



## Fannin Guzman Native American DNA Ancestry Report

GJ4337 – T233233

A mitochondrial DNA specimen was extracted, amplified by the PCR process and sequenced by Family Tree DNA for markers or mutations in the control sections of the D loop known as Hypervariable Regions I and II containing several hundred base pairs of DNA. The following differences from the reference series mutations were reported (rCRS; Andrews; Anderson). A mutation is any inheritable change in a nucleotide in the DNA sequence of genes. Although mutations in the D loop of mitochondrial DNA do not change the individual or have any effect, they have been found useful in tracing female, or mitochondrial, lineages (Richards and Macaulay):

**HVR I:** Results of mtDNA sequencing for Hypervariable Region I

	16223	16298	16325	16354	16526
rCRS	C	T	C	C	G
T233333	T	C	T	T	A

**HVR II:** Results of mtDNA sequencing for Hypervariable Region II

	73	249	263	290	291	309.1
rCRS	A	C	A	C	T	T
T233333	G	:	G	:	:	C

According to Richards et al. (2000), the subject's mutations belong to haplogroup C although no exact or close matches were found. Similarly, in the Cambridge Reference Sequence and Mitochondrial DNA Concordance there were the following matches on HVS1 and HVS2 (where red indicates a matching, blue an added, and black a missing mutation):

16223[T] 16298[C] 16325[C] 16327[T] 16354[T]	<ul style="list-style-type: none"> <li>•Ginther,93; S11; [P2]; Mapuche(1)</li> <li>•Ginther,93; S8; [P2]; Mapuche(2)</li> <li>•Ginther,93; S7; [P2]; Mapuche(3)</li> <li>•Torrioni,93a; 35; [C]; Yanomama(?)</li> <li>•Twgdam; 35(PNY008); Hisp. Amer.(1)</li> <li>•Twgdam; 36(PNY321); Hisp. Amer.(1)</li> <li>•Twgdam; 37(PNY287); Hisp. Amer.(1)</li> <li>•Twgdam; 41(CM403); Hisp. Amer.(1)</li> </ul>
73[G] 249[D] 263[G] 290[D] 291[D] 309.1[C]	<ul style="list-style-type: none"> <li>•Twgdam; 42(PNY271); Hisp. Amer.(1)</li> </ul>

In Mahli et al. (2003), the specific [haplotype](#) corresponds to no Southwest type. In Mitosearch, The subject exactly matched a descendant of Maria Lopez Perrero, born 1833 in Sonora, Mexico (J53CD).

### Analysis and Conclusion

On his mother's side, the subject belongs to Native American haplogroup C (recently renamed C1). The defining mutation for his [haplotype](#) is 16354T, which is also found in B haplotypes of the Southwest and hence may point to the origin of the subject's particular lineage, being present through mediation from B neighbors.

Haplogroup C is relatively uncommon in Southwest Indians, at least in their ancestral DNA (15%; see Carlyle 2000). In one Northern Mexico study, it accounted for only 23% of modern-day Indians (Green 2000). It is more common in Eastern tribes, reaching a frequency of 53% in one study of Oklahoma Cherokee (Mahli 2001). It is most common in Algonquian, Siouan and Iroquoian populations. Oddly, it attains its highest frequency in Patagonian Indians of South America.

Haplogroup C arose in Central Asia some 60,000 years ago and is one of the classics American Indian haplogroups along with A, B, D and X. Read about the spread of C in National Geographic's [Genographic Project](#).

**Donald N. Yates, Ph.D.**  
*Principal Investigator*  
DNA Testing Systems  
August 29, 2009

## References

1. Anderson, S., Bankier, A. T., Barrell, B. G., de Bruijin, M. H. L., Coulson, A. R., Drouin, J., Eperson, I. C., Nierlich, D. P., Roe, B. A., Sanger, F., Schreier, P. H., Smith, A. J. H., Staden, R., and Young, I. G. Sequence and organization of the human mitochondrial genomes. *Nature* (1981) 290:457-465.
2. Andrews R.M. *et al* (1999). Reanalysis and revision of the Cambridge reference sequence for human mitochondrial DNA [letter]. *Nat Genet* 1999;23:147. The Revised Cambridge Reference Series, cited as rCRS.
3. Eshleman J.A. *et al.* (2004). Mitochondrial DNA and prehistoric settlements: Native migrations on the Western edge of North America. *Human Biology* 76:55-75.
4. Malhi, R.S., *et al.* (2003). Native American mtDNA Prehistory in the American Southwest. *Am J of Phys Anthropol* 120:108-24.
5. Mahli, Ripan S. *et al* (2001). The Structure of Diversity within New World Mitochondrial DNA Haplogroups: Implications for the Prehistory of North America, *Am. J. Hum. Genet.*, 70:905-919.
6. Malhi, R.S. *et al.* (2001). Distribution of Mitochondrial DNA Lineages among Native American Tribes of Northeastern North America. *Hum Biol* 73:17-55.
7. Oppenheimer, Stephen (2004). *The Real Eve*. New York: Carroll & Graf; ---- (2006). *The Origins of the British. A Genetic Detective Story*. *Ibid.*
8. Richards, M. *et al.* (2000). Tracing European founder lineages in the Near Eastern mtDNA pool. *Am. J. Hum. Genet.* 67: 1251-1276. Supplementary Data (by Vincent Macaulay): <http://www.stats.gla.ac.uk/~vincent/founder2000/index.html>
9. Richards, M. and Macaulay, V. (2000) The mitochondrial gene tree comes of age. *Am. J. Hum. Genet.* 68: 1315-20.
10. Sykes, Brian (2001). *The Seven Daughters of Eve. The Science that Reveals Our Genetic Ancestry*. New York, Norton. Names the founders of Europe's major female haplogroups Helena, Jasmine, Katrine, Tara, Velda, Xenia, and Ursula.
11. Wells, Spencer (2006). *Deep Ancestry: Inside the Genographic Project*. Washington: National Geographic.



THIS DOCUMENT CERTIFIES THAT  
FANNIN GUZMAN

Ordered a DNA Ancestry Test from Our Laboratories Yielding the Following Results:

Native American Lineage C1

	16223	16298	16325	16354	16526
rCRS	C	T	C	C	G
T223333	T	C	T	T	A

	73	249	263	290	291	309.1
rCRS	A	C	A	C	T	T
T233333	G	:	G	:	:	C

*Downie Yates*  
Principal Investigator, DNA Consultants, 26488 N. 42<sup>nd</sup> Way, Phoenix, Arizona 85050



August 29, 2009