Virus Name: Khasan		Abbreviation: KHAV
Status **Possible Arbovirus**	Select Agent **No**	SALS Level **3**

SALS Basis
Isufficient experience with virus; i.e., experience factor from SALS surveys was less than 500 in laboratory facilities with low biocontainment.

Other Information

Antigenic Group
CHF-Congo

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
LEIV-776P

Accession Number

Original Date Submitted
8/22/1984

Family
Bunyaviridae

Genus
Nairovirus

Information From
D.K. Lvov

Address
Inst. of Virology, USSR Acad. of Med. Sciences, Gamaleya, 16, Moscow, USSR

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
D.K. Lvov, et al.

Isolated at Institute
Moscow, USSR

Host Genus
Haemaphysalis longicornis (pool of 300 ticks)

Species

Host Age/Stage
Nymphs

Sex
Not Answered

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod

Time Held Alive before Inoculation

Collection Method
By hand

Collection Date
5/25/1971

Place Collected (Minimum of City, State, Country)
Khasansk Region, Primorye Terr., USSR

Latitude
45° 30' N

Longitude
130° 41' E

Macrohabitat
Broad leaved

Microhabitat
Nursery of spotted deer (Cervus nippon Temminck, 1838)

Method of Storage until Inoculated
Alive in refrigerator at +4dC

Footnotes

Section III - Method of Isolation

Inoculation Date
6/21/1971

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
Yes

Other Reasons
Virus different from those existing in the laboratory

Homologous Antibody Formation by Source Animal

Test(s) Used

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)

Lipid Solvent (ether - % used to test) **50%**	After Treatment Titer **2.5 dex**	Control Titer **4.5 dex**
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) **1:1000**	After Treatment Titer **3.6 dex**	Control Titer **5.8 dex**

Other (formalin, radiation)

Virion Morphology

Shape **Spherical; bunyavirus-like (1)**	Dimensions **90-110 nm**	
Mean nm	Range nm	
Measurement Method **Electron microscopy**	Surface Projections/Envelope	Nucleocapsid Dimensions, Symmetry

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	**SMB ext. by sucrose-acetone**	**Goose**
pH Range	pH Optimum	
5.5-7.0		
Temperature Range	Temperature Optimum	
+4dC, +22dC		

Remarks
*** Type of nucleic acid determined by sensitivity of the virus to 5-bromo-2- deoxyuridine**

Serologic Methods Recommended
CF, NT

Footnotes
*** Type of nucleic acid determined by sensitivity of the virus to 5-bromo-2- deoxyuridine**

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

Khasan antigen in the CF test did not react with MIAF to the following arboviruses: group A (Polyvalent, Getah, Kyzylagach, Sindbis, WEE); the African horse sickness group (AHS); group B (Polyvalent, Kadam, Karshi, Langat, Jap . enc., Powassan, Sokuluk, St. Louis enc., tickborne enc., Tyuleniy, West Nile); the bluetongue group (bluetongue); group C (Polyvalent); the California group (Tahyna, Trivittatus); the CHF-Congo (CHF); the Bakau group (Polyvalent); the Bunyamwera group (Polyvalent, Batai Cache Valley, Guaroa, Ilesha, Kaeng Khoi, Kairi, Maguari, Shokwe); the Nairobi sheep dis. group (Dugbe); the Hart Park group (Polyvalent); the Hughes group (Polyvalent, Saldado); the Kaisodi group (Polyvalent, Silverwater, Lanjan); the Kemerovo group (Baku, Huacho, Kemerovo, Okhotskiy, Wad Medani); the Corriparta group (Polyvalent); the Kwatta group (Polyvalent); the Palyam group (Polyvalent); the Qalyub group (Polyvalent, Bandia); the Quaranfil group (Polyvalent, C-5502); the Sakhalin group (Sakhalin); the Simbu group (Aino, Akabane, Sabo, Sango, Sathuperi, Shamonda, Simbu); Matariya group (Matariya); the Tete group (Bahig, Matruh, Tete); the Turlock group (Turlock); the Uukuniemi group (Uukuniemi, Zaliv Terpeniya); the VSV group (Polyvalent, Chandipura); the Bhanja group (Bhanja); the CTF group (CTF); the DGK group (DGK); the Mossuril group (Kern Canyon); the Nyamanini group (Nyamanini); the Sawgrass group (Sawgrass); the Thogoto group (Thogoto); the Upolu group (Upolu); the rabies serogroup (Lagos bat); ungrouped (Artashat, Batken, Kaspiy, Chim, Chobar Gorge, Dhori, Issyk- Kul, Japanaut, Joinjakaka, Jos, Lone Star, Matucare, Ogunpa, Oyta, Razdan, Tamdy, IbAr 2012, IbAr 2484, Wanowrie). Ectromelia, reovirus, type 3, LCM were serologically excluded.
Polyvalent MIAF were obtained from YARU.

Khasan virus subsequently was shown to be antigenically related to CHF virus both by CF and NT [2] . Consequently, Khasan virus was added to the CHF-CON serogroup as an additional member.

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn mice

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)	
Chicken and			No CPE	3.1**				+	
duck embryo fibroblasts(PC)			No CPE	6.0				+	
C. aethiops kidney (PC)			No CPE	5.0				+	
Human embryo fibroblasts(PC)			No CPE					-	
L cells (CL)			No CPE					+	
BHK-21 (CL)			No CPE					+	
RH (CL)			No CPE					+	

** Virus infectivity titers determined by interference with WEE virus; titers 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
Haemaphysalis longicornis Neumann, 1901	1/23,050 ticks (213 pools)		Khasansk Region, Primorye Territory USSR

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)	SMB 5	ic 0.01	Paralysis, death	5-6	8.0
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)		ic 0.03	Paralysis, death	7-9	7.0
Mice (wn)		ip 0.20	Antibody		
Mice (ad)		ip 0.20	Antibody		
hamsters (ad)		ip 0.50	None		
guinea pigs (ad)		ip 1.00	None		
rats (ad)		ip 1.00	None		
rats (nb)		ic 0.03	Paralysis, death	5-6	7.0

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)

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)
USSR

Suspected (Antibody only detected)

Section XIII - References

1. Lvov, D.K., et al. 1978. Acta Virol. 22:249-252.
2. Lvov, D.K., et al. Personal communication. 1983.

Remarks