Virus Name: Kao Shuan	Abbreviation: KSV

Status
Possible Arbovirus

Select Agent
No

SALS Level
2

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

Other Information

Antigenic Group
Dera Ghazi Khan

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
ArT 904

Accession Number

Original Date Submitted
11/18/1984

Family
Bunyaviridae

Genus
Nairovirus

Information From
Robert E. Williams

Address
U.S. Naval Medical Research Unit No. 3, Cairo, Egypt

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
U.S. NAMRU-3

Isolated at Institute
Cairo Egypt

Host Genus
Argas robertsi

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
7/1/1970

Place Collected (Minimum of City, State, Country)
Kao Shuan, Taiwan

Latitude
24° 56' N

Longitude
120° 11' E

Macrohabitat
From bark of Acacia trees, rookery of night herons, Nycticorax nycticorax

Microhabitat
Located at 300 ft. altitude

Method of Storage until Inoculated
Mechanical refrigeration at -60dC

Footnotes

Section III - Method of Isolation

Inoculation Date
9/10/1970

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
Yes

Other Reasons
No similar virus in laboratory

Homologous Antibody Formation by Source Animal

Test(s) Used

Footnotes

Section IV - Virus Properties

Physicochemical

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)	After Treatment Titer	Control Titer
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) **1:200**	After Treatment Titer **<1.0 dex**	Control Titer **>4.3 dex**

Other (formalin, radiation)

Virion Morphology

Shape	Dimensions	
Mean nm	Range nm	
Measurement Method	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 **5.8-7.2**	pH Optimum	
Temperature Range **RT**	Temperature Optimum	

Remarks

Serologic Methods Recommended
CF

Footnotes

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

No relationship to: Sindbis, dengue, Langat, Powassan, Uganda S, West Nile, yellow fever, Zika, Royal Farm, Bunyamwera, Matruh, Chenuda, Kemerovo, Tribec, Wad Medani, Dugbe, Lanjan, Silverwater, Burg El Arab, Matariya, Qalyub, Johnson Atoll, Quaranfil, Arumowot, sandfly fever, EgAn 6156-63 (Simbu group), Grand Arbaud, Manawa, Uukuniemi, Nyamanini, Dhori, Thogoto, Upolu, Wanowrie, Zirqa, EgAn 1398-61, EgAn 4996-63, Congo, Hughes, Kaisodi, Punta Salinas, Mono Lake, Bandia, Bhanja, Lone Star, Mal 1361, Matucare, Sawgrass, Bandia, CTF, Farallon, Ganjam, Hazara, Lipovnik, Soldado, Jos. By CF related to but easily distinguishable from DGK as follows:

	Kao Shuan Antigen			Kao Shuan Immune Serum		
	CF		NT	CF		NT
Immune Serum or Antigen	Ht/Ho	Ratio	Ht/Ho	Ht/Ho	Ratio	Ht/Ho
DGK	32/256	1/8		8/256	1/32	

Kao Shuan virus and members of the DGK serogroup share intergroup relationships with viruses of serogroups CHF-CON, HUG, NSD, QYB and SAK, all of which comprise the Nairovirus genus [2] , [3] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Duck embryo 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)	

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
Argas robertsi	2/10		Kao Shuan, Taiwan
Argas robertsi	39 * /137 pools (685 ticks)		Northern Terr., Australia (1)
Argas robertsi	1		Java (4)

* For the present, all are considered strains of Kao Shuan pending further neutralization testing.

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 6	ic .01	Paralysis, death	5	6.7
Mice (nb)		ip .01	Paralysis, death	9-13	6.7
Mice (nb)		sc			
Mice (wn)		ic .03	5/12 died	7-12	
Mice (wn)		ip .2	Antibody		
Mice (nb)		sc .01	Irregular deaths	9-12	<5.0
rabbit (7 wk)		ic .5	Antibody		
hamster (3 wk)		ic .05	Antibody		
guinea pig (3 wk)		ic .05	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

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)
Taiwan, Australia (1), Java (4)

Suspected (Antibody only detected)

Section XIII - References

1. Doherty, R.L., et al. 1976. Search 7:11-12.
2. Casals, J. and Tignor, G.H. 1980. Intervirology 14:144-147.
3. Bishop, D.H.L., et al. 1980. Intervirology 14:125-143.
4. QIMR, Brisbane, Queensland, Australia. Unpublished. 1974.

Remarks