

Virus Name: Chagres		Abbreviation: CHGV
Status Probable Arbovirus	Select Agent No	SALS Level 2
SALS Basis Results of SALS surveys and information from the Catalogue.		
Other Information		
Antigenic Group Phlebotomus Fever		

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation JW-10	Accession Number	Original Date Submitted 7/3/1984
Family Bunyaviridae	Genus Phlebovirus	
Information From Alexis Shelokov	Address Yale Arbovirus Research Unit	
Information Footnote Revised		

Section II - Original Source

Isolated By (name) Staff of Mid. America Research Unit	Isolated at Institute Canal Zone, Panama (1)	
Host Genus Man	Species	Host Age/Stage Adult
Sex Male		
<u>Isolated From</u>	<u>Isolation Details</u>	
Serum/Plasma		
Signs and Symptoms of Illness Fever, headache, retroorbital pain, dizziness	Arthropod	
Time Held Alive before Inoculation		
Collection Method	Collection Date 7/18/1960	
Place Collected (Minimum of City, State, Country) Jungle warfare training center; Canal Zone, Panama		
Latitude 9° 0' N	Longitude 79° W	
Macrohabitat Moist tropical Forest	Microhabitat	Method of Storage until Inoculated Wet ice
Footnotes		

Section III - Method of Isolation

Inoculation Date
7/18/1960

Animal (Details will be in Section 6)
nb mice

Route Inoculated ic and ip	Reisolation Yes
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Other Reasons

Homologous Antibody Formation by Source Animal
Yes

Test(s) Used
NT

Footnotes

Section IV - Virus Properties

Physicochemical
RNA, Single Strand

Pieces (number of genome segments) 3	Infectivity	Sedimentation Coefficients(s) (S)
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Percentage wt, of Virion Protein	Lipid	Carbohydrate
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Virion Polypeptides: Number 2 or 3 (2)	Details MW: 85 x 103, 54 x 103 and 22 x 103 (2)
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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) 1:1000	After Treatment Titer 1.6 dex	Control Titer 5.3 dex (1)
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Other (formalin, radiation)

Virion Morphology

Shape Spherical	Dimensions
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Mean 100nm	Range 85-115nm
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Measurement Method Electron microscopy (3)	Surface Projections/Envelope Surf. project. (5-10 nm) anchored in lipid bilayer	Nucleocapsid Dimensions, Symmetry
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Morphogenesis

Site of Constituent Formation in Cell Cytoplasm (3)	Site of Virion Assembly Budding into membranous cisternae (3)	Site of Virion Accumulation Cisternae of Golgi and reticulum membranes (3)
Inclusion Bodies	Other	

Hemagglutination

Hemagglutination Yes	Antigen Source SMB ext. by sucrose-acetone + sonication	Erythrocytes (species used) Various
pH Range 6.0-6.8	pH Optimum 6.0 (4,5)	
Temperature Range	Temperature Optimum Not dependent	

Remarks
Trypsinized human, chick, rooster and goose red blood cells enhance agglutination (4,5)

Serologic Methods Recommended
HI, CF, NT

Footnotes
Trypsinized human, chick, rooster and goose red blood cells enhance agglutination (4,5)

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

HI tests [6] :											
HI titer of antibody to:											
Antigen (4 units)		SFN	ICO	CHG	ANH	BUJ	ITP	SFS	KAR	CDU	AMT
Naples	SFN	1280	160	80	40	20	20	0	80	0	20
Icoaraci	ICO	80	640	20	20	40	0	0	160	0	80
Chagres	CHG	320	80	>320	160	40	0	0	80	0	160
Anhanga	ANH	40	20	40	2560	160	0	0	40	0	40
Bujaru	BUJ	20	40	20	80	80	0	0	20	0	40
Itaporanga	ITP	10	160	80	10	80	320	0	40	0	80
Sicilian	SFS	0	10	10	0	80	0	80	20	0	10
Karimabad	KAR	20	80	0	0	40	0	0	> 320	0	20
Candiru	CDU	0	40	0	10	0	10	0	80	160	0
Arumowot	AMT	20	40	20	0	20	0	0	20	0	160

See Reference for additional HI data.

In cross-CF tests CHG antigen and antibody reacted with Aguacate and Bujaru viruses, although was distinct from both viruses. CHG antigen and antibody did not react with 19 other PHL group members [7].
 Plaque neutralization tests [8]:

Immune Serum	Virus	
	Chagres	Homologous
Chagres	2560 *	2560
Anhanga	10	320
Arumowot	10	10240
Cacao	80	80
Frijoles	40	10240
Itaporanga	20	320

* Reciprocal of highest antibody dilution producing at least 90% plaque reduction.

CGH virus was not inhibited in NT by specific immune reagents against AGU, ALE, ANH, AMT, BUE, BUJ, CAC, CAI, CDU, CHI, CHV, FRI, GF, GOR, TEH, ICO, TOS, ITA, ITP, KAR, SFN, NIQ, PAC, PT, RVF, RG, SAF, SAL, SFS, TUA or URU viruses [8].

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (M)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn mice and Vero cell cultures

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 14	3	4+		8	1 mm	4.7**(9)	
LLC-MK2 (CL)					3	2 mm(9)		
HeLa (CL)	SM 10				2	Plaques	2.9(10)	
HEp-2 (CL)					2	Plaques	2.9(10)	
Chick embryo (PC)						No plaques (10)		
MA-111 (CL)					5	<1 mm	6.2 (15)	
BHK-21 (CL)	SM 12	3-4	3-4+	6.5** (16)				
Hamster embryo(PC)					8	3-4 mm	8.3 (17)	

** Expressed in dex

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Man	4	152/4,608 HI	Panama (1, 11)
Sabethes chloropterus	1		Panama (12)
Lutzomyia trapidoi(females)	2/52,415		Panama (13)
Lutzomyia ylephilatrix(females)	3/24,376		
Lutzomyia sp. (males)	1/64,183		
Lutzomyia sp. (females)	1/81,383		
Sentinel animals		3 pos. NT	

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, JW-10	ic 0.02	Death	4-8	7.3
Mice (nb)		ip 0.04	Death	6-10	6.7
Mice (nb)		sc			
Mice (wn)		ic 0.03	Cyanosis, convulsions,	6-10	6.1
Mice (wn)		ip 0.06	Agonal paralysis	6-10	5.0
Mice (ad)		ip	Survival and antibody		
hamster (ad)		sc or ip	Death	5-7	
guinea pig		ip	Antibody		

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
Chagres virus did not survive in Aedes albopictus or Culex quinquefasciatus following inoculation (14).									

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 Reported	Residual	Death
Subclinical	Overt Disease	
Clinical Manifestations Fever, headache, retroorbital pain, myalgia, vomiting, weakness (1,11)		
Number of Cases Four reported	Category (i.e. febrile illness, etc.) Febrile illness	

Section XII - Geographic Distribution

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

Section XIII - References

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Remarks

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