Virus Name: Germiston	Abbreviation: GERV

Status
Arbovirus

Select Agent
No

SALS Level
3

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

Other Information
Hepa Filtration

Antigenic Group
Bunyamwera

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
Ar 1050

Accession Number

Original Date Submitted
9/30/1984

Family
Bunyaviridae

Genus
Bunyavirus

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)
R.H. Kokernot, et al. (1)

Isolated at Institute
Johannesburg

Host Genus
Pool of 12 Culex rubinotus and 5 Culex theileri

Species

Host Age/Stage
Adult

Sex
Female

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod

Time Held Alive before Inoculation
12 hours

Collection Method
Off human bait by hand

Collection Date
4/2/1958

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

Latitude
26° 0' S

Longitude
28° 0' E

Macrohabitat
Grassland plateau; temperate; urban

Microhabitat
Outdoors, reed-bed on shores of lake

Method of Storage until Inoculated
Held alive at room temperature

Footnotes

Section III - Method of Isolation

Inoculation Date
4/3/1958

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
Not tried

Other Reasons
Another strain isolated from Culex rubinotus collected at the same time and place.

Homologous Antibody Formation by Source Animal

Test(s) Used

Footnotes

Section IV - Virus Properties

Physicochemical
RNA, Single Strand

Pieces (number of genome segments) **3**	Infectivity	Sedimentation Coefficients(s) (S)
Percentage wt, of Virion Protein	Lipid	Carbohydrate
Virion Polypeptides: Number **4**	Details **Three major structural polypeptides (MW 125 x 10\3/, 27 x 10\3/, 18 x 10\3/) as well as a minor large protein (MW 185 x 10\3/) (2)**	
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	Dimensions
Mean nm	Range nm
Measurement Method	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	**SM serum (1), HeLa (3) and BHK-21 cell cultures (4)**	**Goose**
pH Range	pH Optimum	
5.7-6.7	**6.1**	
Temperature Range	Temperature Optimum	

Remarks

Serologic Methods Recommended
CF, NT, HI

Footnotes

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

Antibodies	GER Virus HI [5]	GER Virus CF [4]	GER Virus PRNT [6]	Antigens	GER Antibody HI [5]	GER Antibody CF [4]	GER Antibody PRNT [6]
Bunyamwera	2	16	46	Bunyamwera	>64	>512	-
Batai	8		256	Batai	>64		-
Ilesha	1	16	-	Ilesha	>64	>512	-
Tensaw	64		-	Tensaw	>64		-
Cache Valley	>32		-	Cache Valley	32		-
Maguari	32		-	Maguari	>64		-
Lokern	16		-	Lokern	>64		-
Main Drain	>16		-	Main Drain	>64		-
Kairi	8		-	Kairi	>64		-
Sororoca	8		-	Sororoca	>64		-
Shokwe		32	-	Shokwe		128	-
Birao		256	-	Birao		>1024	-
Anhembi			-	Anhembi			-
Wyeomyia			-	Wyeomyia			-
Northway			-	Northway			-
Tlacotalpan			-	Tlacotalpan			-

Results expressed as quotient of homologous/heterologous (Ho/Ht) titers; - = Ht PRNT titer of <1:20.

In the original desciption of GER, there was significant reciprocal neutralization with BUN virus in an adult mouse NT, but the viruses were readily separable by HI and CF [1] .
Cross-neutralization studies indicated that GER virus is a distinct member of the Bunyamwera serogroup; it has been placed in the Bunyamwera complex, one of five complexes comprising that serogroup at that time [6] .
For further studies see Reference [7] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (M), liver (LV), serum (LV), pooled organs (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)	
BHK-21 (CL)	SMB 15	2-3	4+	7.5* (8)					
BHK-21 (CL)					2	1 mm	8.5* (9)		
Chick embryo (PC)					3	<1 mm	6.6 (9)		
HeLa (CL)					6	2-3 mm	8.7 (9)		
L (CL)					6	1-2 mm	7.8 (9)		
LLC-MK2 (CL)					4	1 mm	7.9 (9)		
MA-104 (CL)					4	1-2 mm	8.4 (9)		
MA-111 (CL)					3	1-2 mm	8.2 (9)		
PS-C1 (CL)					3	1-2 mm	7.9 (9)		
Vero (CL)					3	2 mm	8.6 (9		

* 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 (serum)	2	15/114 HI	Natal, South Africa(1, 4)
Man		36/492 NT	Angola (10)
Man		25/120 NT	Caprivi, Namibia (11)
Man		61/323 NT	Okavango, Botswana (11)
Wild rodents (4 species)	8		Lunyo Forest, Uganda (12, 13)
Wild rodents (7 species)		28/106 NT	Lunyo Forest, Uganda (12)
Cattle		169/290 NT	Natal, South Africa (4)
Sentinel hamster (liver)	42		Natal, South Africa(4, 15)
Sentinel hamster (liver)	12		Mozambique (15)
Culex rubinotus	90/21,814		South Africa (1, 4, 14)
Culex rubinotus	5/563		Zimbabwe (14)
Culex rubinotus	1/102		Mozambique (14)
Culex rubinotus	1/418		Uganda (12)
Culex rubinotus	3		Kenya (16)

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)	Ar 1050, SMB 3	ic	Death	1	8.1
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)		ic	Death	4	8.3
Mice (wn)		ip	Death	8	7.6
vervet monkey (ad)		ip	Antibody		
guinea pig (ad)		ic	Antibody		
hamster		ip	Death (4)	3	8.2
Wild rodents:					
Tatera brantsi	SMB 3	ip	Viremia (17)		>7.7
Arvicanthis niloticus		sc	Viremia (13)		6.8

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 rubinotus	Naturally infected				hamster	4/5	40 mosq.; fed on 5 hamsters, 4 infected (18)		
Culex rubinotus	8.2		12-14	26	hamster	3/3	26 mosq.; fed on 3 hamsters, 3 infected (4)		
Culex rubinotus			511 females and 478 male adult F1 progeny, free of virus (4)						

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
Reported

Clinical Manifestations
Hyperthermia, headache, lumbo-sacral pain, weakness, mental confusion, rash

Number of Cases — Category (i.e. febrile illness, etc.)
Two lab infections, 1 in nature — **Febrile illness with rash**

Section XII - Geographic Distribution

Known (Virus detected)
South Africa (1), Zimbabwe (14), Uganda (12), Mozambique (14,15), Kenya (16)

Suspected (Antibody only detected)
Angola (10), Namibia (11), Botswana (11)

Section XIII - References

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Remarks

GER virus is evidently maintained by Culex rubinotus among wild rodent species.