

## Molecular Epidemiology of Dog Rabies in Nigeria

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### Background:

As in many parts of the developing world, both human and animal rabies statistics are limited in Nigeria. This is largely due to underreporting, misdiagnosis and lack of national rabies surveillance systems. It is estimated that at least 10,000 human deaths occur every year in Nigeria, with 99% or more due to dog rabies. This is despite the availability of Low egg passage (LEP) flury strain rabies vaccine which is produced locally for vaccination of dogs. As a result rabies is on the increase and continues to pose a public health threat.

### Objective:

The general objective was to investigate the molecular epidemiology of dog rabies in Nigeria by nucleotide sequencing of partial regions of the glycoprotein (G) and nucleoprotein (N) genes of virus isolates from different geographical areas. The phylogenetic relationships of these viruses were also assessed with those from neighbouring Chad, Cameroon, Niger and Benin.

### Methods:

A hundred dog brain tissues from a panel of samples submitted for routine diagnosis at the Rabies Unit of the National Veterinary Research Institute, Vom Nigeria were included in the study. Total viral RNA was extracted using Tri-Reagent (Sigma, USA) and partial regions of the N and G genes were reverse transcribed and amplified. The PCR products were purified using the Wizard PCR purification system (Promega, USA) and then cycle sequenced with same primer sets as specified by the manufacturer (Applied Biosystems USA). The phylogenetic analysis was carried out with the MEGA program.

### Results:

This phylogenetic analysis showed that all the dog viruses included in the investigation could be segregated into two major groups according to geographical origin. The viruses demonstrated at least 99% sequence homology and were distinct from the Pasteur virus (PV) used as the outlier. They also showed a 13.2% sequence divergence from the PV. It was also obvious that rabies viruses from Nigeria and her neighbours all grouped into the Africa 2 dog lineage clearly distinct from those of north, central east and southern African countries.

### Conclusions:

This study provides baseline data on rabies epidemiology in Nigeria. It is evident that one dominant variant is circulating in domestic dogs and the close evolutionary and epidemiologic links of Nigerian viruses with those of her neighbours was also illustrated from this study. The genetic characterization has shown that the viruses are very closely related with geographical and site dependence. Clearly, a mass vaccination campaigns targeted at stray dogs remains the only effective means of breaking the rabies cycle and the transmission to humans and other animals. The unrestricted movement of people and animals across international borders can influence the spread of rabies and other infectious diseases especially to areas that are considered free. There is a need to enforce strict dog movement control along human transportation routes.

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***Molecular Epidemiology of Dog Rabies in Nigeria.*** *continued*

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