Virus Name: Banzi	Abbreviation: BANV

Status
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
H336

Accession Number

Original Date Submitted
10/5/1984

Family
Flaviviridae

Genus
Flavivirus

Information From
B.M. McIntosh; revised

Address
National Institute for Virology, P/Bag X4, Sandringham, 2131, South Africa

Information Footnote
Revised

Section II - Original Source

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

Isolated at Institute
Johannesburg

Host Genus
Man

Species

Host Age/Stage
9 years

Sex
Male

Isolated From	Isolation Details
Serum/Plasma	

Signs and Symptoms of Illness
Fever

Arthropod

Time Held Alive before Inoculation

Collection Method

Collection Date
3/28/1956

Place Collected (Minimum of City, State, Country)
Ndumu, Natal, South Africa

Latitude
27° 0' S

Longitude
32° 0' E

Macrohabitat
Tropical, coastal lowland; woodland savannah

Microhabitat

Method of Storage until Inoculated
Solid CO2

Footnotes

Section III - Method of Isolation

Inoculation Date
3/31/1956

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
Yes

Other Reasons

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)	After Treatment Titer	Control Titer

Other (formalin, radiation)

Virion Morphology

Shape **Spherical (2)**	Dimensions **Virion 53 nm; core 27 nm**	
Mean **49 nm**nm	Range **53-44 nm**nm	
Measurement Method **Electron microscopy (2)**	Surface Projections/Envelope **Envelope with thin projections present**	Nucleocapsid Dimensions, Symmetry

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Cytoplasm		**Endoplasmic reticulum cisternae; extracellularly in groups or singly**

Inclusion Bodies

Other

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
Yes	**SMB ext. by sucrose-acetone**	**Goose**

pH Range	pH Optimum
6.0-7.0	**6.5**

Temperature Range

Temperature Optimum

Remarks

Serologic Methods Recommended
CF, HI, NT

Footnotes

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

Considered to be a member of a subgroup or antigenic complex which also contains Uganda S virus [16] , [17] .

	BAN Virus			BAN Antibody	
	CF	NT		CF	NT
Antisera	Ho/Ht	Ho/Ht	Virus/Antigens	Ho/Ht	Ho/Ht
Uganda S		2.7/1.0	Uganda S		2.2/1.4
Uganda S		3.3/2.4	Uganda S		2.8/2.9
Uganda S		2.4/0.1			
Uganda S		4 *	Uganda S		1
Bagaza	16 **		Bagaza	64	
Bouboui	4		Bouboui	8	
Dakar bat	16		Dakar bat	>256	
Dengue I	64		Dengue I	>256	
Koutango	32		Koutango	>256	

Ntaya	32		Ntaya	16	
Saboya	16		Saboya	4	
Spondweni	256		Spondweni	64	
Wesselsbron	16		Wesselsbron	64	
West Nile	8		West Nile	>256	
Yellow fever	32		Yellow fever	64	
Zika	64		Zika	>256	
Usutu	16		Usutu	>256	
Uganda S	2		Uganda S	4	

NT: LNI given in dex determined in adult mice .

* The quotient of homologous/heterologous (Ho/Ht) plaque-reduction neutralization titers .

** The quotient of homologous/heterologous CF titers .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Serum (M), liver(LV), pool ofliver, lung, heart, kidney,spleen

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)	
BHK-21 (CL)	SMB 9				3	4 mm	9.4 [a] (4)		
L cells (CL)					6	1 mm	7.8 (4)		
LLC-MK2 (CL)					3	1 mm	8.5 (4)		
PS-C1 (CL)					3	1 mm	8.6 (4)		
Vero (CL)					6	2 mm	9.4 (4)		
Vero (CL)		7		>8.7 [a] (5)					

