Virus Name: Kotonkan		Abbreviation: KOTV
Status **Probable Arbovirus**	Select Agent **No**	SALS Level **2**

SALS Basis
Results of SALS surveys and information from the Catalogue.

Other Information

Antigenic Group
rabies serogroup

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation	Accession Number	Original Date Submitted
IbAr 23380		9/19/1984

Family	Genus
lyssavirus	

Information From	Address
G.E. Kemp and N. Karabatsos	**Division of Vector-Borne Viral Diseases, CDC, Fort Collns, Colorado 80522 USA**

Information Footnote
Revised

Section II - Original Source

Isolated By (name)	Isolated at Institute	
Dr. Vernon Lee	**Ibadan, Nigeria**	
Host Genus	Species	Host Age/Stage
Culicoides spp., pool of approximately 2508 (1, 2)		

Sex
Not Answered

Isolated From	Isolation Details
Signs and Symptoms of Illness	Arthropod

Time Held Alive before Inoculation
less than 8 hours

Collection Method	Collection Date
light trap	**12/11/1967**

Place Collected (Minimum of City, State, Country)
University of Ibadan

Latitude	Longitude
7° 23' N	**3° 56' E**

Macrohabitat	Microhabitat	Method of Storage until Inoculated
grass pasture, derived from clearing high tropical forest	**cattle barns**	**-60dF in mechanical freezer**

Footnotes

Section III - Method of Isolation

Inoculation Date
12/14/1967

Animal (Details will be in Section 6)
nb mice

Route Inoculated
intracerebral

Reisolation
Not tried

Other Reasons

Homologous Antibody Formation by Source Animal

Test(s) Used

Footnotes

Section IV - Virus Properties

Physicochemical

Pieces (number of genome segments)	Infectivity	Sedimentation Coefficients(s) (S)
Percentage wt, of Virion Protein	Lipid	Carbohydrate
Virion Polypeptides: Number	Details	
Non-virion Polypeptides: Number	Details	
Virion Density	Sedimentation Coefficients(s) (S)	
Nucleocapsid Density	Sedimentation Coefficients(s) (S)	

Stability of Infectivity (effects)

pH (infective range)

Lipid Solvent (ether - % used to test)	After Treatment Titer	Control Titer
Lipid Solvent (chloroform) **10%**	After Treatment Titer **2.5 dex**	Control Titer **4.4 dex**
Lipid Solvent (deoxycholate)	After Treatment Titer	Control Titer

Other (formalin, radiation)

Virion Morphology

Shape
conical and parallel-sided, bullet-0shaped virus p

Dimensions

Mean
195x68 (2)nm

Range
nm

Measurement Method **thin-section electron microscopy (2)**	Surface Projections/Envelope **surface projections; membranous envelope**	Nucleocapsid Dimensions, Symmetry

		cross-striations of nucleocapsid helix

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
budding from plasma membrane (2, 3)	**viral matrix or inclusion material in cytoplasm (2, 3)**	
Inclusion Bodies	Other	

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
Not tried		
pH Range	pH Optimum	
Temperature Range	Temperature Optimum	

Remarks

Serologic Methods Recommended
CF, serum dilution NT in nb mice * Mixed pool c

Footnotes

Section V - Antigenic Relationship and Lack of Relationship to Other Viruses

In CF tests done at Ibadan, a kotonkan virus antigen reacted with immune mouse ascitic fluid for Mokola virus of the rabies serogroup but not with nine arbovirus multivalent sera nor with monovalent immune fluids prepared with 64 distinct agents, including rabies, Lagos bat, Chandipura, bluetongue, Ibadan isolates of the epizootic hemorrhagic disease of deer group, IbAr 23388 (Abadina), herpesvirus, Newcastle disease and vaccinia. Following the isolation and identification of bovine ephemeral fever (BEF) virus in Nigeria, kotonkan virus was tested for CF reactions with this agent. Kotonkan hyperimmune mouse ascitic fluid with homologous titer of 1:32 failed to react at the 1:4 dilution with BEF mouse brain antigen; BEF hyperimmune mouse ascitic fluid (homologous titer 1:64) did not react at the 1:4 dilution with kotokan antigen [2] .
In cross-CF tests done at the Yale Arbovirus Research Unit, kotonkan virus again reacted with Mokola but not with rabies, Lagos bat, Obodhiang or 191 other viruses. Indirect FA tests, done at the Centers for Disease Control, confirmed the CF relationship between kotonkan and Mokola [2] , [3] . In N tests, however, kotonkan virus failed to react with Mokola and other rhabdoviruses [2] .

Cross-complement-fixation tests with kotokan and rabies serogroup viruses [2]						Neutralization tests with kotokan and other rhabdoviruses [2]						
	Mouse ascitic fluid CF antibody to:					Mouse ascitic fluid NT antibody to:						
Virus or Antigen	Kotonkan	Mokola	Rabies CVS	Lagos bat	Obodhiang	Kotonkan	Mokola	Rabies [b] CVS	Lagos bat	CHP	BEF Afr [c] / Aust [c]	
Kotokan	64 **	32	0	0	0	2.9 [a]	0.2	1.0	0.6	0.4	0.4	0.4
Mokola	0	256	32	4	16	0.0	3.1	0.9	2.6			
Rabies, CVS	0	64	256	0	0	0.0	0.2	3.0	0.2			
Lagos Bat	0	128	16	32	8	0.0	0.1	0.1	2.0			
Obodhiang	0	4	0	0	128							
191 arbo-viruses and other viruses of vertebrate	0	0	0	0	0							

** ascitic fluid titer; o = <4

[a] LNI expressed in dex

[b] Horse serum supplied by Lederle Labs.

