Virus Name: Simian hemorrhagic fever	Abbreviation: SHFV

Status
Not Arbovirus

Select Agent
No

SALS Level
2

SALS Basis
Results of SALS surveys and information from the Catalogue.

Other Information

Antigenic Group
Ungrouped

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
VR42-0/M6941 (1,3)

Accession Number

Original Date Submitted
11/17/1984

Family
Flavivirdae

Genus
Not listed

Information From
Dr. Nicola M. Tauraso

Address
Biologics Standards, National Institutes of Health, Bethesda, MD 20014 USA

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Dr. Nicola M. Tauraso

Isolated at Institute
Division of Biologics Standards, NIH

Host Genus
Rhesus (Macaca mulatta) monkey, no sentinel

Species

Host Age/Stage
Juvenile

Sex
Not Answered

Isolated From	Isolation Details
Serum/Plasma	

Signs and Symptoms of Illness
Rapid onset, early fever, mild facial edema, anorexia, adipsia, dehydration, [proteinuria, cyanosis, skin [petechiae, melena, epistaxis [and shock.

Arthropod

Time Held Alive before Inoculation

Collection Method
Terminal bleeding

Collection Date
1/29/1966

Place Collected (Minimum of City, State, Country)
Bethesda, Maryland

Latitude

Longitude

Macrohabitat

Microhabitat
Indoors

Method of Storage until Inoculated
Serum frozen at -70dC

Footnotes

Section III - Method of Isolation

Inoculation Date
5/20/1966

Animal (Details will be in Section 6)
(Tissue Culture)

Route Inoculated

Reisolation
Yes

Other Reasons
Other surviving animals developed CF, IFA and neut antibodies

Homologous Antibody Formation by Source Animal
Not tested

Test(s) Used
original animal died

Footnotes

Section IV - Virus Properties

Physicochemical
RNA

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)
3.0 labile; rel. heat (50C) stable; divalent cations enhanced inact. at 50C

Lipid Solvent (ether - % used to test)	After Treatment Titer	Control Titer
Lipid Solvent (chloroform) **1:20**	After Treatment Titer **<1.0 dex**	Control Titer **4.8 dex**
Lipid Solvent (deoxycholate)	After Treatment Titer	Control Titer

Other (formalin, radiation)

Virion Morphology

Shape **Spherical**	Dimensions **40-45 nm**	
Mean nm	Range nm	
Measurement Method **Electron microscopy (4)**	Surface Projections/Envelope **Envelope observed (4);**	Nucleocapsid Dimensions, Symmetry

Virus core = 20-25 nm

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Inclusion Bodies	Other	

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
No	**Infected cell cultures; extracted infected spleen and brain (5)**	**Goose**

pH Range	pH Optimum
***6.8-7.4**	

Temperature Range	Temperature Optimum
4dC, 24dC, and 37dC	

Remarks
*** Other erythrocytes tested included rhesus and African green monkeys, hamster, mouse, rat, guinea pig, human (type O) and day-old chick.**

Serologic Methods Recommended
CF, IFA and NT

Footnotes
*** Other erythrocytes tested included rhesus and African green monkeys, hamster, mouse, rat, guinea pig, human (type O) and day-old chick.**

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

No relationship found to other viruses by CF and IFA tests (see Ref. [6] , [7]).

In one-way tests using 20X concentrated cell culture SHF antigen for CF tests or SHF virus-infected coverslips for fluorescent-antibody (FA) tests, with antisera against the following viruses, negative results were obtained [6] .

Adenoviruses:	SV-11, SV-15, SV-17, SV-20, SV-25, SV-27, SV-36, ICH.	
Arboviruses:	Group A:	Bebaru, EEE, WEE, Una, Uruma (Mayaro)
	Group B:	Bussuquara, dengue 1, 2, 3, 4, Ilheus, MVE, Powassan, SLE, WN
	Bunyamwera group:	Batai, bunyamwera, Cache Valley, Germiston, Guaroa, Ilesha, Kairi, Sororoca, Tensaw, Calovo, Wyeomyia
	California group:	CE, Melao, Tahyna
	Miscellaneous:	Anopheles A, Changuinola, Chagres, EHD, Icoaraci, Kemerovo, Naples SF, Tacaribe, Junin, Tribec, VS-Indiana, VS-NJ, Cocal
Herpesviruses:	H. simplex, canine herpes, simian cytomegalic, B virus	
Myxoviruses:	Parainfluenza 1, 2, 3, SV-5; avian leukosis (RSV/RIF and RSV-Harris); SV-41, measles, mumps, respiratory syncitial, rubella, NDV, rabies	
Papovavirus:	SV-40, K virus	
Picornavirus:	ECHO 1, 2, 3, 5, 6, 7, 8, 9, 11, 12, 14; SV-2, SV-16, SV-19, Theiler's GD VII; poliovirus 1, 2, 3	
Reovirus:	Reo 1, 2, 3, SV-12, SV-59	
Miscellaneous:	SV-4, SV-28, Sv-31, SA-1; PVM, LCM, Crimmean HF, Korean HF, Himalaya HF; hamster HF, human gamma globulin (1:10)	

Positive results were obtained only with sera from simian hemorrhagic fever outbreaks: Sukhumi/64, Bethesda/64, Davis/67, and Sussex/68.
SHF not related to Marburg virus [7] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (LV)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
USU-104, embryonic rhesus kidney cell culture.

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)	
USU-104 (CL)	M/2, MA-104/8	6-7	CPE	5.0* (3)					

* 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
Erythrocebus patas (monocytes) (Chronically infected, continuously viremic)	1 *		NIH, Bethesda, MD, USA (13)

Rhesus (Macaca mulatta) monkeys Virus isolated only from clinically affected animals recently imported from New Delhi, India (1). Other species listed below have developed disease after contact with recently imported sick rhesus monkeys. Many virus isolations made of the Bethesda/64 agent (8).

Other monkey species affected: M. nemestrina (9,10); M. speciosa (1-3); M. assamensus (9,10); M. irus (1-3,11) with a disease similar to that seen in M. mulatta.

* Isolate differs antigenically and biologically from prototype SHF virus (13)

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)		ic	None		
Mice (nb)		ip	None		
Mice (nb)		sc			
Mice (wn)		ic	None		
Mice (wn)		ip	None		
rhesus (M. mulatta) (juvenile)	M/2, MA-104/8	sc 1	Anorexia, hemorrhagic diatheses, eventually shock and death	5-14	7-8

Unable to infect the following hosts: Suckling and young adult Syrian hamster, Hartley guinea pig, white mouse, Sprague-Dawley rat, and cat; and embryonated chicken egg.

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

Section X - Histopathology

Character of lesions (specify host)
Lesions of SHF in rhesus monkey include capillary and venous hemorrhages in the intestine, lung, nasal mucosa, dermis, spleen, perirenal and lumbar subperitoneum, adrenal and liver. Two striking lesions occur in the duodenum and spleen (2).

Inclusion Bodies — Intranuclear

Organs/Tissues Affected
Lungs (LV), liver (LV), spleen (LV), blood vessels (LV)

Category of tropism

Section XI - Human Disease

In Nature	Residual	Death
Subclinical	Overt Disease	

Clinical Manifestations
Human disease not observed

Number of Cases — Category (i.e. febrile illness, etc.)

Section XII - Geographic Distribution

Known (Virus detected)
From recently imported rhesus (Macaca mulatta) monkeys

Suspected (Antibody only detected)

Section XIII - References

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Remarks

At present there is no evidence to suggest that arthropods play a role in the transmission of SHF (6).