

Virus Name: Witwatersrand		Abbreviation: WITV
Status Arbovirus	Select Agent No	SALS Level 2
SALS Basis Results of SALS surveys and information from the Catalogue.		
Other Information		
Antigenic Group Ungrouped		

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation SAAr 1062	Accession Number	Original Date Submitted 10/20/1984
Family Bunyaviridae	Genus Bunyavirus-like	
Information From B.M. McIntosh	Address National Institute for Virology, P/Bag X4, Sandringham, 2131, South Africa	
Information Footnote Revised		

Section II - Original Source

Isolated By (name) B.M. McIntosh, et al. (1)	Isolated at Institute S. Afr. Inst. Med. Res., Johannesburg	
Host Genus Culex rubinotus	Species	Host Age/Stage Adult
Sex Female		
<u>Isolated From</u>	<u>Isolation Details</u>	
Signs and Symptoms of Illness	Arthropod	
Time Held Alive before Inoculation		
Collection Method By hand off human bait	Collection Date 4/11/1958	
Place Collected (Minimum of City, State, Country) Germiston, South Africa		
Latitude 26° 0' S	Longitude 28° 0' E	
Macrohabitat Grassland plateau; temperate zone	Microhabitat Reed-bed on lake shore	Method of Storage until Inoculated Dry CO2
Footnotes		

Section III - Method of Isolation

Inoculation Date
4/14/1958

Animal (Details will be in Section 6)
nb mice

Route Inoculated Intracerebral	Reisolation Yes
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Other Reasons

Homologous Antibody Formation by Source Animal

Test(s) Used

Footnotes

Section IV - Virus Properties

Physicochemical
RNA

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) 50%	After Treatment Titer 2.0 dex loss (2)	Control Titer
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) 1:1000	After Treatment Titer 2.2 dex loss (2)	Control Titer
Other (formalin, radiation)		

Virion Morphology

Shape Spherical (2)	Dimensions 95 nm (2)	
Mean nm	Range nm	
Measurement Method Electron microscopy	Surface Projections/Envelope	Nucleocapsid Dimensions, Symmetry

Morphogenesis

Site of Constituent Formation in Cell
Cytoplasm (2)

Site of Virion Assembly
Endoplasmic reticulum

Site of Virion Accumulation
Cisternae of endoplasmic reticulum

Inclusion Bodies

Other

Hemagglutination

Hemagglutination
Yes

Antigen Source
SMB, serum (better) ext. by acetone; acetone-ether.

Erythrocytes (species used)
Goose

pH Range
5.9-6.2

pH Optimum
6.0

Temperature Range

Temperature Optimum

Remarks

Serologic Methods Recommended
HI, CF, NT

Footnotes

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

In CF, WIT antigen failed to react with HIAF of the following [3] : chikungunya, Semliki Forest, Sindbis, Middelburg, Ndumu, Bagaza, Saboya, Ntaya, Bouboui, Uganda S, Banzi, Wesselsbron, Dakar bat, West Nile, Koutango, Usutu, dengue 1, yellow fever, Zika, Spondweni, Birao, Bunyamwera, Ilesha, Shokwe, Simbu, Shuni, Ingwavuma, Shamonda, Sathuperi, Sabo, Sango, Pongola, Bwamba, Germiston, Rift Valley fever, Gordil, Arumowot, Tele, Tahyna, Dugbe, Bhanja, Thogoto, Nairobi sheep disease, Olifanstmei, Botambi, Nyabira, D'Aguilar, Lebombo, Acado, Pata, Warrego, Bovine ephemeral fever, Chandipura, Keuraliba, Gomoka, Okola, Nkolbisson, Tanga, Quarantfil, Malakal, Nyamanini, Chenuda, Toure, Yogue, Nyando, Zinga, Akabane, Nola, Thimiri, Mossuril, Yata, Bangoran, African horsesickness, bluetongue, M'Poko, Tataguine, Zingilamo. In CF, WIT antigen failed to react with the following grouping fluids [2] : A, B, C, Bunyamwera, California, Guama, Capim, Johnston Atoll-Quarantfil, Phlebotomus fever, Tacaribe, Vesicular Stomatitis, Anopheles; and the following antisera: Anopheles B, Changuinola, Congo, Kemerovo, Koongol, Lagos bat, Tacaiuma, Turlock.

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Brain, liver, spleen, kidney pool (LV), liver (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 +/- (g)
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)	
BHK-21 (CL)					4	2-3 mm	6.9* (2)	
Vero (CL)					3	1-2 mm	7.2 (2)	

* Expressed in dex

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Man		2/712 NT	South Africa (3)
Man		3/79 NT	Mozambique (1)
Rodents:			
<i>Lophuromys flavopunctatus</i>	2/72	12/25 NT	Lunyo Forest, Uganda (4)
<i>Arvicanthis niloticus</i>	1/110	22/44 NT	
Wild rodents (8 species)		8/37 NT	Lunyo Forest, Uganda (4)
<i>Mastomys natalensis</i>		2/112 HI	Mozambique (5)
Sentinel hamster	43		South Africa (5)
Sentinel hamsters	12		Mozambique (5)
<i>Culex rubinotus</i>	1		Uganda (2, 4)
<i>Cx rubinotus</i>	79/21,834		South Africa (1, 3, 6)
<i>Cx rubinotus</i>	3/563		Zimbabwe (6)

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log ₁₀ /ml
Mice (nb)		ic	Death	2-3	8.8
Mice (nb)		ip	Paralysis, death (2)	3-4	7.3
Mice (nb)		sc	Paralysis, death (2)	4-5	7.3
Mice (wn)		ic	Paralysis, death (2)	4-5	7.0
Mice (wn)		ip	Paralysis, death (2)	5-6	>6.8
domestic rabbit (20 wk)		sc	Survived 5.3 dex		
guinea pig		sc	Survived 5.3 dex		
golden hamster		sc	Viremia, paralysis, death	3-5	10.3 7.3 (brain)
Arvicanthus niloticus		sc	Viremia		>7.2

Section XIII - References

1. McIntosh, B.M., et al. 1960. South African J. Med. Sci. 25:33-37.
2. Monath, T.P., et al. 1972. Arch. ges. Virusforsch. 38:125-132.
3. McIntosh, B.M. Unpublished.
4. Henderson, B.E., et al. 1972. Ann. Trop. Med. Parasitol. 66:343-355.
5. McIntosh, B.M., et al. 1976. J. Med. Ent. 12:641-644.
6. McIntosh, B.M., et al. 1976. J. Med. Ent. 12:637-640.
7. McIntosh, B.M., et al. 1976. J. Med. Ent. 12:645-646.
8. Murphy, F.A., et al. 1973. Intervirology 1:297-316.
9. Bishop, D.H.L. and Shope, R.E. 1979. Comprehensive Virology 14:1.

Remarks

WIT virus is probably maintained by *Cx rubinotus* among several rodent species. On morphogenetic and morphological evidence it has been placed in the Bunyaviridae family (2,8,9).