



POSSIBLE AFRICAN ORIGIN OF Y-CHROMOSOME R1-M173

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ABSTRACT

The Eurasian y-chromosome haplogroup R is found in Africa we need to determine if its existence indicates a back migration from Asia. We analyze the varied R haplogroups in Africa to determine their distribution and clade among and within Sub-Saharan populations. Haplogroup R is found among all African populations and linguistic groups including Khoisan and Pygmies. The widespread distribution of R-V88 and R1b globally across Africa may indicate an African origin for R-M173.

KEYWORDS: Y-chromosome haplogroup haplotype phylogeography.

INTRODUCTION

According to Underhill the geographical origin of y-chromosome R1b is situated in Eurasia. As a result, these researchers believed that the R y-chromosome haplogroup in Africa suggest a back migration from Asia to Africa (Cruciani, *et al*, 2010). Cruciani *et al* (2010), assume that the phylogeographic y-haplotype analyses suggest that Asia was probably the home for y-chromosome M173 and that the presence of haplotype M173 is due to a back migration from Asia since haplogroup R chromosomes were found in Cameroon (2002). Although this is Cruciani *et al* (2010), we test the hypothesis that opinion the phylogeography, diversity and widespread nature of M173 across the African continent implies that haplotype M173 probably originated in Africa, and that it expanded into Asia recently.

MATERIALS AND METHODS

The aggregated African populations with an R-M173 DNA profile were disaggregated to determine the distribution of R-M173 in Sub-Saharan Africa. We analyzed the y-chromosome sequences of the R haplogroup from Africa and Asia. This review of prior literature on macrohaplogroup R allowed us to critically look at the distribution of R lineages across the African continent.

RESULTS

The greatest diversity of haplogroup R is found in Africa not Asia (see Figure 1). The distribution of haplogroup R in Africa increases moving from east to west.

The Eurasian form of haplogroup R, include R1a (SRY1532) and R1b (M269). Haplogroup R1-M173 is ancestral to R-P25 (xM269) and other Eurasian downstream lineages. In Asia the frequency of haplotype M173 is as follows: Anatolia 0.19%, Iran 2.67%, Iraq 0.49% Oman 1.0%, Pakistan 0.57% and Oman 1.0% (Abu-Amero *et al*, 2009). This contrast sharply with the widespread distribution of R1*-M173 in Africa, that ranges between 7-95% and averages 39% (Coia *et al*, 2005); but no trace of Eurasiatic maternal lineages in West Central Africa.

Y-chromosome R1 is found throughout Africa. The pristine form of R1-M173 is only found in Africa (Coia *et al*, 2005; Cruciani *et al*, 2002, 2010). The age of y-chromosome R is 27ky. Most researchers believe that R(M173) is 18.5 ky. There is a great diversity of the macrohaplogroup R in Africa (See Figure 1). Y-chromosome R is characterized by M207/V45. The V45 mutation is found among African populations (Cruciani *et al*, 2010). ISOGG 2010 Y-DNA haplogroup tree makes it clear that V45 is phylogenetically equivalent to M207. The most common R haplogroup in Africa is R1 (M173). The predominant haplogroup is R1b (Berniell-Lee *et al*, 2009; Coia *et al*, 2005; Winters, 2010b; Wood *et al*, 2009). Cruciani *et al* (2010) discovered new R1b mutations including V7, V8, V45, V69, and V88. Geography appears to play a significant role in the distribution of haplogroup R in Africa. Cruciani *et al* (2010) has renamed the R*-M173 (R P-25) in Africa V88. The TMRCA of V88 was 9200-5600 kya (Cruciani *et al*, 2010).

Y-chromosome V88 (R1b1a) has its highest frequency among Chadic speakers, while the carriers of V88 among Niger-Congo speakers (predominately Bantu people) range between 2-66% (Cruciani *et al*, 2010; Berniell-Lee *et al*, 2009). Haplogroup V88 includes the mutations M18, V35 and V7. Cruciani *et al* (2010) revealed that R-V88 is also carried by Eurasians including the distinctive mutations M18, V35 and V7.

R1b1-P25 is found in Western Eurasia. Haplogroup R1b1* is found in Africa at various frequencies. Berniell-Lee *et al* (2009) found in their study that 5.2% carried Rb1*. The frequency of R1b1* among the Bantu ranged from 2-20. The bearers of R1b1* among the Pygmy populations ranged from 1-25% (Berniell-Lee *et al*, 2009). The frequency of R1b1 among Guinea-Bissau populations was 12% (Carvalho *et al*, 2010).

Most Eurasians carry the M269 (R1b1b2) mutation. The subclades of R1b1b2 include Rh1b1b2g (U106) (TMRCA 8.3kya) and R1b1b2h (U152) (TMRCA 7.4kya). The most recent common ancestor for R1b1b2 in Europe is probably 8kya (Balaesque *et al*, 2010). Y-Chromosome R1b1b2 has high frequencies in England, France, Italy and Germany (Balaesque *et al*, 2010).

Around 0.1 of Sub Saharan Africans carry R1b1b2. Wood *et al* (2009) found that Khoisan (2.2%) and Niger-Congo (0.4%) speakers carried the R-M269 y-chromosome.

The Khoisan also carry RM343 (R1b) and M 198 (R1a1) (Naidoo *et al.*, 2010) the archaeological and linguistic data indicate the successful colonization of Asia by Sub-Saharan Africans from Nubia 5-4kya (Winters, 2007,2008, 2010c). The archaeological evidence makes it clear that around 4kya intercultural style artifacts connected Africa and Eurasia (Winters, 2007,2010c).

