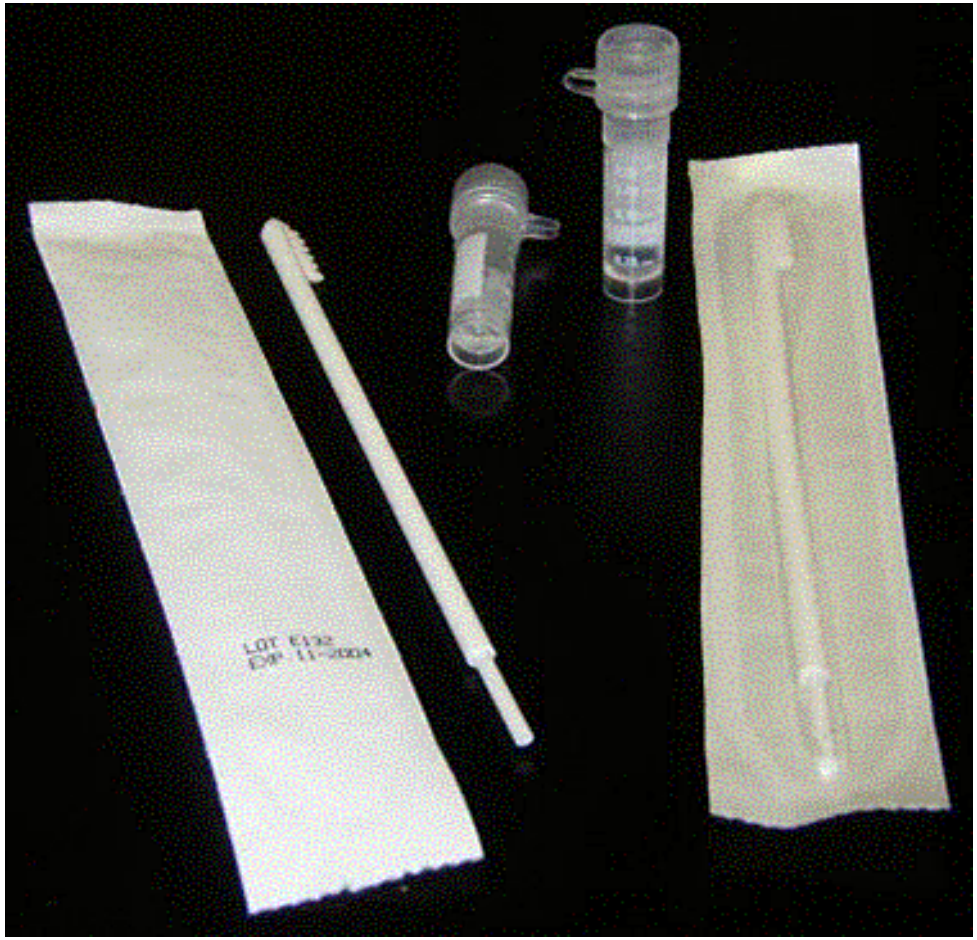
- Peter the Shepherd – me
- Martin of Schwente – Horst Remus of IBM
- Franz of Stretzin – no known person

Is that all?

- Franz of Vandsburg – Marc Remus of Koln

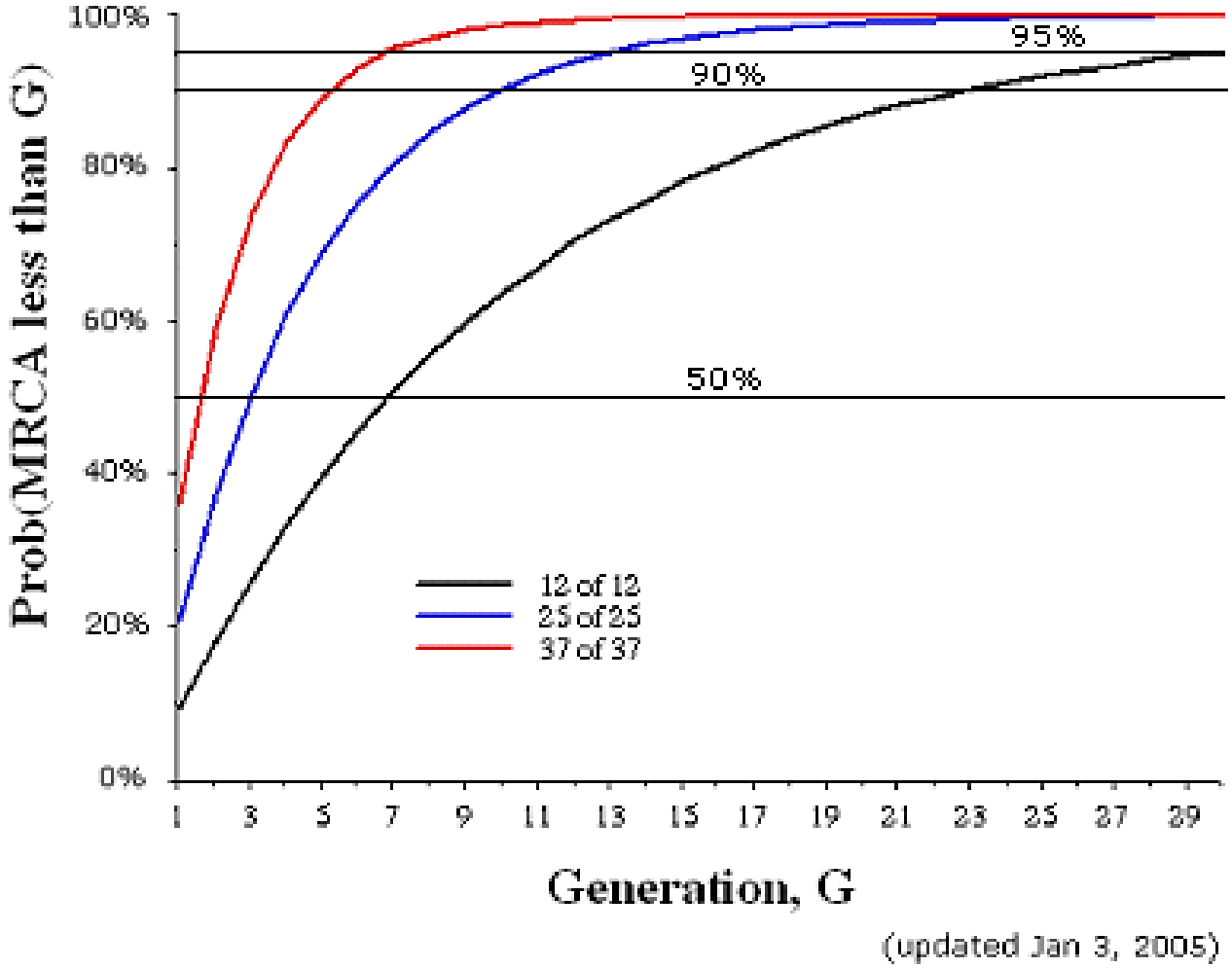
FamilyTreeDNA

All it takes is a swab!



