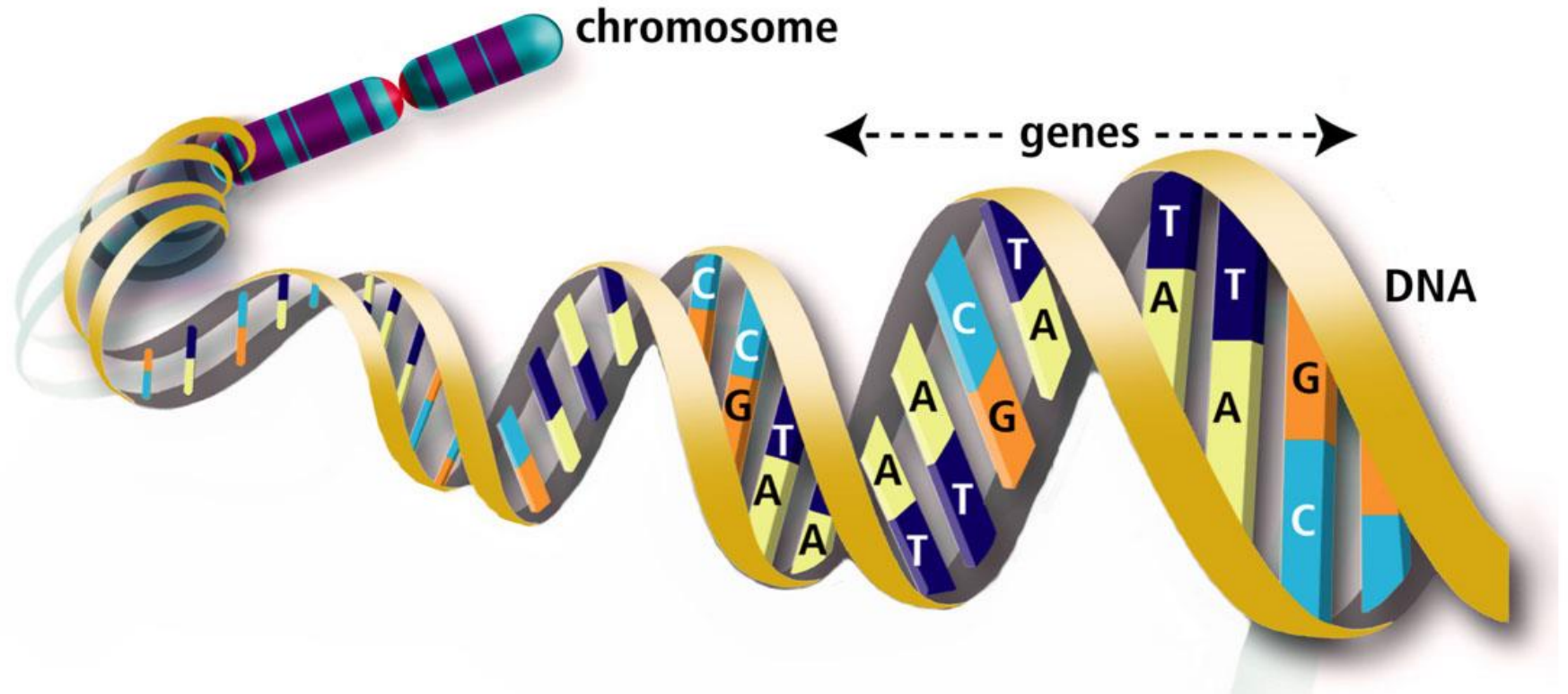


The background of the slide features a series of overlapping, wavy, translucent lines in shades of green and blue. These lines create a sense of depth and movement, resembling a stylized landscape or perhaps a representation of DNA strands. The colors transition from a vibrant green on the left to a lighter blue on the right, with some areas appearing more saturated than others.

Understanding DNA

Structure of a DNA Molecule



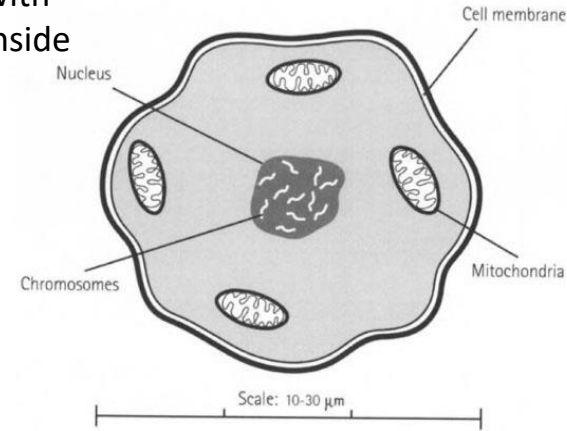
The double helix whereby the two strands of a molecule are held together by bonds between the bases.

