

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		
<u>Isolated From</u>	<u>Isolation Details</u>	
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)	Infectivity	Sedimentation Coefficients(s) (S)
3		

Percentage wt, of Virion Protein	Lipid	Carbohydrate
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Virion Polypeptides: Number	Details
4	Three major structural polypeptides (MW 125 x 10³/, 27 x 10³/, 18 x 10³/) as well as a minor large protein (MW 185 x 10³/) (2)

Non-virion Polypeptides: Number	Details
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Virion Density	Sedimentation Coefficients(s) (S)
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Nucleocapsid Density	Sedimentation Coefficients(s) (S)
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Stability of Infectivity (effects)

pH (infective range)

Lipid Solvent (ether - % used to test)	After Treatment Titer	Control Titer
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Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
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Lipid Solvent (deoxycholate)	After Treatment Titer	Control Titer
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Other (formalin, radiation)

Virion Morphology

Shape	Dimensions
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Mean nm	Range nm
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Measurement Method	Surface Projections/Envelope	Nucleocapsid Dimensions
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Morphogenesis

Site of Constituent Formation in Cell

Site of Virion Assembly

Site of Virion Accumulation

Inclusion Bodies

Other

HemagglutinationHemagglutination
YesAntigen Source
SM serum (1), HeLa (3) and BHK-21 cell cultures (4)Erythrocytes (species used)
GoosepH Range
5.7-6.7pH Optimum
6.1

Temperature Range

Temperature Optimum

Remarks

Serologic Methods Recommended
CF, NT, HI

Footnotes

Antibodies	GER Virus			Antigens	GER Antibody		
	HI [5]	CF [4]	PRNT [6]		HI [5]	CF [4]	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 description 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 +/- (g)
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)	
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

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)

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log ₁₀ /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)		Transmission 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
Reported

Residual

Death

Subclinical

Overt Disease
Reported

Clinical Manifestations

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

Number of Cases

Two lab infections, 1 in nature

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

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.