

Virus Name: Sandfly fever Sicilian	Abbreviation: SFSV	
Status <b>Arbovirus</b>	Select Agent No	SALS Level 2
SALS Basis <b>Results of SALS surveys and information from the Catalogue.</b>		
Other Information		
Antigenic Group <b>Phlebotomus Fever</b>		

#### SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation <b>Sabin</b>	Accession Number	Original Date Submitted 7/11/1984
Family <b>Bunyaviridae</b>	Genus <b>Phlebovirus</b>	
Information From <b>Robert B. Tesh</b>	Address <b>Yale Arbovirus Research Unit</b>	
Information Footnote <b>Revised</b>		

#### Section II - Original Source

Isolated By (name) <b>A.B. Sabin (1)</b>	Isolated at Institute <b>Child. Hosp. Res. Fdn., Cincinnati</b>	
Host Genus <b>Man (pooled sera from two patients)</b>	Species	Host Age/Stage <b>Adult</b>
Sex <b>Male</b>		
<u>Isolated From</u>		<u>Isolation Details</u>
<b>Serum/Plasma</b>		
Signs and Symptoms of Illness <b>Fever, chills, headache, myalgia, conjuntival injection</b>	Arthropod	
Time Held Alive before Inoculation		
Collection Method	Collection Date <b>9/8/1943</b>	
Place Collected (Minimum of City, State, Country) <b>Palermo region, Sicily, Italy</b>		
Latitude <b>38° 10' N</b>	Longitude <b>13° 50' E</b>	
Macrohabitat <b>American troops in World War II during Phlebotomus fever epidemic</b>	Microhabitat	Method of Storage until Inoculated <b>No refrigeration for two days, then frozen on dry ice</b>
Footnotes		

**Section III - Method of Isolation**

Inoculation Date  
**10/6/1943**

Animal (Details will be in Section 6)  
**4 men\***

Route Inoculated  
**Intracutaneous**

Reisolation  
**Yes**

Other Reasons

Homologous Antibody Formation by Source Animal  
**Not tested**

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

Virion Polypeptides: Number  
**3**      Details  
MW: 21 x 103, 57 x 103 and 22 x 103 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  
**<1.0 dex**      Control Titer  
**6.4 dex (3)**

Lipid Solvent (deoxycholate)      After Treatment Titer  
**Inactivated (4)**      Control Titer

Other (formalin, radiation)

**Virion Morphology**

Shape  
**Spherical**      Dimensions  
100 + 10 nm in diameter (2)

Mean  
nm      Range  
nm

Measurement Method  
**Electron microscopy (2)**      Surface Projections/Envelope  
**10 nm external fringe of surface projections**      Nucleocapsid Dimensions,  
Symmetry

### Morphogenesis

Site of Constituent Formation in Cell Cytoplasm	Site of Virion Assembly <b>By budding into smooth-surfaced vesicles in Golgi region (4)</b>	Site of Virion Accumulation
Inclusion Bodies	Other	

### Hemagglutination

Hemagglutination                          Antigen Source  
**Yes**                                        **SMB ext. by sucrose-acetone + sonication**

Erythrocytes (species used)  
**Various**

pH Range                                    pH Optimum  
**6.0-6.8**                                    **6.0**

Temperature Range                         Temperature Optimum  
**4dC - 37dC**                                **Not dependent**

Remarks  
**The use of trypsinized red cells enhances agglutination (5)**

Serologic Methods Recommended  
**HI, CF, NT**

Footnotes  
**The use of trypsinized red cells enhances agglutination (5)**

HI tests [7] :

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

Naples: SFN, Chagres: CHG, Bujaru: BUJ, Sicilian: SFS, Candiru: CDU Icoaraci: ICO, Anhangas: ANH, Itaporanga: ITP, Karimabad: KAR, Arumowot: AMT

In plaque neutralization test, SFS immune serum (homologous titer = 5120) inhibited FRI virus to a 1:160 dilution. In cross-CF and neutralization tests, SFS virus antigen and immune serum were unrelated to AGU, ALE, ANH, AMT, BUE, BUJ, CAC, CAI, CDU, CHG, CHI, GOR, TEH, ICO, TOS, ITA, ITP, KAR, SFN, NIQ, PAC, PT, RVF, RG, SAF, SAL, URU, GF, or TUR viruses, antigens or immune reagents [7], [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. Human volunteers  
used in original isolation of virus

