



Inference of Ancient Black Mexican Tribes and DNA

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Inference of Ancient Black Mexican Tribes and DNA

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Abstract

Background: Controversy surrounds the time period when Indigenous Mexican-African admixture occurred. Most researchers assume this admixture took place after the Atlantic Slave Trade. But, Spanish eyewitness accounts, Mayan skeletons with sickle cell anemia, and West African skeletal remains generally indicate that there were Black Native Mexican and Meso-American communities in Meso-America before 1492. Using genetic association studies of available Indigenous Mexican and African genome-wide SNP genotypes and HLA we infer the probable pre-or post Columbian date for the admixture. Here we analyze the historical and archaeogenetic literature relating to the American foundational haplogroups and HLA to extract ancestry information detailing when Indigenous Mexican-African admixture took place.

Results: Indigenous Mexican and African archaeogenetic, DNA and HLA resources were analyzed to determine to what extent admixture had occurred between these populations. The sample indicated that Indigenous Mexican-African admixture has taken place across Mexican fundamental male and female lineages; and that Africans and Indigenous Mexicans share HLA alleles. In addition, archaeogenetic evidence including, African [Mande] inscriptions, Mande substratum in Mayan languages, Africans depicted in Mayan murals at San Bartolo and Xultun, African skeletons generally, and ancient Mayan skeletons with sickle cell anemia support Spanish eyewitness accounts of Black Native American tribes [Otomi, Chontal (Mayan speaking group), Yarura and etc.] in Meso-America when they arrived on the scene.

Conclusion: We demonstrate that given the age of the African skeletons, excavated at Meso-American archaeological sites and Spanish eyewitness accounts of Black Mexicans, Indigenous Mexican- African admixture occurred prior to the European discovery of America. The date for the African skeletons indicate that there were several waves of West Africans who probably introduced African haplotypes into the Americas. The 25,000 Malians who sailed to America in 1310 probably had a major influence on the exchange of African genes in the Americas.

Introduction

Meso-America is the geographical name for Mexico and the countries of Central America. Today people believe that the Blacks of Mexico and the Blacks of Guatemala, Honduras and Belize are the descendants of Sub-Saharan African (SSA) slaves taken to Mexico during the Atlantic Slave trade.

Researchers have suggested that Sub-Saharan Africans (SSA) were among the first Americans (1-6). Spanish explorers found Sub-Saharan African communities in Mexico when they arrived (1,7).

Sub-Saharan Africans were living in Mexico in 1492 (1-2). These SSA were trading with the mongoloid Amerindians, in addition to having their own settlements in the Americas. Amerigo Vespucci met African merchants on their way back to West Africa in the Middle of the Atlantic Ocean (7).

Much of what we know about African nautical sciences comes from Vasco da Gama. Vasco da Gama is said to have found information about the West Indies from Ahmad b. Majid, a West African he met during his travels along the West Coast of Africa (8). Da Gama claimed that ibn Majid wrote a handbook of navigation on the Indian Ocean, the Red Sea, the Persian Gulf, Sea of Southern China and the waters around the West Indian Islands. Majid is also said to be the inventor of the compass (8-9).

The Spanish left us mention of many Sub-Saharan Communities in Central America and Mexico (10-11). These dark skinned Indians were Africans not mongoloid Indians. Paul Gaffarel noted that when Balboa reached America he found "negre veritables" or true Blacks(12). Balboa noted "...Indian traditions of Mexico and Central America indicate that Negroes were among the first occupants of that territory" (12)." This is probably why so many Mexicans have "African faces " .

In addition, eyewitness accounts of SSA populations in the Caribbean, and Mexico anthropologists have found SSA skeletons at Pre-Columbian sites (5, 13-17). Some of the ancient Mayan skeletal remains indicate that they suffered from sickle cell anemia an illness associated with Sub-Saharan Africans (18-20). The presence of sickle cell anemia among the ancient Maya, supports Quatrefages claim that the Chontal Maya were Africans(7,11) .

Methods

The research design used in this study is a literature based research methodology. We analyzed the DNA literature relating to the subclades of Indigenous foundation haplogroups and HLA, and compared them to African haplogroups. The sample includes genomic and HLA literature of Indigenous Mexicans and West African test populations.

An inter-population comparison of Indigenous Mexican and African genomic and HLA literature was conducted to make a database of shared HLA alleles and population admixture frequencies. Data mining of the literature was used to determine haplogroup and HLA frequencies presented in this study.

Review

There is a high frequency of African-Mestizo admixture ranging between 20-40% (21). The admixture rate between Africans and indigenous Mexican Indians ranges between 5-50% (22-23).

The Amerindian haplogroups (hg) are descendant from the L3(M,N, & X) macrohaplogroup): ABCDN and X. The L3 (M,N,X) macrogroup converge at np 16223.

