

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		
<u>Isolated From</u>	<u>Isolation Details</u>	
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
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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

Hemagglutination Yes	Antigen Source SMB ext. by sucrose-acetone; hamster kidney cell culture. *	Erythrocytes (species used) 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

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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 +/- (g)	
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)		
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

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)

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log ₁₀ /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 log ₁₀ /ml (b)		Incubation period (c)		Transmission by bite (d)		Assay of arthropod, log ₁₀ /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	
<u>Inclusion Bodies</u>	<u>Intranuclear</u> Lower Vertebrates
Organs/Tissues Affected Brain (LV)	
Category of tropism	

Section XI - Human Disease

In Nature Reported	Residual	Death
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).

Section XIII - References

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Remarks