Adenine (A) forming a base pair with Thymine (T),

Cytosine (C) forming a base pair with Guanine (G).

Anatomy of a Cell

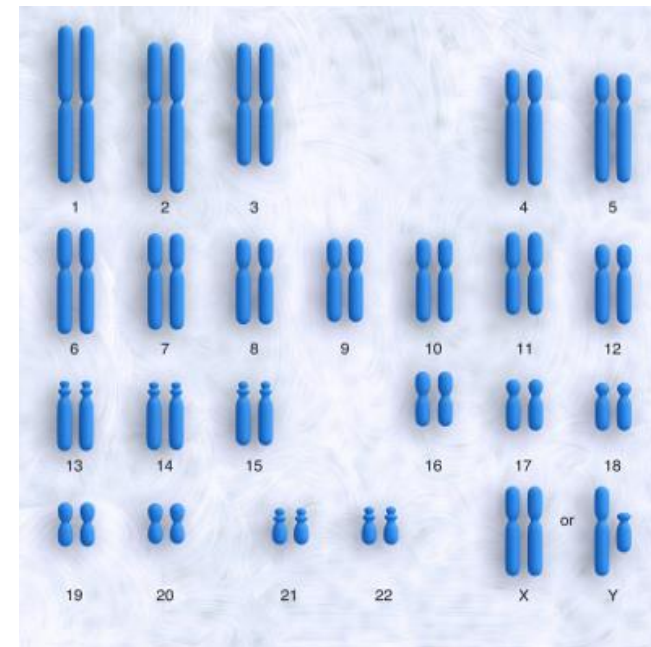
Nucleus of cell with Chromosomes inside one cell.



The nucleus of a cell contains 23 pairs of DNA-bearing chromosomes that collectively define genetic make-up. The body of the cell (the cytoplasm) also contains several mitochondria, and numerous other organelles.

Mitochondria shown in position outside of the nucleus of the cell. Mitochondria are inherited through the female line. Although mitochondrial DNA is **passed to sons** from their mothers, **it cannot be passed from the son to his children.**

