Virus Name: Kokobera		Abbreviation: KOKV
Status **Probable Arbovirus**	Select Agent **No**	SALS Level **2**

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

Other Information

Antigenic Group
B

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation	Accession Number	Original Date Submitted
MRM 32		2/5/1985

Family	Genus
Flaviviridae	**Flavivirus**

Information From	Address
R.L. Doherty	**Queensland Institute of Medical Research, Herston N9, Brisbane, Queensland**

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)	Isolated at Institute	
Doherty, et al. (1)	**Brisbane**	
Host Genus **Culex annulirostris**	Species	Host Age/Stage **Adult**

Sex
Female

Isolated From	Isolation Details
Signs and Symptoms of Illness	Arthropod
Time Held Alive before Inoculation	
Collection Method **Hand collection from horses and man**	Collection Date **4/4/1960**

Place Collected (Minimum of City, State, Country)
Mitchell River Mission, North Queensland, AS

Latitude	Longitude
15° 30' S	**141° 40' E**

Macrohabitat	Microhabitat	Method of Storage until Inoculated
Low-lying plain bordering Gulf of Carpentaria, open forest- grassland	**On bank of creek on edge of aboriginal mission**	**Dry ice 1 week; then in Revco**

Footnotes

Section III - Method of Isolation

Inoculation Date
4/27/1960

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
Yes

Other Reasons
Subsequent isolations and demonstration of antibody in same area.

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)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate)	After Treatment Titer	Control Titer

Other (formalin, radiation)

Virion Morphology

Shape	Dimensions	
Mean nm	Range nm	
Measurement Method	Surface Projections/Envelope	Nucleocapsid Dimensions, Symmetry

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Inclusion Bodies	Other	

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
Yes	**SMB ext. by sucrose-acetone or acetone-ether**	**Goose**
pH Range **6.5-7.0**	pH Optimum **6.6**	
Temperature Range	Temperature Optimum **37dC used routinely**	

Remarks

Serologic Methods Recommended
CF, HI, NT

Footnotes

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

	MRM32 Antigen				MRM32 Mouse Antiserum		
	HI	CF	NT		HI	CF	NT
Immune Sera	Ht/Ho	Ht/Ho	Ht/Ho	Antigens	Ht/Ho	Ht/Ho	Ht/Ho
Studies in Brisbane [1]							
MVE (MRM66)	40/640	<8/32	1.7/3.0	MVE	80/640	8/32	2.0/>5.0
Kunjin (MRM16)	320/320	<8/64	2.2/>6.0	Kunjin	40/640	<8/32	1.5/>5.0
Edge Hill (C281)	20/320	<8/128	1.0/>3.2	Edge Hill	80/640	8/32	1.2/>5.0
Stratford (C338)	160/320	8/64	4.8/3.0	Stratford	80/640	32/32	1.1/3.0
Studies at RFVL New York [2]							
Dengue 4		4/>128		RSSE		0/64	
RSSE	20/320	0/32		Kunjin	2560/640	64/64	
Kunjin	0/640	64/256		Tembusu		0/32	
Tembusu		0/32		SLE		0/32	
Rio Bravo	320/5120			West Nile		4/32	

Bussuquara	10/160			JBE		0/32	
Modoc	640/5120			Rio Bravo	320/640		
Usutu	160/1280			Bussuquara	1280/640		
Israel Turkey Men.	0/640			Modoc	80/640		
Wesselsbron	0/40			Usutu	640/640		
Spondweni	0/20			Israel Turkey	320/640		
YF	160/5120			Wesselsbron	1280/640		
Banzi	80/640			Spondweni	320/640		
Zika	80/2560			YF	320/640		
Ilheus	1280/5120			Banzi	320/640		
JBE	40/2560			Zika	1280/640		
SLE	40/2560			Ilheus	320/640		

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)	
HeLa (CL)			CPE (8)						
BHK-21 (CL)			CPE (10)						
PS (CL)	P-6				8	1-1.5 mm	7.2* (9)		
Vero (CL)	P-7				2	1 mm	7.8 (11)		
LLC-MK2 (CL)					4	4 mm	7.8 (11)		
Aedes aegypti (CL)	SMB 5		No CPE (12)					- (12)	

* 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
Man	Cross-reaction between group B viruses makes interpretation of serum surveys difficult. However four sera from centres in Cape York Peninsula neutralized Kokobera only (3).		
Wallabies		Many	Queensland, AS (6)
Kangaroo: Macropus major		14/68 HI	Queensland, AS
Macropus rufus		1/16 HI	
Horses and cattle		Many	Queensland, AS (3, 7)
Aedes vigilax	1/2,139		Mitchell River, AS; 1967-68 (6)
Aedes spp. (pool of 22)	1		Bainyik, Sepik Dist. New Guinea (13)
Culex annulirostris	4/6,703		Mitchell River Mission, AS; 1960
Culex annulirostris	2/2,260		Australia; 1961
Culex annulirostris	1/914		Australia; 1963

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)	SMB 4 (MRM32)	ic 0.01	Death	5.1	8.1
Mice (nb)		ip 0.03	Death	8.0	7.8
Mice (nb)		sc			
Mice (wn)		ic 0.03	Death	9.5	6.5
Mice (wn)		ip 0.03	Antibody formation		
embryonated egg (7 day)		ys 0.1	Irregular deaths only		
		CAM 0.05	No deaths or lesions at 10-2 to 10-8		
rabbit (ad)		ip 0.2	Antibody formation		
guinea pig (ad)		ip 0.2	Antibody detected in some guinea pigs after 3 inoculations		

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
Culex quinquefasciatus	Adult mosquitoes intrathoracically inoculated; virus titrated in mice. 3.5/mosquito on day 8 (<1.3 on days 1 and 2) <1.87/mosquito from day 4 to day 25 (4). Adult mosquitoes exposed to virus by membrane feeding; virus titrated in mice. 3.5/mosquito on day 8 (<1.3 on days 1 and 2) <1.87/mosquito from day 4 to day 25 (4). Exp. transovarial transmission demonstrated with Aedes albopictus (14).								

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

Serological studies implicated Kokobera virus as the likely causative agent of acute polyarticular illness in 3 patients residing in SE Australia during 1983-84 and 1984-85 (15).

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

Section XII - Geographic Distribution

Known (Virus detected)

Australia, New Guinea

Suspected (Antibody only detected)

Possible northern West Australia (5)

Section XIII - References

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Remarks