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)	Man 2, SM 34	4-6	4+		6-7	2-3 mm	5.7** (8)			
LLC-MK2 (CL)	SM 37		3+		6	2 mm	>7.0 (9)			
BHK-21 (CL)	SM 46	2-3	4+	7.3**(29)	3-4	Plaques	6.0 (10)			
Hamster embryo(PC)	SM 46	2	CPE		5	2-3 mm	8.5 (30)			

SFS virus did not grow in Aedes albopictus, Aedes aegypti or Toxorhynchites amboinensis cell lines (21,22).

\*\* 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
Man	1		Sicily, Italy (1)
Man	3		Nile Delta, Egypt(11)
Man	1/47		Pakistan (12, 13)
Man	3/6		Iran (12, 13)
Phlebotomus sp. (females)	17/106,404 (254 pools)		Nile Delta, Egypt(14, 15)
Phlebotomus sp. (males)	2/9,489 (31 pools)		Nile Delta, Egypt(15)
Phlebotomus papatasi (females)	1		Pakistan (16)
Phlebotomus sp.	9/26,734 (264 pools)		India (17)
Phlebotomus sp. (females)	49/10,615		Isfahan Prov.Iran(18)
Phlebotomus sp. (males)	1/1,870		

Antibodies to SFS virus have been found in human populations living in southern Europe, northern Africa and central Asia. For a summary of previous serologic studies, see Reference 19; for results of serologic studies in animals, see References 3 and 20.

**Section VIII - Susceptibility to Experimental Infection (include viremia)**

<b>Experimental host and age</b>	<b>Passage history and strain</b>	<b>Inoculation Route-Dose</b>	<b>Evidence of infection</b>	<b>AST (days)</b>	<b>Titer log10/ml</b>	
Mice (nb)	Man 2, SM 34	ic	Death,* no viremia detected (8)	4.5		
Mice (nb)		ip				
Mice (nb)		sc				
Mice (wn)		ic				
Mice (wn)		ip	Antibody and survival (8)			
hamster (nb)		ic	Death (8)			

\* The original SFS strain was passed twice in humans and then serially passed in newborn mice three times before it began to cause illness. In subsequent mouse passages, the AST decreased (23).

**Section IX - Experimental Arthropod Infection and Transmission**

<b>Arthropod species &amp; virus source(a)</b>	<b>Method of Infection log10/ml (b)</b>		<b>Incubation period (c)</b>		<b>Transmision by bite (d)</b>		<b>Assay of arthropod, log10/ml (e)</b>		
	<b>Feeding</b>	<b>Injected</b>	<b>Days</b>	<b>°C</b>	<b>Host</b>	<b>Ratio</b>	<b>Whole</b>	<b>Organ</b>	<b>System</b>

Experimental transmission of Sandfly fever virus (type unknown) to man by bite of infected *Phlebotomus papatasii* has been demonstrated repeatedly (1,23,24,25).

SFS did not survive or replicate in *Aedes albopictus* or *Culex quinquefasciatus* after inoculation (27).

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## Section X - Histopathology

Character of lesions (specify host)

Newborn mice and hamsters inoc. ic: encephalitic lesions produced.

Inclusion Bodies

Intranuclear

Organs/Tissues Affected

Category of tropism

Neurotropic

## Section XI - Human Disease

In Nature	Residual	Death
<b>Significant</b>	<b>Reported</b>	
Subclinical	Overt Disease	
Clinical Manifestations		
<b>Fever, myalgia, headache, retroorbital pain, conjunctival injection, anorexia, and malaise (1,24,28)</b>		
Number of Cases	Category (i.e. febrile illness, etc.)	
<b>Many</b>	<b>Febrile illness</b>	

## Section XII - Geographic Distribution

Known (Virus detected)

**Italy, Egypt, Iran, Pakistan, India**

Suspected (Antibody only detected)

**Bangladesh, Iraq, USSR, Turkey, Greece, Yugoslavia, Saudi Arabia, Tunisia, Morocco, Sudan, Somalia (19)**

### Section XIII - References

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### Remarks