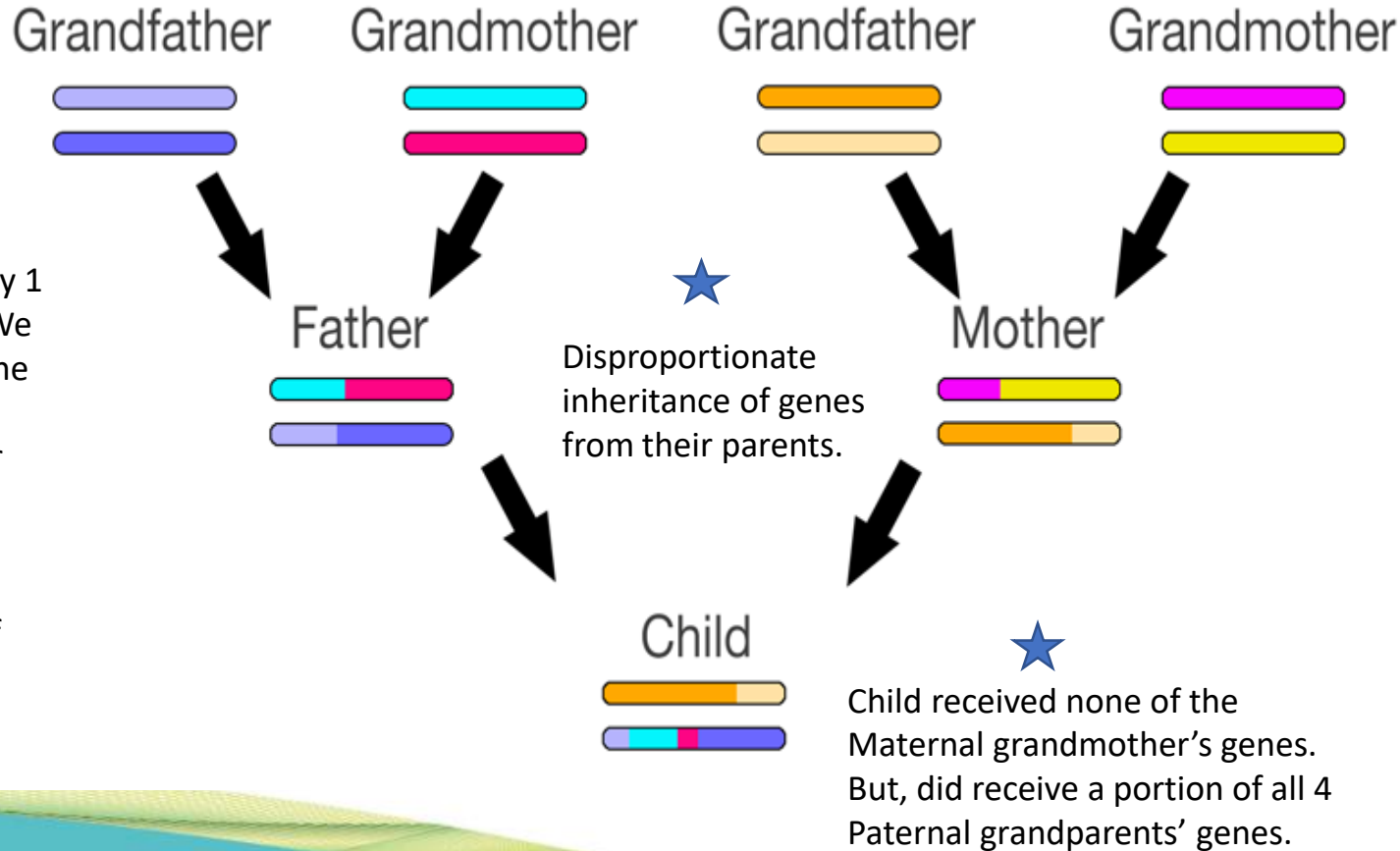
There are **3 billion** base pairs of DNA. **Chromosome 1** is the longest and **Chromosome 22** is the smallest. All the **DNA** in all your cells **put together** would be about **twice the diameter** of the Solar System.



Anatomy of Autosomes 1 to 22 with sex Chromosome 23.

Sex **Chromosome 23** showing **female double X** inheritance and **male XY** inheritance.

Recombination or Genetic Inheritance



This diagram represents only 1 of your 23 chromosomes. We do not inherit 50% of any one chromosome from our parents, nor they from their parents. You might have an exact copy of one of your parent's chromosomes, and thus you'll get no portion of their other chromosome.

Each parent's genomes are shuffled before they are passed to a child.

You do not inherit the exact same combination of DNA as your siblings, unless you have an identical twin. Fraternal twins will inherit a slightly different combination of DNA.

Your results will look different because the DNA you inherited at conception is unique to you.

Determining Ethnicity

Ancestry uses a reference panel of 500 people for their 'Ireland/Scotland' ethnic category.

A few people with 'stray' ancestors is not going to change the overall picture.

500 is far too small a reference population upon which to make a solid claim of an ethnicity.

23&Me is asking customers who "report" that all four grandparents were born in a certain country to be part of the reference database for that country. No documentation required to prove this claim—just customer say-so.

Great-grandparents could be from anywhere.

Your DNA results are matched to a concentration of recent testers who self report their grandparents as X,Y, and Z.

You may share a large number of genes with people who say their grandparents were Londoners. But, perhaps your grandparents were born in Germany, moved to London, England and identified from that point on as a "Londoner".

Under this type of result reporting your ethnicity is going to be lumped into "Londoner" and your Germany genetic contribution will go unreported

Ethnicity Comparison – 1 tester, 2 different results

Eurogenes K13 Admixture Proportions

This utility uses the Eurogenes K13 model (rev 21 Nov 2013), created by Davidski (Polako). Questions and comments about this model should be directed to him at his [Project Blog](#).
Software Version: Feb 21 2019 04:44:06

Kit Number: PV4445865 Elapsed Time: 13.81 seconds

[Spreadsheet](#)

