Virus Name: Phnom-Penh Bat | **Abbreviation: PPBV**

Status
Probably not 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
A38/69

Accession Number

Original Date Submitted
11/20/1984

Family
Flaviviridae

Genus
Flavivirus

Information From
Dr. J.J. Salaun

Address
Institut Pasteur de Cote d'Ivoire, B.P. 490, Abidjan, Ivory Coast

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Dr. J.J. Salaun

Isolated at Institute
Phnom-Penh, Cambodia

Host Genus
8 Cynopterus brachyotis angulatus

Species

Host Age/Stage
Adult

Sex
Not Answered

Isolated From	Isolation Details
Other Fluids	**Salivary glands and brown fat**

Signs and Symptoms of Illness
Not observed

Arthropod

Time Held Alive before Inoculation

Collection Method
Netted by Dr. J.M. Klein and G. Hebrard

Collection Date
6/11/1969

Place Collected (Minimum of City, State, Country)
Chrui-Chang-War peninsula at Phnom-Penh, Cambodia

Latitude
11° N

Longitude
105° E

Macrohabitat
Tropical plain country, between Tonle Sap and Mekong Rivers

Microhabitat
In attics of houses on piles

Method of Storage until Inoculated
Revco at -60dC

Footnotes

Section III - Method of Isolation

Inoculation Date
6/12/1969

Animal (Details will be in Section 6)
nb mice

Route Inoculated	Reisolation
ic and ip	**Yes**

Other Reasons
Not related to other viruses in the laboratory

Homologous Antibody Formation by Source Animal
Not tested

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) **1:2**	After Treatment Titer **7.1 dex**	Control Titer **11.1 dex**
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) **1:1000**	After Treatment Titer **<6.0 dex**	Control Titer **>10.0 dex**

Other (formalin, radiation)

Virion Morphology

Shape	Dimensions **<50 nm**	
Mean nm	Range nm	
Measurement Method **By millipore filtration**	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
Yes

Antigen Source
SMB ext. by sucrose-acetone; fluorocarbon; crude alkaline

Erythrocytes (species used)
Goose

pH Range
5.75-7.2

pH Optimum

Temperature Range
4dC, 22dC, 37dC

Temperature Optimum
22dC

Remarks

Serologic Methods Recommended
CF, HI, and NT

Footnotes

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

Information from YARU (Dr. J. Casals):

CF -	homologous titer of serum = 256	
	heterologous titer =	64 with Alfuy, Banzi, Ilheus, MVE, SLE, Tembusu, West Nile.
		32 with Apoi, Cowbone Ridge, Edge Hill, Israel Turkey, JBE, Kadam, Langat, Ntaya, Powassan, RSSE, Tyuleniy, Usutu, Wesselsbron, Zika.
		16 with Rio Bravo, Bussuquara, Central European tick- borne, Dakar bat, dengue 3, KFD, Kunjin, Louping ill, MML, Negishi, Spondweni, yellow fever.
		8 with dengue 4, Entebbe bat, Potiskum (IbAn 10069), Modoc, Omsk HF.
		<8 with dengue 1, dengue 2, Kokobera, Stratford.

Antigen	Serum								
	A38-D	YF	Banzi	WN	Alfuy	Tembusu	Ilheus	MVE	SLE
A38-D	512/128	0/0	0/0	8/8	8/8	0/0	0/0	0/0	16/8

YF (Asibi)	32/64	64/256+							
Banzi	32/64		64/256+						
WN	64/128			256/256+					
Alfuy	128/32				256/128				
Tembusu	32/128					64/256			
Ilheus	128/256						256/256+		
MVE	64/256+							256+/256+	
SLE	128/128								256+/256+

Serum titer/antigen titer; first dilutions = 1:8.

Information from Institut Pasteur de Dakar (Dr. Y. Robin)

CF -	homologous titer = 16 Negative results with ArT 285, Banzi, Bukalasa bat, Saboya, Koutango, Bagaza (DakArB 209), Bouboui, DakArY 276, DakArY 310, Dakar bat, DakHD 10674, Kadam, Ntaya, Spondweni, Uganda S, Usutu, Wesselsbron, West Nile, yellow fever, Zika.

Cross CF and NT studies indicate that Batu Cave and Phnom-Penh bat viruses should be considered strains of the same virus [2] . Batu Cave virus registration was withdrawn at the request of Dr. A. Rudnick.

Virus Source (all VERTEBRATE isolates)
Salivary gland (LV), brown fat (LV)

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)
Monkey kidney (PC)	SMB 8		No CPE after 2 passages					
Chick embryo (PC)			No CPE at isolation; CPE in 1st passage			No plaques		
Vero (CL)	SM 2				10	Plaques	6.0* (2)	
LLC-MK2 (CL)					6	Plaques	8.7 (2)	
Duck embryo (PC)						No plaques		- (2)
C6/36 (CL)			No CPE					

* Expressed in dex

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Bats	2/633 *	9/71 HI	Cambodia
Eonycteris spelaea (bat)	1/many **		Batu Cave, Selangor, Malaysia (3)
Cynopterus brachyotis (bat)	1/many		Tanjong Rabok, Selangor, Malaysia (3)
Rodents	0/218		Cambodia
Birds	0/132		
Reptiles	0/2,676		
Man	0/1,139		
Mosquitoes	0/238,576		
Other arthropods	0/9,390	0/461 HI	

* One isolation from salivary glands and one from brown fat; these organs were from the same pool of 8 Cynopterus brachyotis angulatus (fruit bat). Isolation titer in salivary glands = 4.2 dex; in brown fat = 4.0 dex.

** Both isolates from salivary glands.

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 6	ic 0.02	Paralysis, death	6	11.1
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)	SMB 9	ic 0.02	Paralysis, death	10-13	
Mice (wn)		ip 0.03	None		
white rat (2 mo)		ic 0.1	None		
white rat (2 mo)		ip 0.25	None		
guinea pig (2 mo)		ic 0.15	Death	26-40	
guinea pig (2 mo)		ip 0.25	Death	40	

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
Aedes aegypti	Fed on suckling mice infected by ic inoculation								
Culex pipiens	Mosquitoes after feeding showed titer above 8.0 logs; no virus isolated from mosquitoes killed on days 5, 10, and 15 post infection. Virus titer in brain of infected mice = 11.1 LD50/0.2 ml. Virus titer in blood of paralyzed mice above 9.0 LD50/0.2 ml.								

Section X - Histopathology

Character of lesions (specify host)
SM: Severe encephalitis (infiltration with glial cells, pycnosis of nuclei, ring infiltrates, congestion. Necrosis occupies all of cortex). Hemorrhages, hard congestion and infiltration with mononuclear cells in lungs and kidneys.

Inclusion Bodies

Intranuclear

Organs/Tissues Affected
Brain (LV), lungs (LV), kidney (LV)

Category of tropism
Especially neurotropic

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)
Cambodia, Peninsular Malaysia (3)

Suspected (Antibody only detected)

Section XIII - References

1. Salun, J.J., et al. 1974. Ann. Microbiol. (Paris) 125A:485-495.
2. Wesley, I.V. and Calisher, C.H. Am. J. Trop. Med. Hyg. 31:1273-1284.
3. Rudnick, A. Personal communication.

Remarks