OJPHI

ISDS 2013 Conference Abstracts

ISDS INTERNATIONAL SOCIETY FOR DISEASE SURVEILLANCE

Detection of Some Lyssaviruses from Fruigivorous and Insectivorous Bats in Nigeria

Grace S. Kia*[1, 2], Ivan I. Kuzmin[2], Jarlath U. Umoh[1], Jacob K. Kwaga[1], Haruna M. Kazeem[3], Modupe O. Osinubi[2] and Charles E. Rupprecht[2]

[1]Department of Veterinary Public Health and Preventive Medicine Faculty of Veterinary Medicine, Ahmadu Bello University (ABU), Zaria, Nigeria; [2]Centers for Disease Control and Prevention (CDC), Atlanta., Atlanta, GA, USA; [3]Department of Microbiology, Faculty of Veterinary Medicine, ABU., Zaria, Nigeria

Objective

To investigate the evidence of *Lyssavirus* antigens in the brain tissues of bats and the presence of some lyssaviruses (Lagos bat virus (LBV), Mokola virus (MOKV), Duvenhage virus (DUVV), West Caucasian bat virus (WCBV), Shimoni bat virus (SHBV) and classical rabies virus (CVS) antibodies in the sera of bats from Plateau State, Nigeria.

Introduction

One of the most significant zoonotic pathogen of bat origin is the rabies virus of the genus *Lyssavirus*. Lyssaviruses cause fatal encephalitis for which there is no effective treatment . The close association of some people to bats on account of residence, tourism, occupation, the consumption of bats by people in many parts of Nigeria and the public health implication of these remains to be assessed. Thus, the need for surveillance for lyssaviruses in bats is expedient. Surveillance is also particularly important for nonrabies lyssaviruses, because the rabies biologics commercially available do not reliably protect against Lagos bat virus (LBV), Mokola virus (MOKV), and West Caucasian bat virus (WCBV).

Methods

In total, 356 bats representing 7 genera and 8 species (*Chaerephon pumila, Eidolon helvum, Epomophorous franqueti, Epomophorous gambianus, Lavia frons, Nycteris macrotis, Rhinolophous landerii and Rhinopoma microphylum*) were collected during 2010-2011 in 8 locations in Plateau State of northern Nigeria (Table 1) . Collection of bats was based on the availability of bat roosts and consent from relevant authorities.

Brain tissues of the 356 bats were screened by direct fluorescent antibody (DFAT) [1] test for *Lyssavirus* antigens utilizing an anti-rabies monoclonal (Fujirebio Diagnostics, Inc., Malvern, Pennsylvania, USA) and polyclonal (Chemicon Int., Temecula, CA) fluorescent isothiocyanate-labelled anti-rabies virus antibodies. The modified rapid fluorescent focus inhibition test (RFFIT) [2] was used to test 76 available bat sera for the presence of *Lyssavirus* neutralizing antibody under a biological safety cabinet (Baker, Sterilgard III).

Results

None of the 356 bat brains screened by direct fluorescent antibody (DFAT) test was positive for *Lyssavirus* antigens. Of the 76 sera screened by the modified rapid fluorescent focus inhibition test (RFFIT), 24 (31.6%) had neutralizing activity (Table 1). Among these, 22(29.0%) neutralized LBV, 6(7.9%) neutralized MOKV and 18 (23.7%) neutralized SHBV. Eighteen (23.7%) sera neutralized more than one *Lyssavirus*: 2 (2.6%) neutralized LBV and MOKV; 12 (15.8%) neutralized both LBV and SHBV while 4 (5.3%) neutralized LBV, MOV and SHBV. None of the sera neutralized CVS, DUVV and WCBV. Eight of the serum samples from *E. helvum* bats were cytotoxic to the mouse neuroblastoma (MNA) cells.

Conclusions

This study reports the first evidence of Shimoni bat virus circulation in Nigeria. LBV, MOKV and SHBV antibodies detected in this study suggest these lyssaviruses may be circulating in bats or other animals in the wild. There is need for continuous surveillance in order to understand the epidemiology of lyssaviruses in the country and public enlightenment of the possible risk of rabies through unprotected contact and handling of bats.

Table 1. Virologic, and serologic data on bats captured during surveillance for lyssaviruses in bats in Plateau State, Nigeria (2010 to 2011)

Serial number	Species, Location	Sex Male/Female	Age Adult/Young Adult	Brains DFA Tested(1)	Serum tested by RFFT LBV positive / MOKV-positive / SHBV positive/No. tested
1	*Chaerephon pumila* Kanke	3/30	31/2	33	1/0/1/4
2	*Eidolon helvum* Jos Zoo	88/156	224/0	244	21/6/17/70
3	*Epomophorus franquetti* Shendam	7/5	12/0	12	NA(2)
4	*Epomophorus gambianus* Shendam	0/5	5/0	5	0/0/0/1
5	*Lavia frons* Lakushi forest	2/1	3/0	3	NA(2)
6	*Nycteris Macrotis* Pandam culvert	7/11	16/2	18	0/0/0/1
7	*Rhinolophus landerii* Pandam well	7/30	35/2	37	NA(2)
8	*Rhinapoma microphylum* Leptur cave	2/2	4/0	4	NA(2)
	Total	116/240	350/6	356	22/6/18/76

(1)All brains were negative for *Lyssavirus* antigen
(2) NA - not available

Keywords

Eidolon helvum; Mokola bat virus; Shimoni bat virus; Lagos bat virus; Chaerophon pumila

Acknowledgments

This work was partially supported by Education Trust Fund ETF/DESS/AST&D/UNIV/ABU/ZARIA/VOL.2.

References

1. Dean, D. J., Abelseth, M. K. and Atanasiu, P. The fluorescent antibody test. In F.-X. Meslin, M. M. Kaplan, and H. Koprowski (ed.), Laboratory techniques in rabies, 4th ed. WHO, Geneva, Switzerland 1996, Pp. 88–93.
2. Smith J.S., Yager P.A., Baer G.M. A rapid repro¬ducible test for determining rabies neutralizing anti¬body. Bulletin of World Health Organization 1973, 48: 535–541.

*Grace S. Kia
E-mail: gracegracekia@yahoo.com