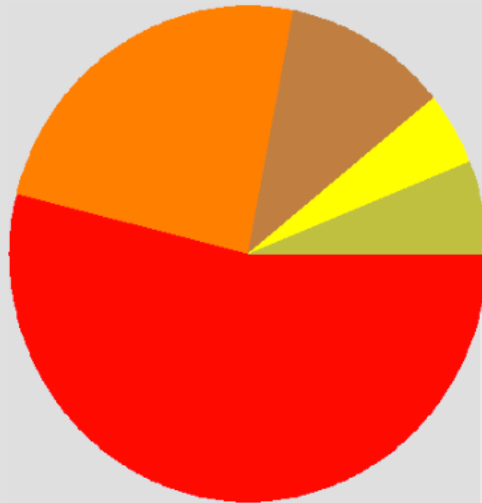
Population	
North_Atlantic	53.76 Pct
Baltic	24.39 Pct
West_Med	11.15 Pct
West_Asian	4.46 Pct
East_Med	3.23 Pct
Red_Sea	-
South_Asian	0.88 Pct
East_Asian	-
Siberian	0.79 Pct
Amerindian	0.59 Pct
Oceanian	-
Northeast_African	0.70 Pct
Sub-Saharan	-

[Oracle](#)

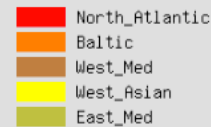
[Oracle-4](#)

UNDER DEVELOPMENT:

[Rotating 3D-PCA](#)



Eurogenes K13
PV4445865



Single Population Sharing:

#	Population (source)	Distance
1	West_Scottish	2.51
2	Orcadian	2.81
3	Irish	3.17
4	North_Dutch	3.88
5	Danish	4.16
6	Southeast_English	4.42
7	Southwest_English	4.69
8	Norwegian	4.92
9	North_German	6.92
10	Swedish	7.97
11	South_Dutch	10.04
12	West_German	11.16
13	North_Swedish	14.14
14	French	15.25
15	Austrian	16.31
16	East_German	16.46
17	Hungarian	20.74
18	Spanish_Cataluna	22.01
19	Southwest_Finnish	22.38
20	Southwest_French	23.02

Note Amerindian in both results 0.59% and 0.34%. I can guarantee there is no North American Indian ancestry. So, therefore, this must be an echo from deep ancestry in the Caucasus region in Central Asia.

Eurogenes EUtest V2 K15 Admixture Proportions

This utility uses the Eurogenes EUtest V2 K15 model, created by Davidski (Polako). Questions and comments about this model should be directed to him at his [Project Blog](#).
Software Version: Feb 21 2019 04:44:06

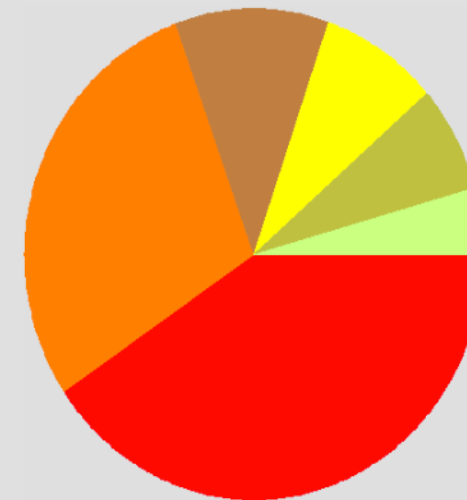
Kit Number: PV4445865 Elapsed Time: 16.29 seconds

[Spreadsheet](#)

Population	
North_Sea	40.62 Pct
Atlantic	28.77 Pct
Baltic	10.86 Pct
Eastern_Euro	8.24 Pct
West_Med	6.95 Pct
West_Asian	2.41 Pct
East_Med	0.54 Pct
Red_Sea	-
South_Asian	0.50 Pct
Southeast_Asian	-
Siberian	0.39 Pct
Amerindian	0.34 Pct
Oceanian	-
Northeast_African	0.37 Pct
Sub-Saharan	-

[Oracle](#)

[Oracle-4](#)



Eurogenes EUtest V2 K15
PV4445865



Single Population Sharing:

#	Population (source)	Distance
1	Orcadian	2.66
2	West_Scottish	3.42
3	North_Dutch	3.69
4	Irish	4.18
5	Danish	4.58
6	West_Norwegian	4.92
7	Southeast_English	5.2
8	Norwegian	5.83
9	Southwest_English	6.29
10	Swedish	7.39
11	North_German	7.71
12	West_German	10.55
13	South_Dutch	10.91
14	North_Swedish	11.12
15	French	14.92
16	East_German	16.01
17	Southwest_Finnish	17.14
18	Finnish	20.19
19	Hungarian	20.48
20	Austrian	20.52

These are the people in each of the databases to which the tester's DNA is compared to arrive at ethnicity estimates.