Processing the DNA Sample

Locus	DYS#	Alleles
1	393	13
2	390	25
3	19*	16
4	391	10
5	385a	11
6	385b	14
7	426	12
8	388	12
9	439	11
10	389-1	13
11	392	11
12	389-2	29
13	458	16
14	459a	9
15	459b	10
16	455	11
17	454	11
18	447	23
19	437	14
20	448	19
21	449	32
22	464a	12
23	464b	13
24	464c	13
25	464d	15
26	464e	15
27	464f	15
28	464g	16



(updated Jan 3, 2005)

What the Birds and the Bees Can Tell You

Case Study II: Is August Remus related to Franz or Peter?

- Franz Remus Postmaster of Vandsburg born about 1755 (Deutsche Geschlechterbuch vol 62 from 1929) and son of Martin Remus the village head of Schwente
- Peter Remus the Shepherd in Waldowo?
- Neither

- August Remus is a blacksmith born in 1815 near Vandsburg. He worked on manorial estates in Mrotschen and his children ended up migrating to the Chicago area.

- First: What we know without DNA analysis
- Second: What DNA analysis tells us about this question

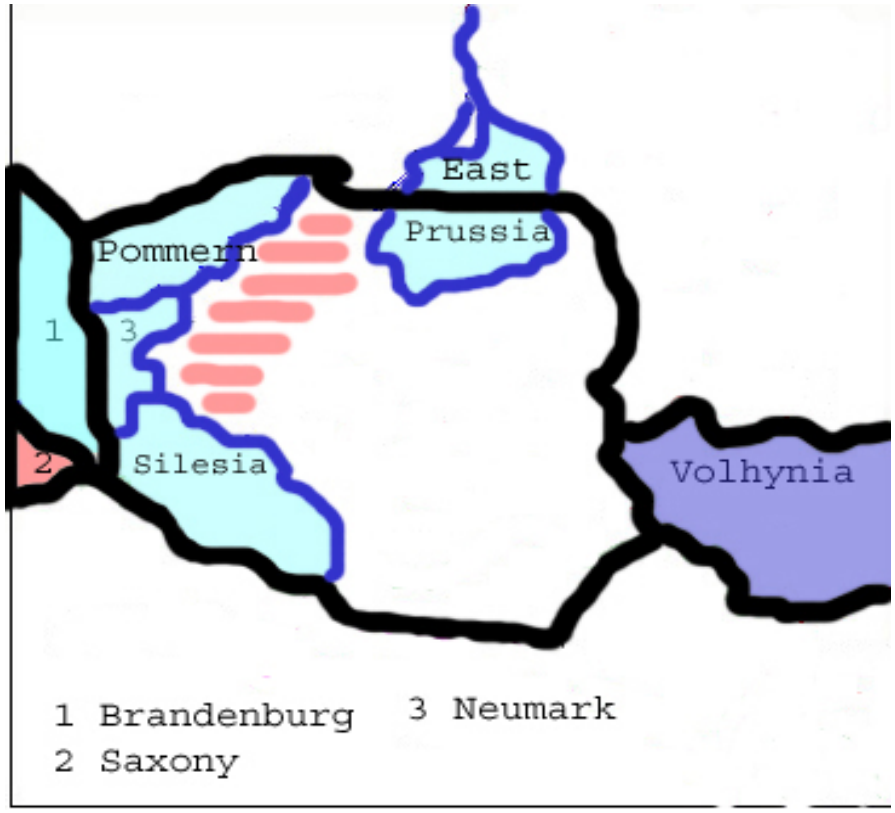
Quiz 1

Case Study IIIa: Are the William Remus and Martin Remus lines related?

- William's ancestors were born in West Prussia (they went to Volhynia, MB then MI) and Martin's ancestors were born in Pomerania (they came directly to WI and then to MN).

Who are the right samples?

Migrations 1700 to 1772



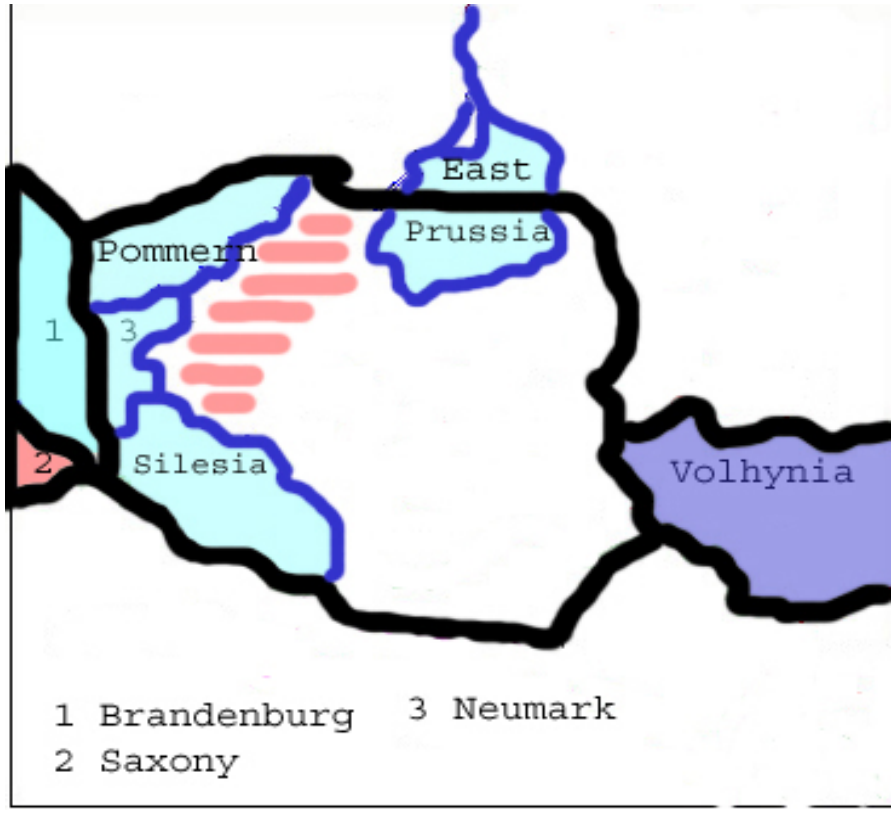
Quiz 2

Case Study IIIb: Are the Gottlieb Krassin and Martin Krassin lines related?

