

Virus Name: Benevides		Abbreviation: BVSV
Status Probable Arbovirus	Select Agent No	SALS Level 2
SALS Basis Placed at this biosafety level based on close antigenic or genetic relationship to other viruses in a group of 3 or more viruses, all of which are classified at this level.		
Other Information		
Antigenic Group Capim		

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation BeAn 153564	Accession Number	Original Date Submitted 5/8/1984
Family Bunyaviridae	Genus Bunyavirus	
Information From F. Pinheiro and Amelia A.T. Rosa	Address Instituto Evandro Chagas, FSESP, Brazilian Ministry of Health, CP 621, 66.000 Belem, Brazil	
Information Footnote Revised		

Section II - Original Source

Isolated By (name) Belem Virus Laboratory	Isolated at Institute Instituto Evandro Chagas, Belem	
Host Genus Mouse, sentinel	Species	Host Age/Stage Infant
Sex Not Answered		
<u>Isolated From</u>	<u>Isolation Details</u>	
Organs/Tissues	Brain and liver	
Signs and Symptoms of Illness	Arthropod	
Time Held Alive before Inoculation		
Collection Method unknown	Collection Date 5/25/1968	
Place Collected (Minimum of City, State, Country) APEG, IPEAN, Belem, Para, Brazil		
Latitude 1° 28' S	Longitude 48° 27' W	
Macrohabitat Tropical rain forest	Microhabitat Relatively undisturbed flooded forest, at ground level	Method of Storage until Inoculated At -60dC
Footnotes		

Section III - Method of Isolation

Inoculation Date
11/25/1968

Animal (Details will be in Section 6)
nb mice

Route Inoculated Intracerebral	Reisolation Not tried
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Other Reasons
Other strains of the virus isolated from the same area

Homologous Antibody Formation by Source Animal

Test(s) Used

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 <0.5 dex	Control Titer 6.5 dex
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

Hemagglutination Antigen Source Erythrocytes (species used)
Yes **SM serum ext. by acetone** **Goose**

pH Range pH Optimum
5.8-6.0 **6.0**

Temperature Range Temperature Optimum
RT, 37C **Room temperature**

Remarks

Serologic Methods Recommended
CF, HI, NT

Footnotes

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

Benevides virus (BeAn 153564) is a member of the Capim group as shown below:

Sera	CF TEST						
	Capim	Guajara	Bushbush	Moriche	Acara	Benfica	Benevides
Capim	64/>256 ^a	8/16	0	0	0	0	0
Guajara	0	32/16	0	0	0	0	0
Bushbush(BeAn 20076)	0	8/16	32/16	32/>256	0	0	0
Moriche	0	32/16	>256/16	>256/>256	0	0	0
Acara	0	0	0	0	16/>25	8/64	16/>256
Benfica	0	0	0	0	16/>256	32/6	32/>256
Benevides	0	0	0	0	16/>256	8/64	32/>256

^a Antibody titer/antigen titer; 0 = <4/<4

HI TEST

ANTIGENS (4 units)

Sera	Capim	Guajara	Bushbush	Moriche	Acara	Benfica	Benevides
Capim	80	0	0	0	0	0	0
Guajara	0	80	0	0	0	0	0
Bushbush	0	0	80	0	0	20	0
Moriche	0	0	0	160	40	0	0
Acara	0	0	0	0	40	0	0
Benfica	0	0	20	0	0	80	0
Benevides	0	0	0	0	0	0	40

NEUTRALIZATION TEST (infant mice, ic route)

Virus (infected baby mouse serum)

Sera	Acara	Benfica	Benevides
Acara	> 6.2 ^b	0.1	0.1
Benfica	> 1.2	> 5.1	0.1
Benevides (An 153564)	> 1.2	0.1	> 5.1

^b LNI in dex

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Brain and viscera (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)	
Vero (CL)	SM 7	2-3	4+	7.0-8.0 (c)				
Chick embryo (PC)					5-6	1 mm	4.0 (c)	

(c) 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
Sentinel mouse (brain and liver)	10		APEG, IPEAN, Belem, Para, Brazil
Culex (Mel) spissipes (engorged)	1		
Culex spp.	3		
Nectomys s. amazonicus		1/134 NT	Utinga and APEG, Belem, Para, Brazil
Proechimys sp.		0/31 HI	Itaituba-Jacareacanga, km.212, Para, Brazil
Oryzomys sp.		0/23 HI	
Agouti paca		0/7 HI	
Dasyprocta aguti		0/2 HI	
Sciurus sp.		0/1 HI	
Didelphis m. marsupialis		0/36 HI	

Metachirus nudicaudatus	0/3 HI	
Marmosa cinerea domina	0/19 HI	
Marmosa murina madeirensis	0/4 HI	
Monodelphis emiliae	0/1 HI	
Proechimys spp.	0/84 HI	Santarem-Cuiaba, km.212, Para, Brazil
Oryzomys spp.	0/143 HI	
Agouti paca	0/3 HI	
Dasyprocta aguti	0/3 HI	
Nectomys s. amazonicus	0/23 HI	
Neacomys sp.	0/8 HI	
Oxymycterus sp.	0/6 HI	
Mesomys hispidus	0/1 HI	
Didelphis m. marsupialis	0/24 HI	
Metachirus nudicaudatus	0/2 HI	
Marmosa cinerea	0/15 HI	
Marmosa murina	0/31 HI	
Monodelphis brevicaudata	0/53 HI	
Philander o. opossum	0/26 HI	

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 log ₁₀ /ml	
Mice (nb)	SM 2	ic 0.02	Death	3.0		
Mice (nb)		ip 0.02	Death	4.0		
Mice (nb)		sc				
Mice (wn)		ic 0.03	Antibody			
Mice (wn)		ip 0.03	Antibody			
Mice (nb)		SM 7	ic 0.02	Viremia, death		9.9 (liver)
Mice (nb)	SM 8	ic 0.02	Viremia, death		10.9 (serum)	
Nectomys (6 mo)	SM 6	ic 0.2 (6.1 dex)	Antibody (1)			

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

Section X - Histopathology

Character of lesions (specify host)		
<u>Inclusion Bodies</u>	<u>Intranuclear</u>	
Organs/Tissues Affected		
Category of tropism		

Section XI - Human Disease

In Nature	Residual	Death
Subclinical	Overt Disease	
Clinical Manifestations		
Number of Cases	Category (i.e. febrile illness, etc.)	

Section XII - Geographic Distribution

Known (Virus detected)
Brazil
Suspected (Antibody only detected)

Section XIII - References

1. Belem Virus Laboratory, Belem, Brazil. 1969. Unpublished data.

Remarks

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