Ethnicity Comparison – Child / Mother

– all of child’s grandparents are British

Ethnicity results from My Heritage

Child	FTDNA
European	99%
British Isles	99%
East Europe	0% ✨
Finland ⓘ	< 1%
Scandinavia	0%
Southeast Europe	0%
Iberia	0%
West and Central Europe	0%

All ethnicities	All supported ethnicities
Europe	100.0%
North and West Europe	100.0%
English	93.3%
Scandinavian	6.7%
Child	100.0%

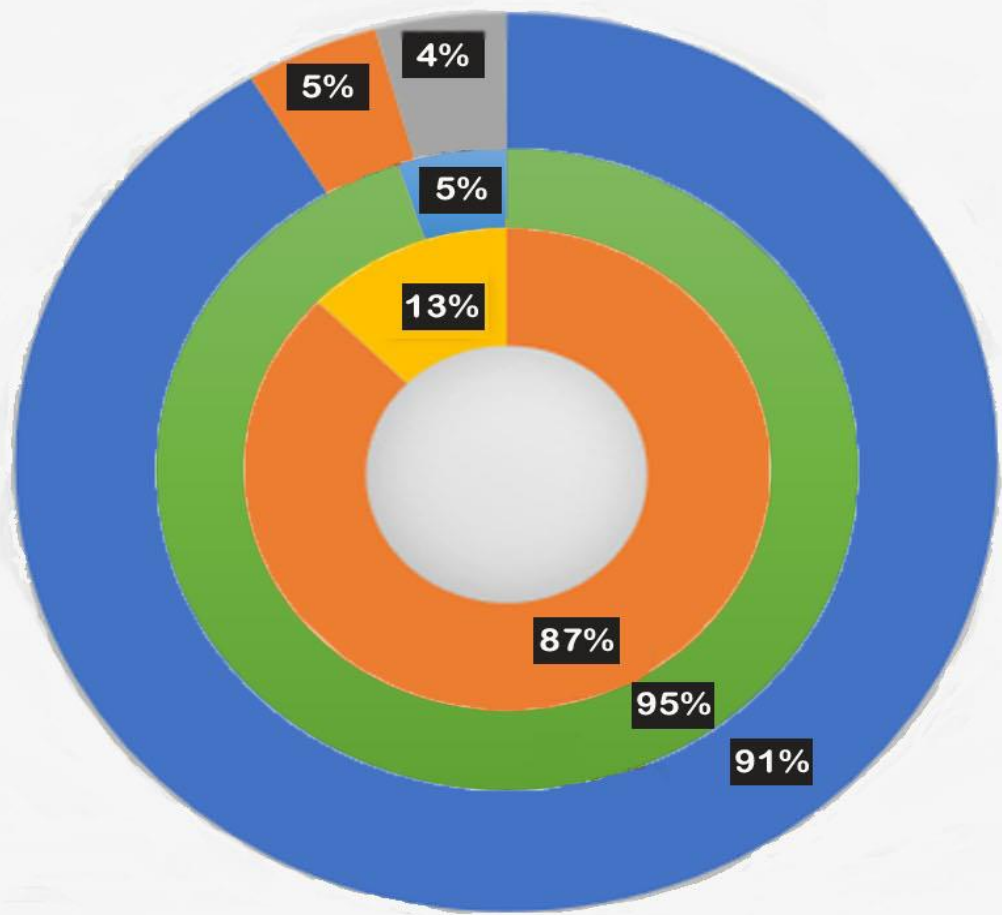
All ethnicities	All supported ethnicities
Europe	100.0%
North and West Europe	100.0%
North and West European	91.3%
Scandinavian	4.4%
English	4.3%
Mother	100.0%

Mother	FTDNA
European	100%
British Isles	95%
East Europe	5% ✨
Finland	0%
Scandinavia	0%
Southeast Europe	0%
Iberia	0%
West and Central Europe	0%

The “i” indicates that this is background noise and not an actual result.

Note that the East Europe amount was not shared with the child. This indicates that the child did not inherit any of that DNA, skewing match results.

Ethnicity vs. Factual



Ethnicity
Outer Ring
From My Heritage

- 91% North and West European
- 5% Scandinavian
- 4% English

Ethnicity
Middle Ring
From FTDNA

- 95% British Isles
- 5% East European

Factual
Inner Ring

- 87% England born 14 of 16 gg-gp
- 13% Germany born 2 of 16 gg-gp

Calculating GGG-Grandparents results in same percentages of factual data.