- Gottlieb was born in Radowanke ca 1780 (they went directly to MN) and Martin was born in 1782 in Schokken (they came to WI via Volhynia); both are from flax cloth making villages near Posen circa 1770.

Who are the right samples?

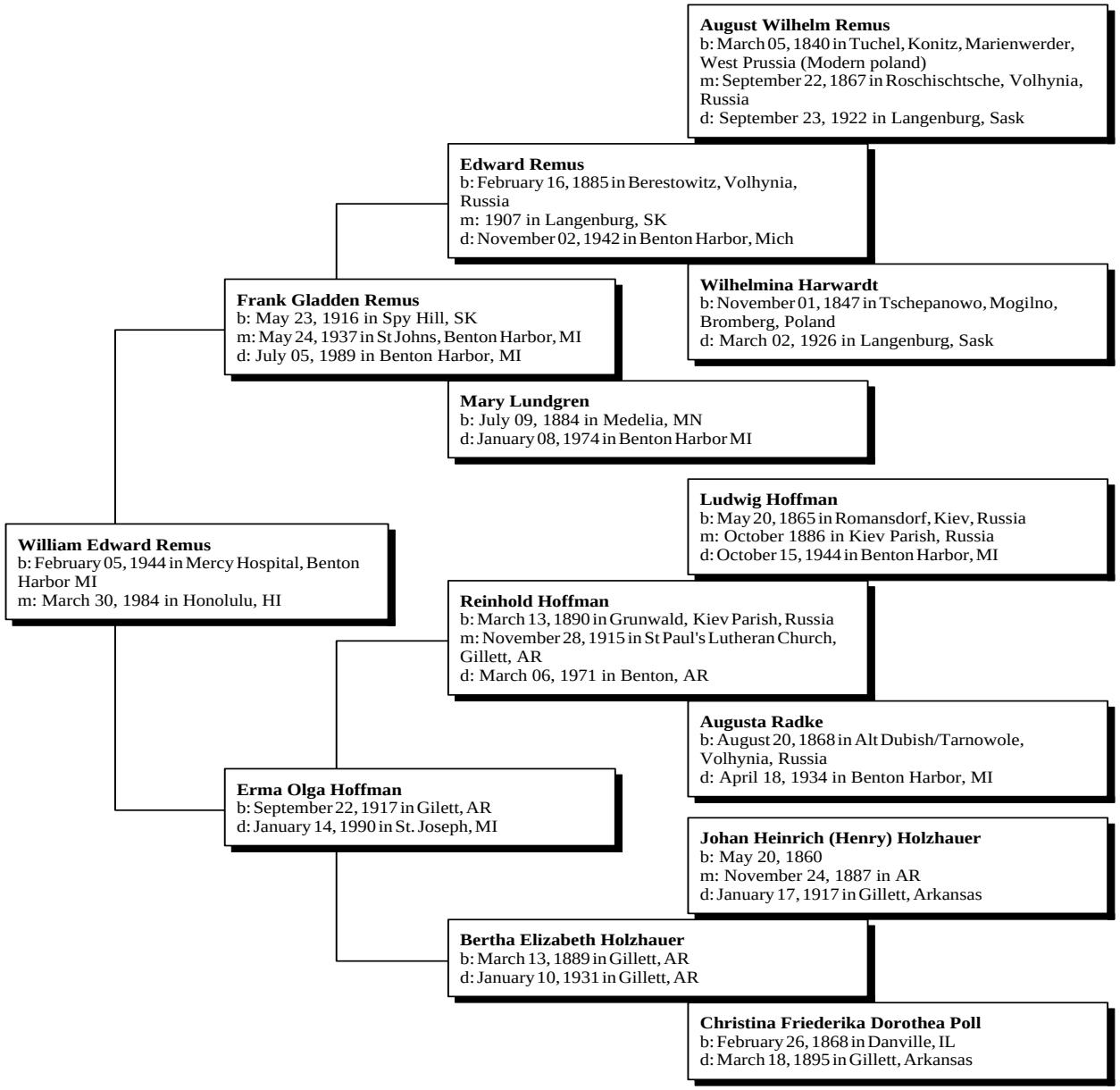
Migrations 1700 to 1772



Quiz 3: Who can provide the right DNA data on your ancestors?

- Finding your paternal grandfather's Y DNA line (your surname line)
- Finding your paternal grandmother's Y DNA line (her surname line)
- Finding your maternal grandfather's line DNA (his surname line)
- Finding your maternal grandmother's DNA line (her surname line)

Ancestors of William Edward Remus



Getting Updates from your DNA lab

- Was Peter Remus the Shepherd a Kasubian (a ethnic group living in Northern Poland)?

Other Interesting DNA tests

- Are you descended from Genghis Khan?
- What path did your DNA take out of Africa?
- What is your ethnic mix of DNA?
- Are you a descendent of American Indians?

Do you really want to know the answer?

- Non-paternal events
- Not really an American Indian

Getting the Birds and the Bees to Reveal Their Secrets

How complicated is all this to do?

- Choosing the test (25 marker) and DNA laboratory to do the work
- Getting the samples (its like brushing your teeth or gargling for Y DNA)
- Getting people to provide samples (might not be easy)
- Costs and who pays ($200 for Y DNA and $125 for mt DNA)
- Keeping track of the results

Building a website to help attract people.

- With your dna lab - for example http://www.familytreedna.com/surname_join.asp?code=X53983&special=true
- On your own - for example http://www.remus.shidler.hawaii.edu/genes/dna/

What references or resources are available?

