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

Isolated From	Isolation Details
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 Source Animal

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 10\3/) and 2 minor polypeptides (58 x 10\3/ and 20 x 10 \3/ daltons)(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) **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)

Virion Morphology

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

Electron Microscopy (3) | **Surface proj.(5-10 nm in size) diffuse** | Symmetry

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Cytoplasm	**Smooth endoplasmic membranes in Golgi region (3)**	
Inclusion Bodies	Other	

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
Yes	**SMB ext. by sucrose-acetone + sonication (13)**	**Various**
pH Range	pH Optimum	
6.0-6.4	**6.0**	
Temperature Range	Temperature Optimum	
4dC - 37dC (13)	**Not dependent**	

Remarks
Trypsinized red cells enhance agglutination

Serologic Methods Recommended
HI, CF, NT

Footnotes
Trypsinized red cells enhance agglutination

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

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	
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)	+/- (g)	
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

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
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)		Transmision 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)

Inclusion Bodies — Intranuclear

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), Bengladesh (17)

Section XIII - References

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Remarks