DNA Results Comparison

Text results of the double helix composition of DNA showing individual RSID* numbers

Section of Chromosome 1

*The **rs number** is an accession number used by researchers and databases to refer to specific SNPs. It stands for Reference SNP cluster ID. The **rsid** numbers are used for SNPs in diagnosing health and inherited traits.
EX: Chr. 1 SNP rs28936694
Is one of many associated with Glaucoma MYOC gene.

Child				Mother											
	A	B	C	Alleles D		A	B	C	Alleles D	E	F	G	H	I	J
141	rs1153103	1	1415012	AA	141	rs1153103	1	1415012	AA						
142	rs1153105	1	1415099	CT	142	rs1153105	1	1415099	TT						
143	rs2862157	1	1418112	AA	143	rs2862157	1	1418112	AA						
144	rs819980	1	1425700	TT	144	rs819980	1	1425700	TT						
145	rs12021879	1	1439671	CC	145	rs12021879	1	1439671	CC						
146	rs6690515	1	1447325	GG	146	rs6690515	1	1447325	GG						
147	rs6669795	1	1450947	AA	147	rs6669795	1	1450947	AA						
148	rs10159041	1	1453921	--	148	rs10159041	1	1453921	TT						
149	rs3813216	1	1458567	--	149	rs3813216	1	1458567	--						
150	rs3737714	1	1458954	--	150	rs3737714	1	1458954	--						
151	rs12032637	1	1465382	AA	151	rs12032637	1	1465382	AA						
152	rs3118505	1	1472047	CC	152	rs3118505	1	1472047	CT						
153	rs9782908	1	1472201	CC	153	rs9782908	1	1472201	CC						
154	rs1571149	1	1474167	AG	154	rs1571149	1	1474167	AA						
155	rs7290	1	1477244	CT	155	rs7290	1	1477244	TT						
156	rs11807706	1	1477660	AA	156	rs11807706	1	1477660	AA						
157	rs3766180	1	1478153	CT	157	rs3766180	1	1478153	TT						
158	rs7533	1	1479333	--	158	rs7533	1	1479333	--						
159	rs2031709	1	1485984	CC	159	rs2031709	1	1485984	CC						
160	rs7531530	1	1489670	CT	160	rs7531530	1	1489670	CC						
161	rs880051	1	1493727	AG	161	rs880051	1	1493727	GG						
162	rs2296716	1	1497824	CT	162	rs2296716	1	1497824	CC						
163	rs9439468	1	1499298	AG	163	rs9439468	1	1499298	AA						
164	rs7519837	1	1510801	CC	164	rs7519837	1	1510801	CC						
165	rs6687029	1	1519068	AC	165	rs6687029	1	1519068	AC						
166	rs6604983	1	1521595	AA	166	rs6604983	1	1521595	AA						
167	rs28430872	1	1549605	CC	167	rs28430872	1	1549605	CC						
168	rs12748433	1	1559971	CT	168	rs12748433	1	1559971	TT						
169	rs28635343	1	1560103	CC	169	rs28635343	1	1560103	CC						
170	rs28464684	1	1566160	CT	170	rs28464684	1	1566160	CC						
171	rs28456011	1	1567206	GG	171	rs28456011	1	1567206	AG						
172	rs35154105	1	1598908	TT	172	rs35154105	1	1598908	TT						
173	rs28707307	1	1610809	AA	173	rs28707307	1	1610809	AA						
174	rs28487995	1	1619541	AG	174	rs28487995	1	1619541	AG						
175	rs35261312	1	1627987	CC	175	rs35261312	1	1627987	CC						
176	rs760925	1	1646574	GG	176	rs760925	1	1646574	GG						
177	rs909823	1	1647686	CC	177	rs909823	1	1647686	--						
178	rs3817856	1	1663831	CT	178	rs3817856	1	1663831	CC						
179	rs2294488	1	1664019	--	179	rs2294488	1	1664019	CC						
180	rs2294489	1	1664124	--	180	rs2294489	1	1664124	--						
181	rs1014988	1	1680219	--	181	rs1014988	1	1680219	--						
182	rs7407	1	1684472	TT	182	rs7407	1	1684472	TT						

Fully identical
difference
no match
half-identical



Thank you to all of you wonderful attendees for joining us, today.

A special “Thank You” to
One World - One Family 2019 and
[The Hamilton Stake of The Church of](#)
[Jesus Christ of Latter-Day Saints](#)
for making this workshop possible.