Books (available in libraries or interlibrary loans)

- Megan Smolenyak-Smolenyak, Trace Your Roots with DNA, Rodale Press, 2004
- Bryan Sykes, The Seven Daughters of Eve, Norton, 2002
- Bryan Sykes, Adam's Curse, Norton, 2004

Websites

- Family Tree DNA http://www.familytreedna.com/

Genealogy DNA Discussion Groups (not recommended – too technical)

Tutorials

http://www.familytreedna.com/dna101.html

http://www.dnaheritage.com/

National Geographic Genonomic Project

https://www5.nationalgeographic.com/genographic/

This presentation is online at
www.remus.shidler.hawaii.edu/

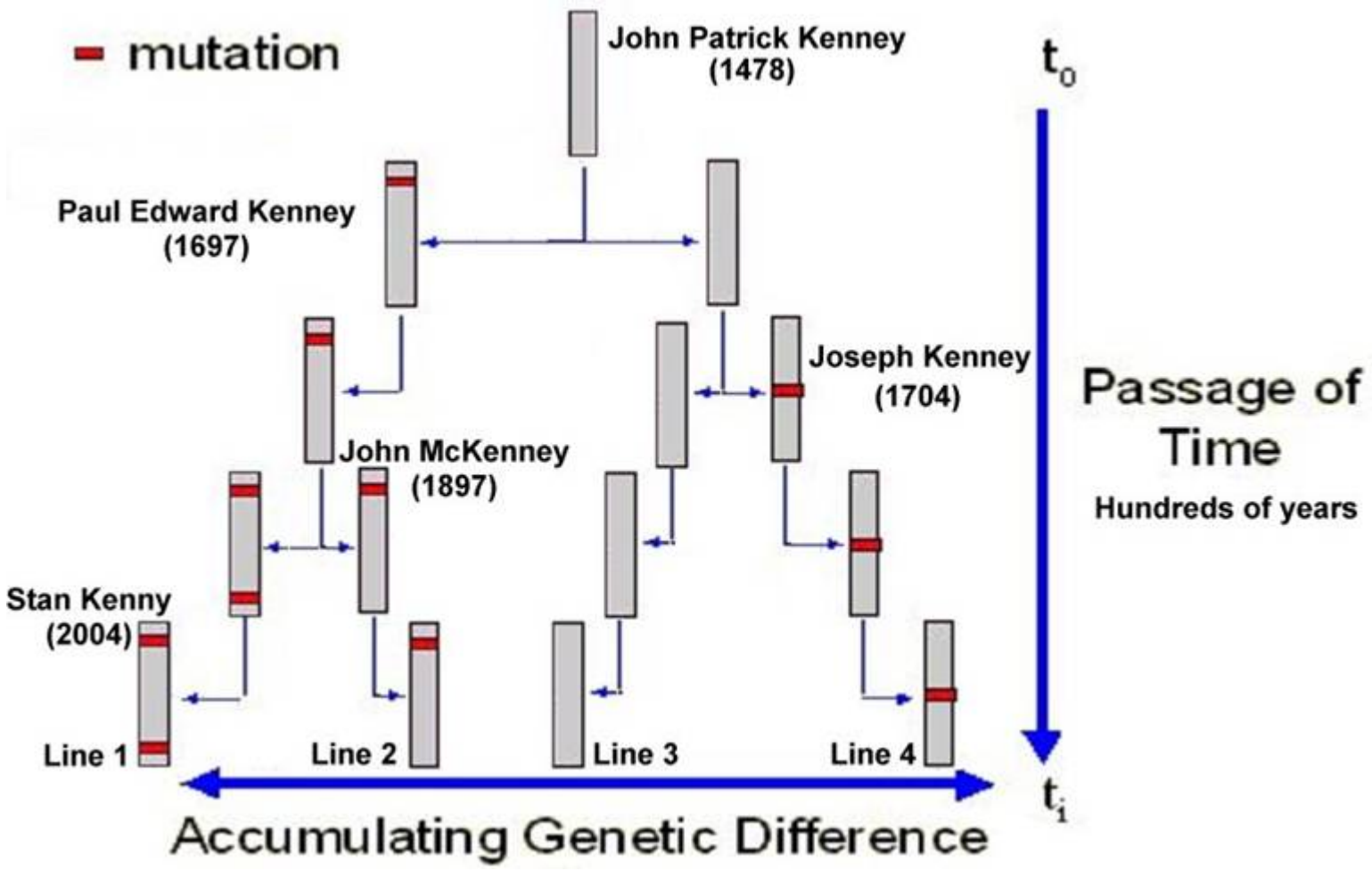
Analysis of Results

	DYS 393	DYS 390	DYS 19	DYS 391	DYS 385a	DYS 385b	DYS 426	DYS 388	DYS 439	DYS 389I	DYS 392	DYS 389II
AI-001	13	22	14	10	13	14	11	14	11	12	11	28
AI-002	13	22	14	10	13	14	11	14	11	12	11	28
AI-003	13	22	14	10	13	14	11	14	11	12	11	28
AI-004	13	22	14	10	13	14	11	14	11	12	11	28
AI-005	13	22	14	10	13	14	11	14	11	12	11	28
AI-006	13	22	14	10	13	14	11	14	11	12	11	28
AI-007	13	22	14	10	13	13	11	14	11	12	11	28
AI-008	13	22	14	10	13	14	11	14	11	12	11	28
AI-009	13	22	14	10	13	14	11	14	11	12	11	28
AI-010	13	22	14	10	13	14	11	14	11	12	11	28
AI-018	13	23	14	10	13	14	11	14	11	12	11	28
AI-019	13	23	14	10	13	14	11	14	11	12	11	28
AI-020	13	23	14	10	13	14	11	14	11	12	11	28
AI-021	13	23	14	10	13	14	11	14	11	12	11	28
AI-022	13	23	14	10	13	14	11	14	12	12	11	28
AI-023	13	23	14	10	13	14	11	14	11	12	11	28
AI-024	13	23	14	11	11	14	11	14	11	12	11	28
AI-011	13	23	14	11	11	14	11	14	11	12	11	28
AI-012	13	23	14	11	11	14	11	14	11	12	11	28
AI-015	13	22	14	10	13	14	12	14	11	12	11	28
AI-013	13	22	14	10	13	14	12	14	11	12	11	28
AI-014	13	24	14	12	11	14	12	14	11	12	12	28

