

Male contribution in the constitution of the Brazilian *Centro-Oeste* population estimated by Y-chromosome binary markers

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Abstract. Brazilian *Centro-Oeste* region settlement was derived from national internal migrations of already mixed individuals. A Brazilian peculiarity, which occurred during the population formation, was the directional mating between European males and Amerindian or African females. Seeking the improvement of the knowledge about *Goiás* and Federal District population history, we studied the distribution of Y-haplogroups in samples of these populations. According to the data obtained, Federal District genetic diversity rate was greater than *Goiás*, which reflected a small divergence between these two neighbors' populations but statistically unsupported ($P=0.0524$). The European contribution was similar in both population and greater than African and Amerindian ones. In Federal District, a little contribution from Japan was also observed. © 2005 Elsevier B.V. All rights reserved.

Keywords: Brazilian populations; Y-chromosome binary marker; Y-haplogroup

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1. Introduction

The genetic constitution of human populations varies widely as a consequence of distinct patterns of migrations and breedings, besides other factors [1]. The Brazilian settlement was based in the admixture between individuals from different ethnic groups, especially Amerindians, Europeans and Africans. Due to the large territorial dimension, the distribution of these parental groups over Brazil was not homogeneous, which surely reflects the genetic composition of current populations. Moreover, it is also known that a strong directional mating between European males and Amerindian or African females happened during Brazilian history [2].

The *Centro-Oeste* region is composed by three states – *Goiás*, *Mato Grosso* and *Mato Grosso do Sul* – and the Federal District. Although Brazilian colonization was initiated in the XVI century, the settlement of this region took place only after the XVII century and the Federal District, where the Federal capital (Brasília) is placed, was founded in 1960. This settlement was performed mainly by mixed people and descendants from the founders groups (especially Portuguese, Sub-Saharan Africans and Amerindians from the Northern of *Centro-Oeste* region). Other groups, as Japanese, also contributed, but in a small rate. Estimatives of *Centro-Oeste* population's ethnic admixture, using autosomic microsatellites, show that the major contribution was from Europeans, followed by Africans and than Amerindians. Otherwise, there is a greater European and a lower African participation in the constitution of *Goiás* than in the Federal District (Godinho et al., personal communication).

This paper aimed to improve the knowledge about the *Centro-Oeste* population history, specially the male genetic contribution. For this purpose, we studied the distribution of Y-haplogroups in *Goiás* and Federal District populations.

2. Materials and methods

The sample was compounded by 129 unrelated native males from *Goiás* and 71 from Federal District. All individuals sampled were informed about the objectives of this research and assigned a consent term about the use of their samples in genetics studies, as demanded by the Brazilian National Ethic in Research Committee (CONEP).

We analyzed 11 binary markers – M89, M2, M213, P2, M34, P3, SRY4064, M3, 92R7, SRY2627 and YAP – located in the nonrecombinant region of the Y-chromosome which were amplified by PCR and analyzed as described by Abe-Sandes [2]. All statistical analyses were done using the ARLEQUIN software, version 2.000 [3]. Haplogroups classification is in agreement with the Y Chromosome Consortium [4].

3. Results and discussion

Brazilian *Centro-Oeste* region was settled by internal migrations. Its history indicates migration from all regions of Brazil in the constitution of Federal District besides a higher neighbor's states contribution in *Goiás* settlement. According to Nei's molecular diversity index, Federal District population genetic diversity was higher (0.71) than *Goiás* (0.67), due to the amount of observed haplogroups in Federal District. As evidenced by *Fst* analysis, there is a small difference between *Goiás* and Distrito Federal populations,

Table 1

Genetic admixture analysis in the formation of Brazilian *Centro-Oeste* population based on Y-haplogroups geographic distribution according to Y Chromosome Consortium [4]

Geographic origin	<i>Goiás</i>		Federal district	
Europe (92R7)	49.6	64.0 ^a	45.0	72.6 ^a
Africa (E3*; E* and E3a*)	27.1	35.0 ^a	14.2	22.9 ^a
Asia and America (Q3* and D1)	0.8	1.0 ^a	2.8	4.5 ^a
Worldwide (F* and R1b8)	22.5	–	38.0	–

^a Excluding worldwide haplogroups.

though statistically unsupported ($F_{st}=0.024$; $P=0.052 \pm 0.002$). Therefore, our data and history suggested that, probably, the Federal District population can be considered as an image of the Brazilian population.

The male contribution estimated by Y-haplogroups showed a higher contribution of European than African and Amerindian in both populations (Table 1). This corroborated autosomic STRs data which also show a higher European contribution in comparison with the other ethnic groups, mainly in *Goiás* (Godinho et al., personal communication). Y-chromosome genetic markers revealed a lower Amerindian contribution in the constitution of both populations than the autosomic ones. These results demonstrated a greater male contribution of Europeans than Africans or Amerindians to the formation of both populations, which is in agreement with historic data and other Brazilian populations already studied.

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