[a] 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 (blood)	1		Natal coastal plain, South Africa (1)
Man (blood)	1		Tanzania (6)
Man		105/626 NT	Natal, South Africa(7)
Man		39/871 NT	Mozambique (8)
Man		30/492 NT	Angola (9)
Man		11/120 NT	Caprivi, Namibia(10)
Man		28/323 NT	Okavango, Botswana(10)
Cattle		9/58 NT	Coastal plain, South Africa (11)
Sentinel hamster	2		Natal coastal plain, South Africa (12)
Sentinel hamster	1		Coastal plain, Mozambique (12)
Mastomys natalensis	1/112	2/24	Coastal plain, South Africa (12)
Culex rubinotus	91/22,344		Mostly coastal plain, South Africa (1, 5, 13)
Culex rubinotus	3/563		Highlands, Zimbabwe(13)
Culex rubinotus	1/1,310		Highlands, Kenya (15)
Culex nakuruensis	2/2,295		
Mansonia africana	1/4,926		

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)	H-336	ic	Death	3-4	>9.9
Mice (nb)		ip	Death	5-8	>9.9
Mice (nb)		sc			
Mice (wn)		ic	Death	5-9	>9.9
Mice (wn)		ip	Death	6-10	
guinea pig	H-366, SMB 8	ic	Antibody, death occasionally		
vervet monkey		ic	Antibody		
rodents: (14)					
Mystromys albicandatus		intracardially	Viremia		6.3
Mastomys natalensis		intracardially	Viremia		5.3
Saccostomus campestris		intracardially	Viremia		6.4
Aethomys chrysophilus		intracardially	Viremia		6.7
Lemniscomys griselda		intracardially	Viremia		5.2
Tatera brantsi		intracardially	Viremia		6.1

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 neavei,H-336	10.2		6-14	26	Mice				>6 transmissions(1)
Culex rubinotus	7.0		11-12	26	Hamster				26 mosq. biting 2 hamsters, both became infected (5). 42 male progeny neg.for trans-ovarial transmission(5)
Culex rubinotus (wild type virus)	Naturally infected		23 female+		Hamster	11/16	(16)		

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
Reported

Subclinical — Overt Disease

Clinical Manifestations
Fever

Number of Cases
2

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

Section XII - Geographic Distribution

Known (Virus detected)
South Africa (1), Tanzania (6), Kenya (15), Zimbabwe (13), Mozambique (12)

Suspected (Antibody only detected)
Angola (9), Namibia (10), Botswana (10)

Section XIII - References

1. Smithburn, K.C., et al. 1959. S. Afr. Med. J. 33:959-962.
2. Calberg-Bacq, C.M., et al. 1975. J. Ultrastruct. Res. 53:193-203.
3. de Madrid, A.T., et al. 1974. J. Gen. Virol. 23:91-96.
4. Way, H.J., et al. 1976. J. Gen. Virol. 30:123-130.
5. National Institute for Virology, South Africa. Unpublished.
6. Williams, M.C. and Woodall, J.P. 1964. E. Afr. Med. J. 41:271.
7. Smithburn, K.C., et al. 1959. S. Afr. Med. J. 33:555-561.
8. Kokernot, R.H., et al. 1960. Anais Inst. Med. Trop. 17:201-230.
9. Kokernot, R.H., et al. 1965. Trans. Roy. Soc. Trop. Med. Hyg. 59:563-570.
10. Kokernot, R.H., et al. 1965. Ibid. 59:553-562.
11. Kokernot, R.H., et al. 1961. Ann. Trop. Med. Parasit. 55:73-85.
12. McIntosh, B.M., et al. 1976. J. Med. Ent. 12:645-646.
13. McIntosh, B.M., et al. 1976. Ibid. 12:637-640.
14. McIntosh, B.M. 1961. Trans. Roy. Soc. Trop. Med. Hyg. 55:63-68.
15. Metselaar, D., et al. 1974. Ibid. 68:114-123.
16. Porterfield, J.S. 1980. Togaviruses. Academic Press. p. 21.
17. Calisher, C.H. Personal communication. 1982.

Remarks

BAN virus is evidently maintained by Culex rubinotus among rodent species.