Analysis of Results

	DYS 393	DYS 390	DYS 19	DYS 391	DYS 385a	DYS 385b	DYS 426	DYS 388	DYS 439	DYS 389I	DYS 392	DYS 389II	
AI-001	13	22	14	10	13	14	11	14	11	12	11	28	
AI-002	13	22	14	10	13	14	11	14	11	12	11	28	
AI-003	13	22	14	10	13	14	11	14	11	12	11	28	
AI-004	13	22	14	10	13	14	11	14	11	12	11	28	
AI-005	13	22	14	10	13	14	11	14	11	12	11	28	
AI-006	13	22	14	10	13	14	11	14	11	12	11	28	
AI-007	13	22	14	10	13	13	11	14	11	12	11	28	**Family Line 3**
AI-008	13	22	14	10	13	14	11	14	11	12	11	28	
AI-009	13	22	14	10	13	14	11	14	11	12	11	28	
AI-010	13	22	14	10	13	14	11	14	11	12	11	28	
AI-018	13	23	14	10	13	14	11	14	11	12	11	28	
AI-019	13	23	14	10	13	14	11	14	11	12	11	28	
AI-020	13	23	14	10	13	14	11	14	11	12	11	28	**Family Line 2**
AI-021	13	23	14	10	13	14	11	14	11	12	11	28	
AI-022	13	23	14	10	13	14	11	14	12	12	11	28	
AI-023	13	23	14	10	13	14	11	14	11	12	11	28	
AI-024	13	23	14	11	11	14	11	14	11	12	11	28	
AI-011	13	23	14	11	11	14	11	14	11	12	11	28	**Family Line 1**
AI-012	13	23	14	11	11	14	11	14	11	12	11	28	
AI-015	13	22	14	10	13	14	12	14	11	12	11	28	
AI-013	13	22	14	10	13	14	12	14	11	12	11	28	**Family Line 4**
AI-014	13	24	14	12	11	14	12	14	11	12	12	28	

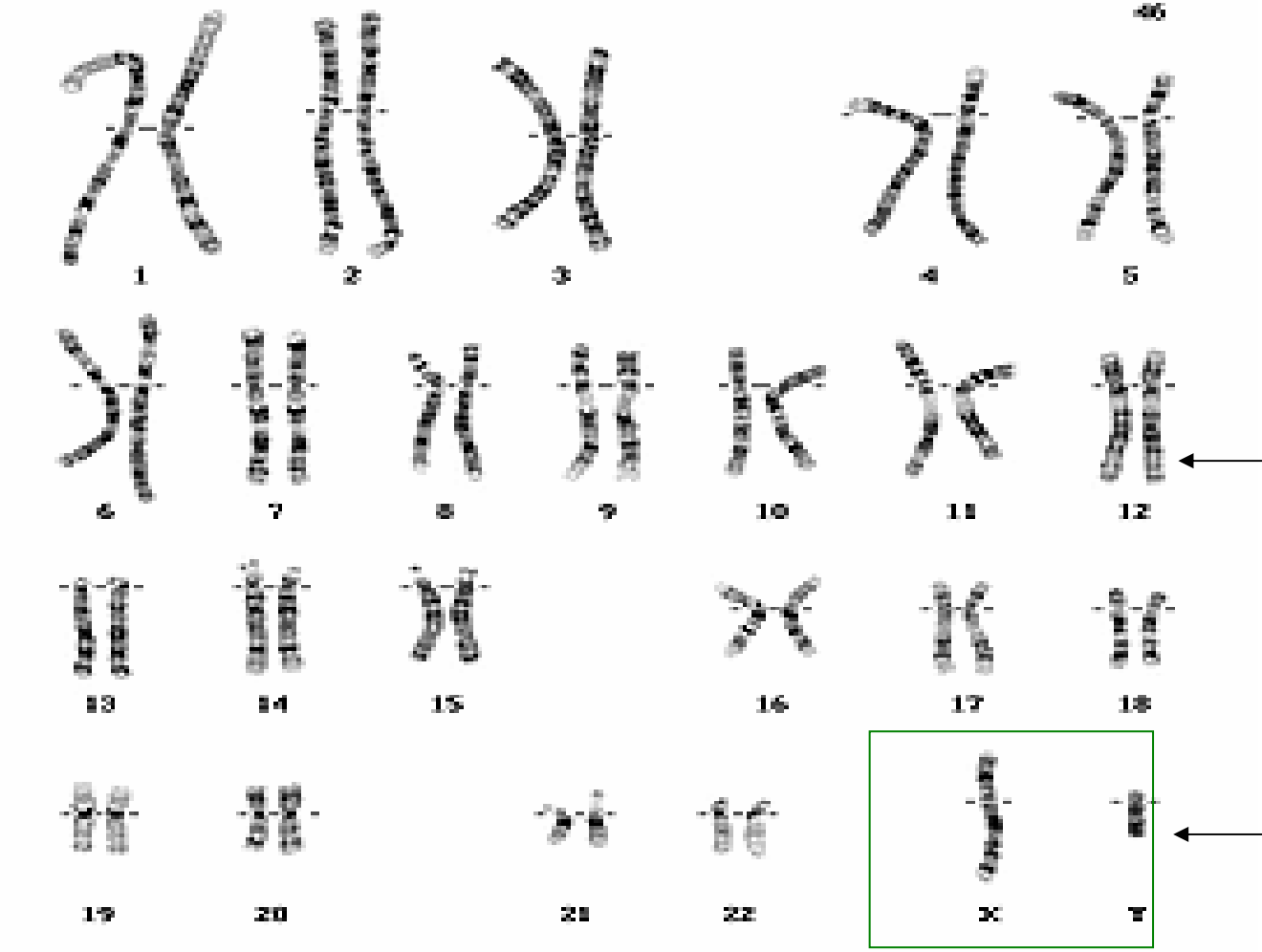
While mutations occur with time, individuals that share a common ancestor, should show the same markers, or markers with very few mutations.



