

Virus Name: Karimabad		Abbreviation: KARV
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 I-58	Accession Number	Original Date Submitted 7/6/1984
Family Bunyaviridae	Genus Phlebovirus	
Information From Robert B. Tesh	Address Yale Arbovirus Research Unit	
Information Footnote Revised		

Section II - Original Source

Isolated By (name) William Suyemoto (1)	Isolated at Institute Walter Reed Army Institute of Research	
Host Genus Phlebotomus spp. (pool of 126)	Species	Host Age/Stage Adult
Sex Female		
<u>Isolated From</u>	<u>Isolation Details</u>	
Organs/Tissues		
Signs and Symptoms of Illness	Arthropod	
Time Held Alive before Inoculation		
Collection Method Hand collection (1)	Collection Date 8/7/1959	
Place Collected (Minimum of City, State, Country) Karimabad, Iran		
Latitude 32° 0' N	Longitude 49° 0' E	
Macrohabitat Rural village	Microhabitat Houses and stables	Method of Storage until Inoculated At -70dC
Footnotes		

Section III - Method of Isolation

Inoculation Date 1/8/1960	
Animal (Details will be in Section 6) nb mice	
Route Inoculated Intracerebral	Reisolation Yes
Other Reasons	
Homologous Antibody Formation by <u>Source Animal</u>	
Test(s) Used	
Footnotes	

Section IV - Virus Properties

Physicochemical RNA, Single Strand		
Pieces (number of genome segments) 3 (2)	Infectivity	Sedimentation Coefficients(s) (S)
Percentage wt, of Virion Protein	Lipid	Carbohydrate
Virion Polypeptides: Number 3 (2)	Details one major polypeptide (21 x 10³) and 2 minor polypeptides (58 x 10³ and 20 x 10³ daltons)(2)	
Non-virion Polypeptides: Number	Details	
Virion Density	Sedimentation Coefficients(s) (S)	
Nucleocapsid Density	Sedimentation Coefficients(s) (S)	
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<u>Stability of Infectivity (effects)</u>		
pH (infective range)		
Lipid Solvent (ether - % used to test)	After Treatment Titer	Control Titer
Lipid Solvent (chloroform) 20%	After Treatment Titer 2.5 dex	Control Titer 7.3 dex (1)
Lipid Solvent (deoxycholate) 1:1000	After Treatment Titer 3.3 dex	Control Titer 8.0 dex (1)
Other (formalin, radiation)		
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<u>Virion Morphology</u>		
Shape Spherical	Dimensions	
Mean 92-105 nmnm	Range 80-120 nmnm	
Measurement Method Electron microscopy (3)	Surface Projections/Envelope Surface proj (5-10 nm in size) anchored	Nucleocapsid Dimensions, Symmetry

Morphogenesis

Site of Constituent Formation in Cell
Cytoplasm

Site of Virion Assembly
**Smooth endoplasmic membranes in Golgi region
(3)**

Site of Virion Accumulation

Inclusion Bodies

Other

Hemagglutination

Hemagglutination
Yes

Antigen Source
SMB ext. by sucrose-acetone + sonication (13)

Erythrocytes (species used)
Various

pH Range
6.0-6.4

pH Optimum
6.0

Temperature Range
4dC - 37dC (13)

Temperature Optimum
Not dependent

Remarks

Trypsinized red cells enhance agglutination

Serologic Methods Recommended

HI, CF, NT

Footnotes

Trypsinized red cells enhance agglutination

HI tests [4] :

Antigen	Antibody										
	SFN	ICO	CHG	ANH	BUJ	ITP	SFS	KAR	CDU	AMT	
4 units											
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

By CF test, KAR virus was slightly related to Gabek Forest virus in one direction only. KAR antigen reacted to low titer with antibody to GF virus. In addition, KAR antigen and immune serum did not react with FRI, CAI, NIQ, AGU, CAC, BUE, PT, CHG, ICO, CDU, ITP, ALE, PAC, ANH, BUJ, ARU, SFS, SFN, or SAL antigens or immune sera [5].

By plaque reduction neutralization test, KAR immune serum (homologous titer = 256) neutralized ITP, AMT and SAL viruses to a titer of 16. Cross- neutralization tests using KAR virus and immune serum were negative with FRI, CAI, NIQ, AGU, ALE, CHI, CAC, BUE, PT, CHG, ICO, CDU, ITA, TEH, TOS, PAC, ANH, BUJ, SIC, SFN, SAF, GOR, and GF viruses and immune sera [5], [10].

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (LV)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn mice, primary hamster kidney 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)	SM22, Vero 5	4	4+		6	1-2 mm	7.0* (6)	
LLC-MK2 (CL)	SM 19				3	1	>5.0 (7)	
Hamster embryo (PC)	SM 20		No CPE		8	1-2	5.9 (14)	
BHK-21 (CL)	SM19	3	2-3+	6.8* (15)				

Karimabad virus did not multiply in *Toxorhynchites amboinensis* cell cultures (12).

* Expressed in dex

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Phlebotomus spp. (females)	10/10,615		Isfahan Prov., Iran(8)
Phlebotomus spp. (males)	1/1,870		
Man		267/402 NT	Isfahan Prov., Iran(9)
Sheep		0/77 NT	
Goats		0/36 NT	
Cattle		0/24 NT	
Gerbils		12/38 NT	
Chickens		0/5 NT	
Pigeon		0/22 NT	
Man		37/336 NT	Khorasan Prov., Iran (10)
Man		21/257 NT	Tehran Prov., Iran(10)
Man		1/486 NT	Khuzestan Prov., Iran (10)
Man		1/100 NT	E. Azerbaijan Prov., Iran (10)
Man		0/163 NT	Moldavian SSR, USSR (10)
Man		1/98 NT	Azerbaijan SSR, USSR (10)
Man		2/197 NT	Uzbek SSR, USSR (10)
Man		16/158 NT	Tadzik SSR, USSR (10)
Man		53/100 NT	Turkmen SSR, USSR (10)
Man		5/302 HI	Pakistan (1)

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)	SM 23	ic 0.02	Death	4.6	
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)	SM 33	ic 0.03	Death	6.4	
Mice (wn)		ip	Survival and antibody		

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
Aedes albopictus		2.1	10	32			3.4		Vero (plaques)(11)
Culex quinquefasciatus		2.1	10	32			3.7		Vero (plaques)(11)
Phlebotomus papatasi, inoc. with KAR virus, transovarially infected 62% of F1 progeny (16).									

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) Iran
Suspected (Antibody only detected) Iran, USSR, Pakistan, Sudan, Egypt (1,10), Bangladesh (17)

Section XIII - References

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Remarks

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