

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		
<u>Isolated From</u>	<u>Isolation Details</u>	
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
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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

Hemagglutination

Antigen Source

Erythrocytes (species used)

No

SMB ext. by sucrose-acetone

Goose

pH Range

pH Optimum

5.8-7.2

Temperature Range

Temperature Optimum

RT

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, Quarantfil, 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:

Immune Serum or Antigen	Kao Shuan Antigen			Kao Shuan Immune Serum		
	CF		NT	CF		NT
	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							Growth Without CPE +/- (g)
		CPE			PLAQUES				
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)		

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)		Transmission 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)	
<u>Inclusion Bodies</u>	<u>Intranuclear</u>
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