Names and examples are fictional and do not represent actual samples or families

FamilyTreeDNA

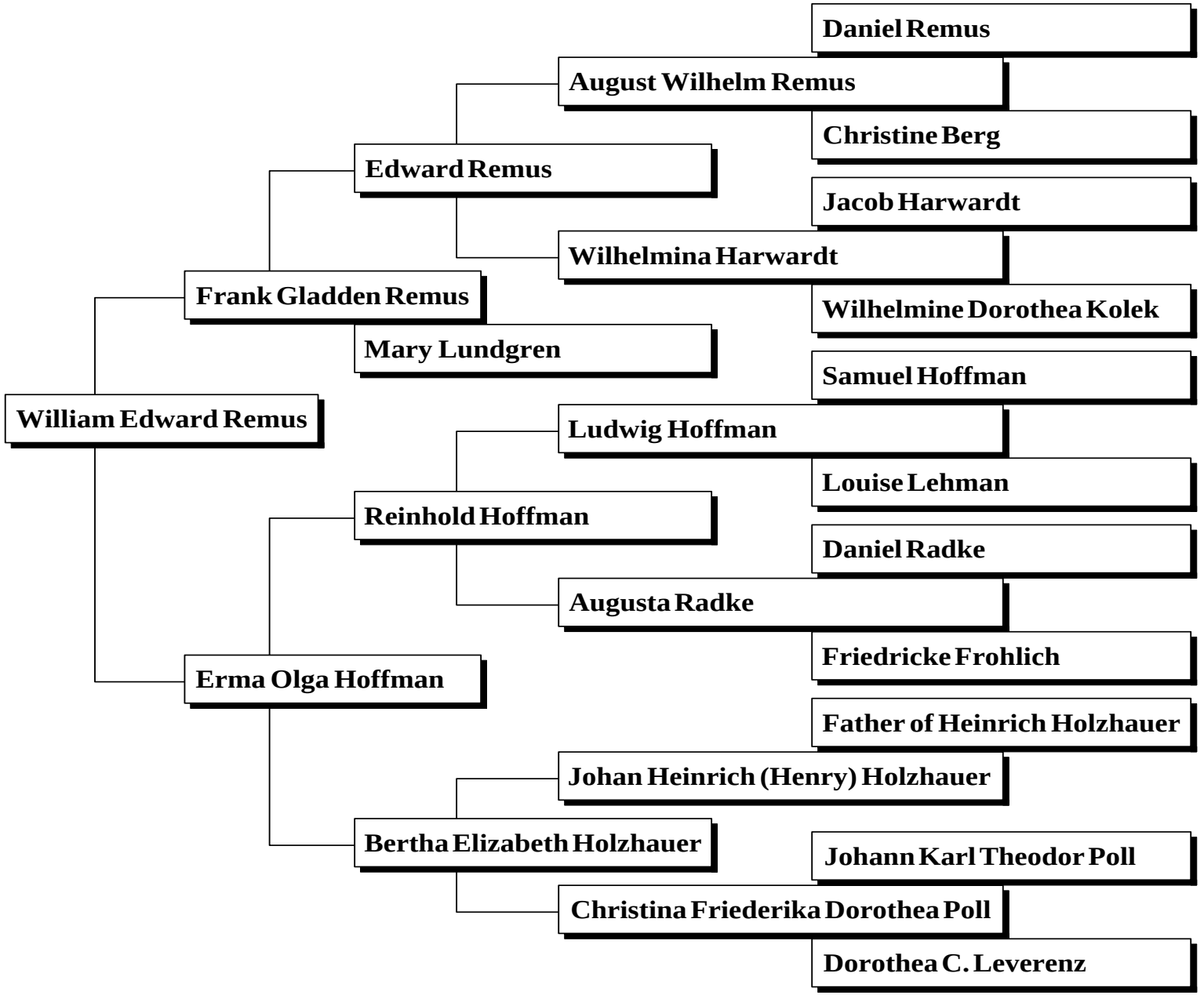
Your genes - 46 chromosomes - 23 from each parent