The mtDNA haplogroups ABC and X are subclades of haplogroup N. In Table 1, we see the distribution of haplogroup N, in the Americas.

The phylogeography of haplogroup C suggest that this American founder haplogroup differentiated in Siberia-Asia (24). The situation is not so clear for haplogroup B2, but A2 and D1 probably differentiated after the mongoloid Native American lineages diverged after crossing the Beringa Straits (24)

Haplogroup A2 has the motif 16111T,16223c, 16290T, 16319A and 16223C (25). Haplogroup A is rare in Siberia (26). Interestingly, haplogroup A absent in western North America is common in parts of Central America and Northern America where the Spanish reported the existence of Black Native American communities(1-2).

In a recent study of post-Classic Mexicans at Tlatilco , dating between 10-13 centuries the subjects carried the founder haplogroups A (36%), B (13%), C (4.3%) and D (17.4%) (27). We should note, that in Yucatec, the Mayans were predominately haplogroup A, the Maya in Honduras, a stronghold of the Black Native Americans belonged to haplogroup C.

The mtDNA haplogroup A common to Mexicans is

also found among the Mande speaking people and some East Africans (28-29). Haplogroup A found among Mixe and Mixtecs (28).The Mande speakers carry mtDNA haplogroup A, which is common among Mexicans (30). In addition to the Mande speaking people of West Africa, Southeast Africa Africans also carry mtDNA haplogroup A (29).

The major American Indian male lineages include R1, C,D and Q3. There is evidence of African admixture in the American y-chromosome haplogroups. The Q y-haplogroup has the highest frequency among indigenous Mexicans. The frequency hg Q varies from a high of 54% for Q-M243, and a low of 46% for QM (34).

African y-chromosome are associated with YAP+ and 9bp. The YAP-à associated with A-àG transition at DYS271 is found among Native Americans. The YAP+ individuals include Mixe speakers (32-33). YAP+ is often present in haplogroups (hg) C and D.

The DYS271 transition is of African origin (32).The DYS271 Alu insertion is found only in chromosomes bearing Alu insertion (YAP+) at locus DYS287 (33). The DYS271 transition was found among the Wayuu, Zenu and Inzano. The Mexican Native American y-chromosome bearing the African markers is resident in haplogroups C and D (34).

R-M173 is also found in Mexico. Haplogroups R and Q are part of the CT microgroup which dates back 56kya. Haplogroup R branches from hg Q, with the SNP M242.

The CT haplogroup has SNP mutation M168, along with P and M294. Haplogroup P (M45) has two branches Q (M242) and R-M207 which share the common marker M45.

The M45 chromosome is subdivided by the biallelic variant M173 (35). In Africa we find P (M173), R1b (M343) and V88; and R1b1a2 (M269).

Native Americans carry a high frequency of R-M173 (48). The predominate y-chromosome in North America is R-M173. R-M173 is found only in the Northeastern United States along with mtDNA haplogroup X (25%). Both haplogroups are found in Africa, but is absent in Siberia.

There are varying frequencies of y-chromosome M-173 in Africa and Eurasia. Whereas only between 8% and 10% of M-173 is carried by Eurasians, 82% of the carriers of this y-chromosome are found in Africa.

This is very interesting given the presence on R-M173 is found among many American Indian groups (48).

R-M173 among the North American Algonquian group range from Ojibwe (79%), Chipewyan (62%),

Seminole (50%), Cherokee (47%), Dogrib (40%) and Papago (38%) . These Indian groups have a long association with Africans and many live in areas where Europeans found Black Native Americans.

In most studies of North American Indians, any evidence of African haplogroups are excluded from all analyses (47). Exclusion of evidence of non-Amerindian admixture and non-foundational Amerindian haplogroups is regularly left out of publications on Native American DNA (49).

The R haplogroup is carried by Mexicans. The frequency of hg R varies from Tarahumara (5.6%), Otomi (14.3%), Yucateca Maya (10.5%). There is also a high frequency of haplogroup R among the Ch'ol and Chontal which stood around 15% (38). The Ch'ol and Chontal also carry E1b1b (38). The Spanish identified the Otomi as a Black Native American tribe(11).

African ancestry has been found among indigenous groups that have had no historical contact with African slaves and thus support an African presence in America, already indicated by African skeletons among the Olmec and Mayan people. Lisker et al, noted that "The variation of Indian ancestry among the studied Indians shows in general a higher proportion in the more isolated groups, except for the Cora, who are as isolated as the Huichol and have not only a lower frequency but also a certain degree of black admixture. The black admixture is difficult to explain because the Cora reside in a mountainous region away from the west coast" (22).

A recent study of African - Mexican admixture yielded a frequency range between 22-41% (25). In one study the researcher found that 3% of Native Americans showed African haplogroups (25).

