Virus Name: Bwamba	Abbreviation: BWAV

Status
Probable Arbovirus

Select Agent
No

SALS Level
2

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

Other Information

Antigenic Group
Bwamba

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
M 459

Accession Number

Original Date Submitted
1/3/1984

Family
Bunyaviridae

Genus
Bunyavirus

Information From
J.P. Woodall

Address
YARU, Yale Univ. Sch. Med., New Haven, Conn. 06510

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Smithburn, et al. (1)

Isolated at Institute
Entebbe, Uganda

Host Genus
Man

Species

Host Age/Stage
24 years

Sex
Male

Isolated From	Isolation Details
Serum/Plasma	

Signs and Symptoms of Illness
Fever, headache, epigastric pain, myalgia

Arthropod

Time Held Alive before Inoculation

Collection Method
Vacuum syringe

Collection Date
12/15/1937

Place Collected (Minimum of City, State, Country)
Bwamba County, western Uganda

Latitude
0° 48' N

Longitude
30° 5' E

Macrohabitat
Tropical rain forest; 2500 ft. A.S.L.

Microhabitat
Working on new road

Method of Storage until Inoculated
In syringe, at ambient temp.

Footnotes

Section III - Method of Isolation

Inoculation Date
12/15/1937

Animal (Details will be in Section 6)
ad mice

Route Inoculated
Intracerebral

Reisolation
Not tried

Other Reasons
Eight other patients yielded identical viruses and developed antibody.

Homologous Antibody Formation by Source Animal
Yes

Test(s) Used
NT

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) **1:1000**	After Treatment Titer **3.0 dex loss (3)**	Control Titer

Other (formalin, radiation)
3.0 dex inactivated by 10-3M p-chloromercuribenzoate at 18C for 1 hour (8).

Virion Morphology

Shape	Dimensions **75-150 nm**	
Mean nm	Range nm	
Measurement Method **Filtration (1,2)**	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; hamster kidney cell culture. ***	**Goose**
pH Range	pH Optimum	
	6.4	
Temperature Range	Temperature Optimum	
	37dC (8)	

Remarks
*** Very difficult to produce antigen by either method. The virus is interferon sensitive (13). Lypholizes well. In M-199 medium at 37C lost 3.4 dex/24 hours(8).Belongs to Bauer's xanthine oxidase Group 1(8).**

Serologic Methods Recommended
NT, CF. Neutralizability improved by centrifugatio

Footnotes
*** Very difficult to produce antigen by either method. The virus is interferon sensitive (13). Lypholizes well. In M-199 medium at 37C lost 3.4 dex/24 hours(8).Belongs to Bauer's xanthine oxidase Group 1(8).**

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

Bwamba virus belongs in the Bwamba Group.

Cross-reactive in NT with Pongola virus [4] but not in quantitative reciprocal manner.

Monkey Antiserum to:		Dex Virus Neutralized	
		Bwamba	Pongola
Bwamba:	Serum 1	2.22	2.40
	Serum 2	2.75	2.12
	Serum 3	4.8	4.56
Pongola:	Serum 1	0	3.05
	Serum 2	0	2.59

No relation to any other virus has been revealed by comprehensive NT [10] ; distant relationships with other groups have been noted by HI and CF tests [19] , which for practical reasons were not considered sufficiently strong to warrant a consolidation of the different groups although all these serogroups now comprise the Bunyamwera Supergroup [19] , [26] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (M)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn and weanling 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)	
Chick embryo (PC)	P-25		CPE			Plaques	5.7* (6)		
Hamster kidney(PC)			CPE						
BHK-21 (CL)	SMB 53	2	4+	6.8* (23)					
Vero (CL)	SMB 86				5	1 mm	5.0 (24)		
LLC-MK2 (CL)					3	3 mm	6.1 (24)		

* 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	9		Bwamba, Uganda
Man		up to 97% NT	Tanzania, Uganda (7, 15, 16)
Man		up to 37% NT	Mozambique (8)
Man	8	up to 77% NT	Nigeria (8, 20, 22)
Man		37/63 NT	S. Africa (4)
Man (with rash)	3		Central African Republic (21)
Birds		1/94 NT	S. Africa (8)
Donkeys		8/30 NT	
Anopheles funestus	1		Masaka, Uganda (16)
An funestus	1		Nigeria (22)
An gambiae	1		Senegal (27)
Man	1		Kenya (25)

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)	M 459, P-41	ic 0.02	Death	3	9.7
Mice (nb)		ip			
Mice (nb)	M 483	sc 0.03	Death (18)		3.6
Mice (wn)	M 459, P-45	ic 0.03	Death	5	8.4
Mice (wn)		ip	Antibody		
guinea pig		ic	Antibody		
rabbit		ic	None		
dog		various	None (14)		
rhesus monkey		ic,sc	Fever, NT antibody		
chick embryo(6-12 day)	M 459,SMB 35	various	Haemorrhage, virus mult., but no death (5)		

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	Haemocoelic inoc;10 serial gland passages positive (12)								
An quadrimaculatus	Haemocoelic inoc;10 serial gland passages positive (12)								
Cx quinquefasciatus	Haemocoelic inoc;10 serial gland passages positive (12)								

Section X - Histopathology

Character of lesions (specify host)
In mice: viral encephalitis with round or oval acidophilic intranuclear inclusions

Inclusion Bodies — Intranuclear
Lower Vertabrates

Organs/Tissues Affected
Brain (LV)

Category of tropism

Section XI - Human Disease

In Nature — Residual — Death
Reported

Subclinical — Overt Disease

Clinical Manifestations
Fever (S), headache (S), conjunctival inflammation (R), myalgia(S), pulse slow (avg. 84) (1)

Number of Cases
Nine

Category (i.e. febrile illness, etc.)
Febrile illness

Section XII - Geographic Distribution

Known (Virus detected)
Africa: Uganda, Nigeria, Central African Republic, Kenya (25), Kenya27)

Suspected (Antibody only detected)
Africa: Tanzania (7), Mozambique (8). South African results complicated by cross-reaction with Pongola (4,9).

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Remarks