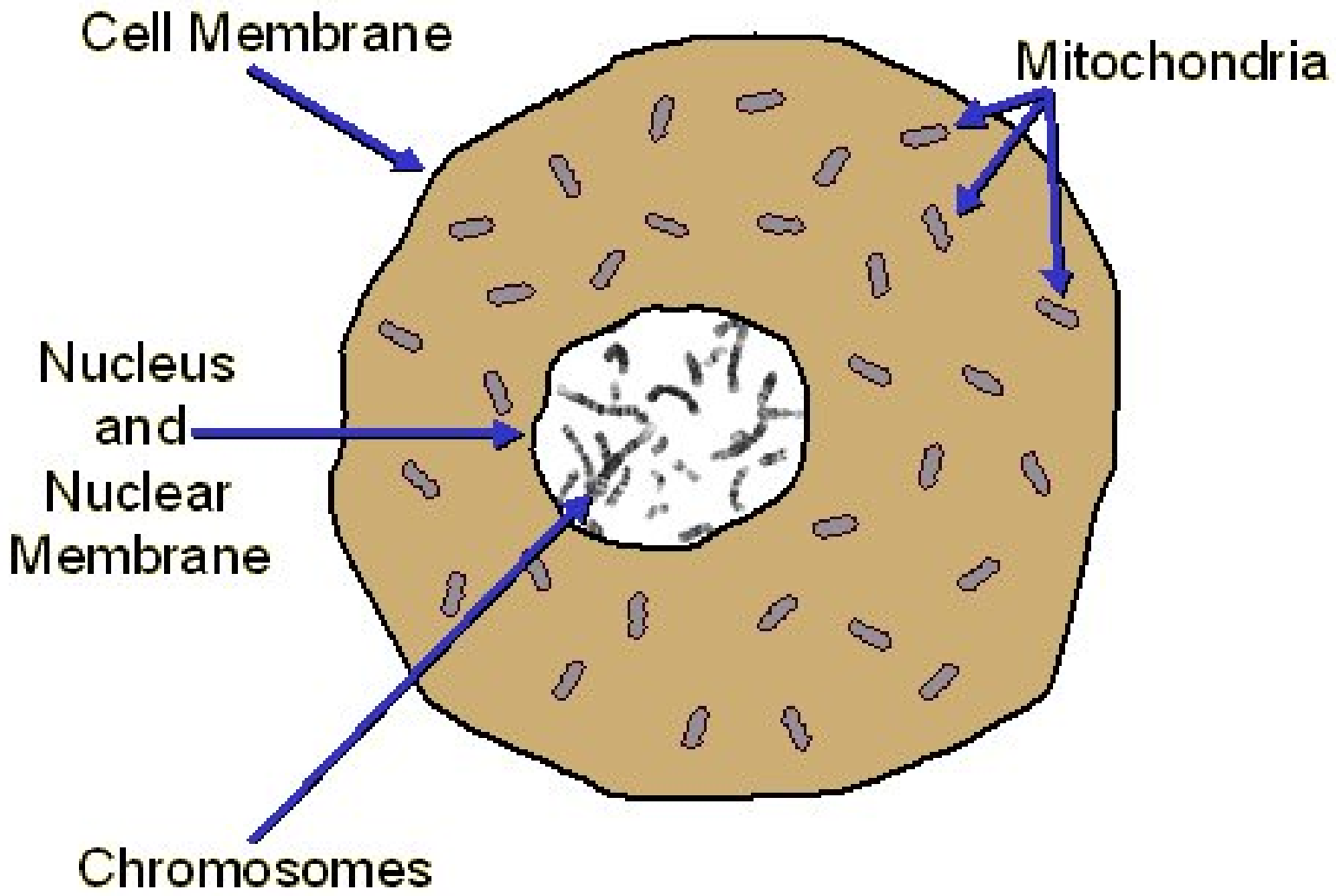


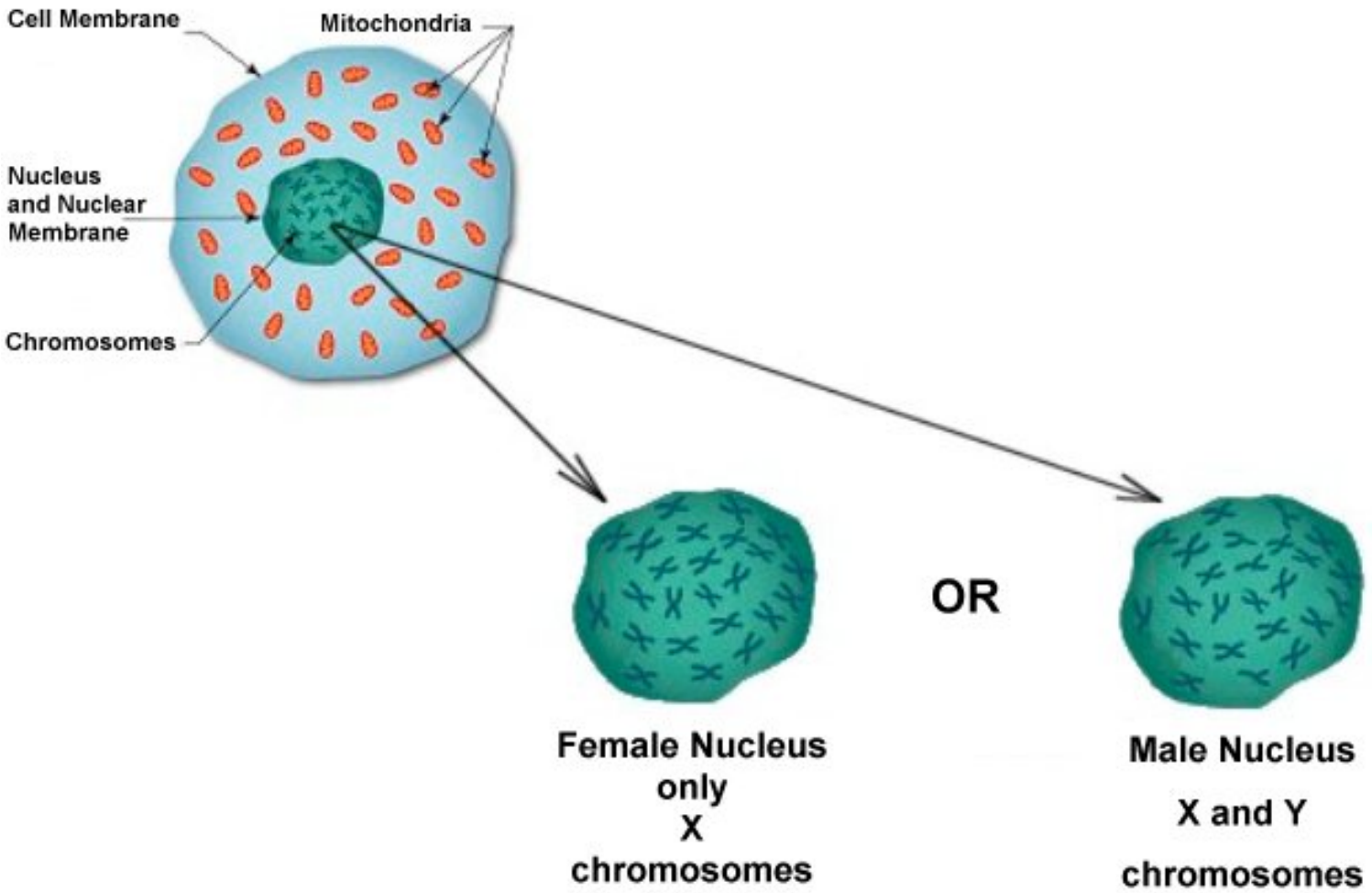
22 pairs
Autossomes

1 pair sex
chromosomes

Ancestors of William Edward Remus




Cell Membrane
Mitochondria
Nucleus and Nuclear Membrane
Chromosomes

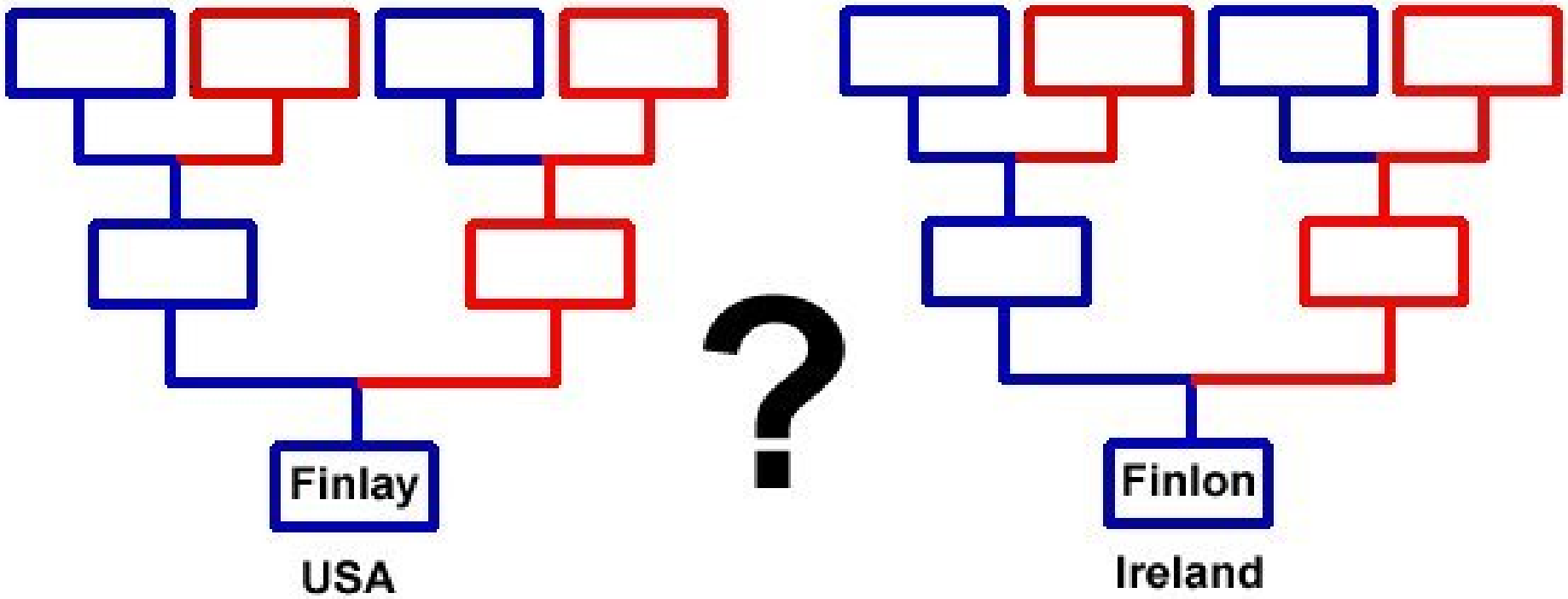

Cell Membrane
Mitochondria
Nucleus and Nuclear Membrane
Chromosomes
OR
Female Nucleus only X chromosomes
Male Nucleus X and Y chromosomes