There is genetic, linguistic and archaeological evidence pointing to the African origin of the Dravidian speakers in India (Aravanan, 1979,1980; Winters,2007). B.B. Lal's research suggests that the Dravidian speaking people may have belonged to the C-Group of Nubia (Lal, 1963).

The C-Group people spread culture from Nubia into Arabia, Iran and India as evidenced by the presence of black-and-red ware (BRW) . The C-Group people used a common black and red ware that has been found from the Sudan, across Southwest Asia and the Indian Subcontinent all the way to China (Singh,1982). The Dravidian speakers in India used the same ceramics and burial procedures as the C-Group (Lal,1963).

The linguistic evidence indicates a close relationship between African languages and South Eurasian languages. There is abundant evidence that the Dravidian languages are genetically related to the Niger-Congo group (Aravanan,1979,1980; Upadhyaya, 1976,1979; Winters 1985a,1985b, 1989). A genetic linguistic relationship between the Dravidian, Elamite and Niger-Congo languages (McAlpin, 1974, 1981; Winters,1989). Balakrishnan (2005) reveals that Niger-Congo speakers and Dravidians share identical place names.The Fulani and Mandekan speak a Niger-Congo language.

Fulani and Mandekan are closely related to the Dravidian languages (Upadhyaya, 1976,1979; Winters 1985a,1985b, 1989). The Fulani and Dravidian speaking Indians also share many HLA factors and y-chromosomes (Winters, 2010a, 2010c).

It is interesting to note that in a sample of Fulani speakers, 52.8% carried the R1b haplotype (Keita *et al*, 2010). Even though the Fulani DNA profile includes a high frequency of R1b they are not from the Middle East (Winters, 2010b, 2010c).

CONCLUSION

The archaeological, linguistic and genetic data fail to support Cruciani *et al* (2002,2010), contention that R1-

M173 in Africa, is the result of a back migration from Asia to Africa. The phylogeography of R1-M173 in Africa makes it clear that this y-chromosome is spread globally across Africa and includes the genetic structure of diverse African populations including Berber, Chadic, Cushitic, Khoisan,Pygmy, Niger-Congo, Nilo-Saharan and Semitic speaking African populations (Berniell-Lee *et al*, 2009; Cruciani *et al*, 2010; Wood *et al*, 2009). The fact that Dravidians carry the R haplogroup illustrate the recent introduction of R y-chromosome to Eurasia.

Abu-Amero *et al* (2009) reveal the fact that Dravidians carry the R haplogroups illustrate the recent introduction of Ry-chromosomes to Eurasia. The frequency of haplotype M173 in Eurasia is as follows: Anatolia 0.19%, Iran 2.67%, Iraq 0.49% Oman 1.0%, Pakistan 0.57% and Oman 1.0% . This contrast sharply with the widespread distribution of R1-M173 in Africa that ranges between 7-95% and averages 39% (Coia *et al*, 2005). Coia *et al* (2005) has revealed that no maternal Eurasian lineages have been found among Sub-Saharan Africans with a R1-M173 profile.

Haplogroup V88 has the greatest frequency in Africa. It is predominately carried by Chadic speakers, ranges between 2-60% among Central African Niger-Congo speakers (Cruciani *et al*, 2010). The phylogenetically deep haplogroup R1b is mainly found in West Africa and the Sahel, where the frequency ranges between 85-100% among Niger Congo speakers (Cruciani *et al*, 2010).

The paternal record of M173 on the African continent illustrates a greater distribution of this y-chromosome among varied African populations than, in Asia. The greatest diversity of R1b in Africa is highly suggestive of an Africa origin for this male lineage.

Archaeological (Lal, 1963), genetic (Winters, 2008;2010a), placenames (Balakrishnan, 2005) and linguistic data group (Aravanan,1979,1980; Upadhyaya, 1976,1979; Winters 1985a,1985b, 1989) linking Africans and Dravidian support the recent demic diffusion of Sub-Saharan Africans and gene flow from Africa to Eurasia. An early colonization of Eurasia 4kya by Sub-Saharan African carriers of R1-M173 is the best scenario to explain the high frequency and widespread geographical distribution of this y-chromosome on the African continent (Winters, 2010c). Given the greatest diversity of R1-M173, this is the most parsimonious model explaining the frequency of R-M173 in Africa

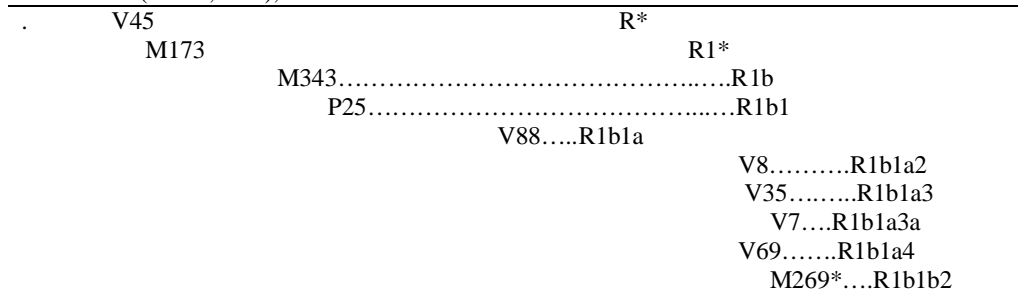


FIGURE 1: African R Haplogroups

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