

Implication of Neighbors in the Genetic Diversity of the Human Immunodeficiency Virus Type 1 in the Democratic Republic Of Congo

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Abstract

The distribution of HIV-1 in the Democratic Republic of Congo (DRC) is very heterogeneous; it is very dynamic, evolving and unpredictable. The DRC has the largest number of variants of HIV type 1, particularly Group M. A research on the published works and the abstracts presented in conference having as subject of interest the identification of the different variants of HIV type 1 in DRC from 1997 to 2015 was done. The research of these works published on the different strains was made on the Internet on the research websites. According to the articles and abstracts of conferences published since 1997, a dominant prevalence of group M (100%) has been noted. For the whole country, the strains are found in the following order: A (49.40%), G (10.73%), C (9.01%) and D (7.86%). The geographical distribution of HIV-1 variants in the DRC is closely related to the distribution of variants in neighboring countries. This distribution is a true mosaic; it is different according to the provinces, the geographical distribution in the country and the methods used.

Keywords: Variants HIV-1, DRC, Neighboring Countries

The distribution of Human Immunodeficiency Virus Type 1 (HIV-1) in the Democratic Republic of Congo (DRC) is very heterogeneous; it is very dynamic, evolving and unpredictable [1]. Located in central African region, the DRC has the largest number of variants of HIV type 1, particularly of Group M in terms of subtypes, sub-subtypes and CRFs circulating across the country [2, 4-6].

A research on the published works and the abstracts presented in conference having as subject of interest the identification of the different variants of HIV type 1 in DRC from 1997 to 2015 was done. The search for these published works on the different strains was done on the internet on research websites. It was based on the following keywords: "HIV, subtype, DRC", "genotype, HIV, DRC" and "HIV strains in the DRC".

According to articles and conference abstracts published from 1997 to 2015, HIV-1 group M is 100% dominant and subgroup A is almost 50% [31,2-68,9] overall in the DRC. The distribution of subtypes differs from one part of the country to another as shown in the figure (1) below. In the Eastern part of the country, subtype a

(44.73%) is dominant on subtypes C (12.20%), G (11.5%), D (9.12%) and U (7.24%). In the center part, subtypeA (62.57%) is followed by subtypes C (10.32%), H (5.02%), U (4.3%) and D (3.9%). In the Western part, subtypeA (40.91%) is followed by subtypes G (19.29%), D (10.5%), F (5.65%) and C (4.51%). For the country, the subtypes are found in the following order: A (49.40%), G (10.73%), C (9.01%) and D (7.86%) [7]. Inter and intra-group differences are statistically significant for the different strains ($p > 0.00$).

The geographical distribution of HIV-1 variants in the DRC is closely related to the distribution of variants in neighboring countries [8]. Among the northeastern neighbors (Sudan [9], Uganda [3, 10, 11], Rwanda [3, 12], Burundi [3, 13, 14]), the predominant subtypes are D, C, A and B. While among the Southeast neighbors (Tanzania [3,15], Zambia [3,16] and even Kenya [3,16,17]), the dominant subtypes are A, C and D. This would explain the difference in prevalence in the eastern part of the country between Kisangani and Bukavu in the northeast, and Lubumbashi and Likasi in the southeast. The neighbor of the South, Angola [3, 18], has a

dominance of subtypes A, C and H which is reflected on Kinshasa and Kimpese. The neighbor of the West, the Republic of Congo [3,19], has a dominance of subtypes A, G and D which is also reflected on Kinshasa and Kimpese. The neighbor of North, the Central African Republic [3,20], has a dominance of subtypes A, B, D and CRF01_AE which is reflected on Bwamanda. The rural exodus to big cities such as Kinshasa, Lubumbashi and Mbuji Mayi, the displacement of the victims of the wars in the East of the country as well as the movement of the populations across the borders of the DRC make this epidemic difficult to control for the country.

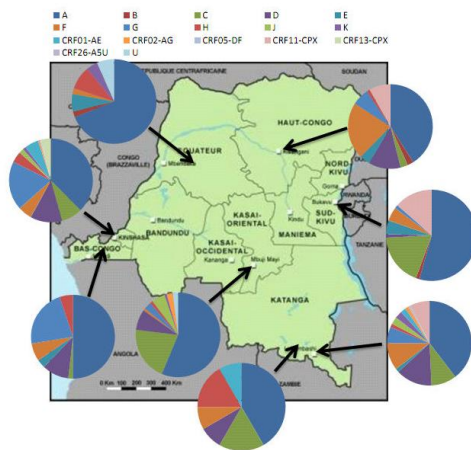


Figure1. Distribution of different strains of HIV-1 in the Democratic Republic of Congo (Source: Kamangu NE et al, 2013)

The distribution of the different variants of HIV Type 1 in the DRC is a mosaic; it is different according to the provinces and the geographical distribution in the country. This diversity will quickly become a big problem for the fight against HIV in the DRC if it is not under control.

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