Underhill et al , noted that:" One Mayan male, previously [has been] shown to have an African Y chromosome" (31). This is very interesting because the Maya language illustrates a Mande substratum, in addition to African genetic markers (3) Plus the Chontal were identified as a Black Native American tribe (11).

The African haplogroups among indigenous Mexicans include L0a1a'3, L2a1, L3b, L3d, and U6a (25). Interestingly, an individual at Laguna de los Condores, Peru dating between AD 1000-1500 carried L3 (36).

Green et al also found Indians with African genes in North Central Mexico, including the L1 and L2 clusters (25).

An important indicator of African admixture is 9bp (22,27). Haplogroup B is defined by 9bp (27) and is linked to haplogroup A.

The 9bp marker is reported among the North Mexicans. It is common among the Mixtec (27).

Some indigenous Mexicans show the G6PD deficiency. In a study of Yucatecos, Tzellzal-Tzoltzil, Mixteca and Mestizo it was found that people on the Oaxaca coast suffered from G6PD deficiency (22). Lisker also found G6PD deficiency in Costa Chica (22). The G6PD deficiency is usually carried by SSA.

Indigenous Indians at Tlaxcala contains 8% African genes, but historically no Africans lived in the area (37). Researchers have also found L1, L2 & L3 clusters among many Mexicans including the Cora, Mixtec and Zapotecs (39-41)

It is interesting to note that the proportion of African haplotypes roughly equivalent to the proportion of European haplotypes [among North Central Mexican Indians] cannot be explained by recent admixture of African Americans for the United States (41). This is especially the case for the Ojinaga area, which presently is, and historically has been largely isolated from U.S. African Americans. In the Ojinaga sample set, the frequency of African haplotypes was higher than that of European hyplotypes"(41).

Human Leukocyte Antigens (HLA) polymorphism is used to investigate ethnic relationships and origins. Africans and Indigenous Mexicans share HLA alleles. In Table 2 we outline the relationship. Guthrie in a study of the HLAs in indigenous American populations, found that the V antigen of the Rhesus system, considered to be an indication of African ancestry, among Indians in Belize and Mexico centers of Mayan civilization (45). Dr. Guthrie also noted that A*28 common among Africans has high frequencies among Eastern Maya (45).

In addition to A*28 , there is a high frequency of HLA B*35 among Mexicans and SSA (46). The frequency of HLA B*35 among indigenous Mexicans and SSA is high ranging between 22-31% among SSA populations and 30-45% among MA groups (46). It is interesting to note that the Otomi, a Mexican group identified as being of African origin and six Mayan groups show the B Allele of the ABO system that is considered to be of African origin.

Discussion

HLA , mtDNA and y-chromosome data indicate that a high frequency of Indigenous Mexican-African admixture exist between these populations. The usual answer to this phenomena was that the admixture occurred as a result of the Atlantic Slave Trade, which led to millions of Sub-Saharan Africans being sold in

Mexico.

The problem with this solution to the African-Indigenous Mexican admixture is that the vast majority of African slaves worked on the East Coast of Mexico. Although this was the case we find that many Mexican Indigenous populations, living in other parts of Mexico show African admixture like the Cora, Huichol, Ojnaga and Tlaxcala Indians that did not live in geographical proximity with African slaves. This suggest that the Indigenous Mexican-African admixture may have taken place prior to the Africans slave trade.

Indigenous Mexicans probably mated with Black Native Americans and Sub-Saharan Africans. The majority of Black Native American tribes according to Quatrefages lived in Meso-America. The Black Native American tribes include the Choco, Manabis, Yaruras, Guarani, Charruas, Othomi (Otomi), Yamassi, Tzendal/Chontal, the Mandinga(a member of the Cunan group of Mexico), the Blacks of Quareca and numerous tribes along the Orinoco river in Venezuela and the Isthmus of Darien (11,51). Quatrefages also mentioned the Black tribes of the United States southwest including a tribe reported by Cabeza de Vaca called Mandinga (11,4).

The Otomi and Caribe spoke a Manding language (3). The Mande languages also appear as a substratum language for the Mayan family of languages (3).

The major center for the Mande speakers, outside of Mexico, was Panama. The major Amerindian group in this area was the Cunan group (3-4). One of the major Cunan languages is Mandinga/Mandenka. Mandinga is the name for a Mande speaking tribe in West Africa.

Some of the Indigenous Mexican-African admixture is probably the result of the Mali discovery of America (11). Mali was an ancient West African Empire which stretched from the Western Sudan to the Atlantic shore. The West Africans had a long tradition of nautical sciences (8-9).

Around A.D. 1310, thousands of Manding speakers arrived in the Americas from ancient Mali. Ibn Fadlullah al- Umari, in his encyclopedia "**Masalik al Absar**", said the mariners from Mali during the reign of Abubakari made transatlantic voyages. Al-Umari, obtained his information from Mansa Musa, who was handed the kingship of Mali by Abubakari when he set out to colonize the Americas.