Now a small technical dna interlude

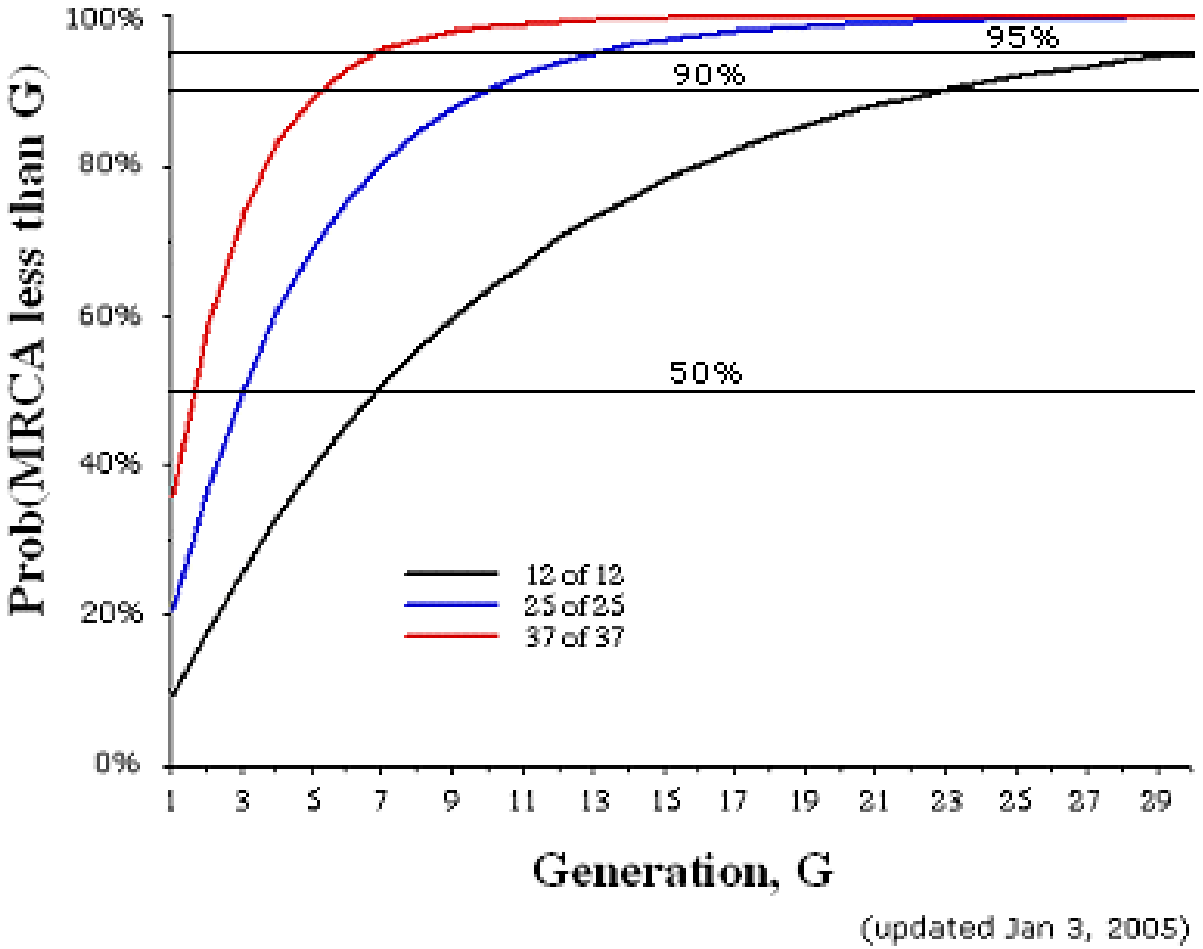
- From the Genetics Learning Center at University of Utah State website
- http://gslc.genetics.utah.edu

FamilyTreeDNA

Could these be two branches of the same family?
And if yes, how long ago could they
probably have had a common ancestor?




SZWECJA
MORZE BAŁTYCKIE
PRUSY
Pomorze
woj. pomorskie
Ks. Warmińskie
woj. mazowieckie
woj. podlaskie
Ks. Kurlandii Semigalii
Ks. Żmudzkie
Ks. Inflanckie
Ziemia Piltyńska
Brandenburgia
Saksonia
Śląsk
Czechy
Morawy
Spisz
AUSTRIA
ROSJA
Bukowina
Moldawia
Siedmiogród
TURCJA
woj. wołyńskie
woj. ruskie
woj. podolskie
woj. kijowskie
RZECZPOSPOLITA PRZED ROZBIORAMI (1771 r.)
0 50 100 150 200 km
granice Rzeczypospolitej
granice Korony i Litwy
granice państw
granice województw i księstw
granice prowincyi i krajów
KALISZ stolice województw i księstw
Tarnów inne miasta i miejscowości
miasta powyżej 50 000 mieszkańców
miasta 10 000 - 50 000 mieszkańców
miejscowości poniżej 10 000 mieszkańców


100%
80%
60%
40%
20%
0%
95%
90%
50%
12 of 12
25 of 25
37 of 37
1
3
5
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17
19
21
23
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27
29
Prob(MRCA less than G)
Generation, G
(updated Jan 3, 2005)

Ydna vs Mdna

- The Y chromosome (YDNA) is one of the 23 chromosomes in the nucleus of the cell. Sperm carries either the Y chromosome or an X chromosome and so determines the sex of the child.
- Mitochondrial DNA (mtDNA) is DNA in the cell but outside the nucleus. This is in the egg provided by the mother.

DNA Mutates

- DNA changes over time (sounds bad)
- There is an average rate for mutation
- So a small difference in DNA can be used to estimate the date of the common ancestor.