[c] Supplied by Veterinary Res. Lab., Onderstepoort, South Africa.

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn mice

Cell system (a)	Virus passage history (b)	Evidence of Infection						
		CPE			PLAQUES			Growth Without CPE
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)	+/- (g)
Aedes albopictus (CL)	MB 9							+(4)
Vero (CL)	MB 9 AA 1	7-10	3+(5)		6	2mm (4)		
BHK-21 (CL)		7-10	3+(4)					
CER (CL)	CER 4			4.0-5.0^d (6)				
BHK-21 (CL)								-(9)
Vero (CL)		4-5	CPE	5.8 (9)				
E6 (CL)		5-6	+-CPE	4.5 (9)				
C6/36 (CL)		3	No CPE	3.8 (9)				+(9)

NOTE: Original Vero or BHK-21 cell culture passage was co-cultivated with infected Ae albopictus cells (4, 5).

D Expressed in dex

Section VII - Natural Host Range (Additional text can be added below table)

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Culicoides spp. *	1/72 (14,500 insects		University dairy barn, Ibadan, Nigeria (1, 2) Northern Nigeria (2)
Man		2/39 NT	Jos

Trade cattle		124/128 NT	(Northern origin)
Dairy cattle		29/29 NT	Vom
Horses		0/2 NT	
Cattle egret, Bubulcus ibis		1/1 NT	Bassa
Hedgehog, Atelerix albiventris		14/15 NT	
Giant rat, Cricetomys gambianus		14/21 NT	
Other rodents		1/2 NT	
Other rodents		0/2 NT	Fika
			Southern Nigeria (2)
Man		0/87 NT	South Nigeria
Monkey		0/1 NT	University of Ibadan
Swine		0/50 NT	
Sheep		8/75 NT	
Cattle		24/25 NT	
Chickens		0/16 NT	
Horses		2/33 NT	Ibadan
Wild birds		0/41 NT	
Shrew, Crocidura sp.		0/48 NT	University of Ibadan
Rodents		0/43 NT	
Bats		0/23 NT	

* In typical light trap catches during this period, the most abundant species was C. pallidipennis.

Section VIII - Susceptibility to Experimental Infection (include viremia)

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log10/ml
mice (nb)	IbAr 23380, MB 0	ic	1/8 dead, 1/8 sick (2)	11	
mice (nb)		ip			
mice (nb)		sc			
mice (wn)		ic			
mice (wn)		ip			
mice (nb)	IbAr 23380, MB 9	ic	illness, death (2)	14	
Fulani calves, white (3 mo)	IbAr 23380, MB 3	sc, intradermal	1/2 developed mild clinical illness similar in many respects to that caused by bovine ephermal fever virus. Viremia not detected during 15 days post-inoculation. Both calves developed NT antibody following infection (7).		

Section IX - Experimental Arthropod Infection and Transmission

Arthropod species & virus source(a)	Method of Infection log10/ml (b)		Incubation period (c)		Transmision by bite (d)		Assay of arthropod, log10/ml (e)		
	Feeding	Injected	Days	°C	Host	Ratio	Whole	Organ	System
Ae. aegypti, An quadrimaculatus, Cx quinquefasciatus, Er chrysogaster, 30 ea., innoc. with 10% mouse brain kotokan virus (IbAr 23380), P-8, titer 5.4 dex LD50/ml., 0.0006 ml/mosq. Every 14 days 5 paris sal. glands (1 ml dil.) passed to 30 clean mosqs. and inoc. ic baby mice; virus confirmed by CF. Kotokan pass. 5 times Ae and virus recovered to 72 days, An 4 times to 58 days, Cx 2 times to 30 days, Er 16 days. Mosq. virus not transmitted by bite to baby mice infect. sc with sal. gland virus. Low level viremia baby mice 3-5 days pi (ic) (8).									

Section X - Histopathology

Character of lesions (specify host)

Inclusion Bodies — Intranuclear

Organs/Tissues Affected

Category of tropism

Section XI - Human Disease

In Nature	Residual	Death
Subclinical	Overt Disease	

Clinical Manifestations

Number of Cases — Category (i.e. febrile illness, etc.)

Section XII - Geographic Distribution

Known (Virus detected)

Suspected (Antibody only detected)

Section XIII - References

1. Lee, V.H. 1979. J. Med. Ent. 16:76-79.
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6. Smith, A.L., et al. 1977. Intervirology 8:92-99.
7. Tomori, O., et al. 1974. Bull. Epizoot. Dis. Africa 22:195-200.
8. Director, YARU. Personal communication. 1972.
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Remarks

Kotokan is a Yorubu word for Culicoides fly; its literal translation is "as next to nothing."