Ibn al-Umari wrote "But the Emperor[Abubakari] did not believe him", continued Musa, "He equipped two thousand vessels, a thousand for himself, and a thousand for water and supplies. He conferred power on me [Mansa Musa] and left with his companions on

the ocean".

The expeditionary force of Mansa Abubakari, must have been immense, because the average boat on the Niger, in the 1500's A.D., could carry 80 men. This means that anywhere between 25,000 to 80,000 men may have sailed from Mali along with Mansa Abubakari. West African nautical science suggest that many members of Abubakari's expeditionary force made it to America, because we find many Mande (Malian) inscriptions in throughout Meso-America, North America and South America (7).

Archaeologists have found numerous SSA or Black Native American skeletons in Mexico (13-16), some of them showing evidence of sickle cell anemia (18-20). This suggest that Africans were in Mexico before the advent of Christophe Columbus and other Europeans(1-4,7). It also indicates that a large number of Blacks lived in Mexico before Columbus arrived in the Western hemisphere. This along with the Lancadon and Otomi being classified as Negroes (7,10-11), may indicate that contact between Indigenous Mexicans and Sub-Saharan African populations prior to the European discovery of America is the reason for the DNA admixture.

The genetic evidence of Indigenous Mexican-African admixture is compelling. The frequency of HLA B*35 at 45% is highest among the Maya. We also find that the YAP+ associated with AàG transition at DYS271 and 9bp also has a high frequency among the Maya, all of these markers are associated with African ancestry. This is not surprising because Quatrefages classified the Chontal Maya as Black Native Americans (3,7,11), and sickle cell anemia is found among ancient Mayan skeletons (18-20).

The Genomic evidence also supports an early presence of Africans in Mexico. Moreno-Estrada et al found that the Borg and Mandenka have old genetic roots in the Caribbean (50).

Their research indicates that the Borg and Mandenka were in the Caribbean area around the time Europeans first arrived. This is quite interesting because the Borg speak an Akan language-and the Yaruras a Black Native American tribe the Spanish met in the New World also spoke the Akan language (51). Plus there was a Mandenka tribe in the Caribbean when the Spanish landed in America (11). Since the Borg and Mandenka were Native American tribes, it would explain the antiquity-evidenced by genetics-- of these populations in the Caribbean (50).

Conclusion(s)

A pre-Columbian date for the admixture between Indigenous Mexicans and Africans is supported by archaeological, anthropological, eye witness accounts and linguistic evidence that Sub-Saharan Africans were already in America when Europeans first reached these shores.

It is obvious that even the founder American haplogroups show African admixture. Moreover, the evidence that the Mande and Mexicans carry mtDNA haplogroup A (28-29) and the association of DYS271 and 9bp (which indicates African admixture) in Indigenous Mexican y-chromosome haplogroups, adds considerable weight to the idea that Africans mixed with indigenous Mexicans before 1492.

In sum, the age of the African skeletons (13-18) excavated at Meso-American archaeological sites and Spanish eyewitness accounts of Black Mexicans (1-2,7,12), suggest that Indigenous Mexican- African admixture probably occurred prior to the European discovery of America. The date for the African skeletons recovered during archaeological excavations indicate that there were at least two waves of West Africans who probably introduced African haplotypes into the Americas. The 25,000 Malians who sailed to America in 1310 (4,7) probably had a major influence on the exchange of African genes in the Americas.

Abbreviation(s)

DNA deoxyribonucleic acid, **hg** Haplogroup, **bp** Base Pair, **SSA** Sub-Saharan African, **SNP** single nucleotide polymorphisms, **mtDNA** Mitochondrial DNA denotes maternal ancestry, **YAP** Yes associated protein, **Y-chromosome** the DNA passed only from father to son.

Authors Contribution(s)

Analyzed the data and wrote the paper.

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Illustrations

Illustration 1

Table 1: Native American Carriers of Haplogroup N

Table 1: Native American Carriers of Haplogroup N

Geographical Area	Frequency
Na-Dene- North	5.3%
Na-Dene South	2.7%
Northern Amerindians	8.0
Central American	0.4
Southern American	1.2%
Fuego-Patagonia	1.7%

Illustration 2

Table 2: Shared African and Indian HLA-A-B Alleles

Table 2: Shared African and Indian HLA-A-B Alleles

HLA Allele	Amerindian*	Gambian**	Malian**	Nigerian**
A*02	5%	14.1%	15.9	
A*24	5%	4%	1.2%	2.1%
A*31	5%	.03%	.018%	.036%
B*35	5%	16.1%	.82%	.59%
B*40	5%	.06%	-----	.09%
*Arnaiz-Villena et al, (43)				
**Allsopp et al, (44)				