

Virus Name: Lokern		Abbreviation: LOKV
Status Arbovirus	Select Agent No	SALS Level 2
SALS Basis Results of SALS surveys and information from the Catalogue.		
Other Information		
Antigenic Group Bunyamwera		

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation FMS 4332	Accession Number	Original Date Submitted 7/20/1984
Family Bunyaviridae	Genus Bunyavirus	
Information From Robert P. Scrivani	Address School of Public Health, University of California, Berkeley, California	
Information Footnote Revised		

Section II - Original Source

Isolated By (name) Robert P. Scrivani	Isolated at Institute School of Public Health, Berkeley	
Host Genus Culex tarsalis (pool of 50)	Species	Host Age/Stage Adult
Sex Female		
<u>Isolated From</u>	<u>Isolation Details</u>	
Signs and Symptoms of Illness	Arthropod	
Time Held Alive before Inoculation		
Collection Method Dry ice baited trap	Collection Date 7/24/1962	
Place Collected (Minimum of City, State, Country) Kern County, California, USA		
Latitude 35° 30' N	Longitude 119° 0' W	
Macrohabitat Farmyard	Microhabitat Outdoors, ground level	Method of Storage until Inoculated Sealed glass tube at -65dC
Footnotes		

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)

Yes**SMB ext. by sucrose-acetone****Goose**

pH Range

pH Optimum

6.2-6.4**6.2**

Temperature Range

Temperature Optimum

4dC, 22dC, 37dC**37dC**

Remarks

Low-titer HA (80-160) enhanced by sonication to 64

Serologic Methods Recommended

HI, CF, NT

Footnotes

Low-titer HA (80-160) enhanced by sonication to 64

Type of Immune Fluid	Lokern Antigen			Lokern antiserum			
	Immune Fluid or Antigen	CF ¹	HI ¹	NT ²	CF ¹	HI ¹	NT ²
		Ht/Ho	Ht/Ho	Ht/Ho			
Hyperimmune mouse serum or ascitic fluid ³	Lokern	512	640	3.7	512	640	3.7
Cache Valley	32/64	0/80		256	20		
Maguari	16/64	20/320		256	80		
Tlacotalpan	512/512	40/320		128	40		
Tensaw	128/512	20/1280		256	160		
Main Drain	64/128	0/1280	0.3/2.1	256	0	0.0	
Immune hamster serum	Lokern		160	3.8		160	3.8
Cache Valley		20/80	1.4/2.1		0	0.8	
Maguari		20/160	1.9/1.8		20	0.4	
Tensaw		80/640	3.0/2.0		0	0.3	
Main Drain		0/80	0.0/2.5		0	0.0	

¹ CF and HI titers are expressed as the reciprocal of the serum or ascitic fluid dilution.

² NT titers are expressed as dex LNI. Tests with hyperimmune sera or ascitic fluids were performed in SM inoculated ic, whereas tests with immune hamster serum were done by plaque reduction in Vero cell cultures.

³ Reagents and facilities of the Yale Arbovirus Research Unit, New Haven, Connecticut, were made available through the courtesy of Dr. W.G. Downs and Dr. R.E. Shope for conducting HI tests. CF tests were done by Dr. R.E. Shope.

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 +/- (g)
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)	
Hamster kidney (PC)			4+	>6.0*				
Vero (CL)			4+	9.5		Plaques	9.5* (2)	
BLN, P-11 (CL)			CPE	5.0 (2)				
BLN, P-25 (CL)			CPE	9.0		Plaques	7.8 (2)	
MDBK (CL)			No CPE	4.5 (2)				
EBTr (CL)			No CPE	3.5		Plaques	<1.0 (2)	
MDGK (CL)			No CPE	4.5 (2)				
SIRC (CL)			No CPE	3.5 (2)				
BHK-21 (CL)						Plaques	7.9	
Ae dorsalis (CL)	SM 2		No CPE					+ (3)
Cx tarsalis (CL)			No CPE					+ (4)

* 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		12/1,997 ^(a)	California, USA

Lepus californicus	5/1,066	294/1,014 HI	
Sylvilagus audubonii	1/601	41/551 HI	Kern Co., California, USA
Ammospermophilus nelsoni	0/1,308	3/1,575 HI	
Citellus beecheyi	0/230	2/269 HI	California, USA
Neotoma sp.		6/135 HI	
Sciurus griseus		2/35 HI	
Other rodentia, chiroptera, carnivora	0/4,489	4/4,982 HI	
Wild birds/sentinel chickens		62/3,894 HI	
Amphibians and reptiles	0/470	0/790 HI	
Equine		138/1,063 HI	
Bovine		35/802 HI	
Ovine		82/784 HI	
Porcine		8/89 HI	
Culex tarsalis	1/158,446		Kern Co., California, USA
Mosq. other than Cx tarsalis	0/58,974		
Culicoides variipenis	23/122,089		
Other Culioides spp. Leptoconops Phlebotomus, Simulium spp.	0/11,689		
Culicoides variipenis	7		Utah, USA (6)
Psorophora signipennis	2		Utah, USA (6)

^(a) The 12 reactors were from a group of 937 normal individuals residing in Kern County, California in 1958. The remainder tested were from patients with undiagnosed febrile disease collected from 1961 through 1969 and were in part supplied through the courtesy of Dr. E. Lennette and Dr. R. Emmons of the California State Department of Public Health.

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log ₁₀ /ml
Mice (nb)	SM 3	ic 0.01	Death	3	8.7
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)	SM 10	ic 0.03	Death	5	1.4-2.7 (serum)
Mice (wn)		ip 0.03	Antibody		
L. californicus			Antibody and/or viremia (2)		
S. audubonii			Antibody (2)		
rodentia (P. maniculatus, A. nelsoni, C. beecheyi, D. nitratoides)			None (2)		
birds (finches, sparrows, doves, blackbirds)		None (2)			

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
Cx tarsalis	pledget,6.0		4-20				Viral mult. detected after incubation period (2).		
Aedes nigromaculis	pledget,6.6		21				Viral mult. detected after incubation period (2).		
Aedes melanimon	pledget,6.6		21				Viral mult. detected after incubation period (2).		
Culiseta inornata	pledget,6.0		7-21				Viral mult. detected after incubation period (2).		
Culicoides variipennis	pledget,5.8		12-14				Viral mult. detected after incubation period.		
Anopheles freeborni did not become infected after feeding on a virus-soaked pledget.									

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)

California; Colorado; Texas; Utah (6), USA (6)

Suspected (Antibody only detected)

Section XIII - References

1. Porterfield, J.S., et al. 1975/75. Intervirology 6:13-24.
2. Francy, D.B. Ph.D. Thesis, University of California, Berkeley, 1972.
3. Cahoon, B.E., et al. 1979. J. Med. Ent. 16:104-111.
4. Main, O.M., et al. 1977. J. Med. Ent. 14:107-112.
5. Hunt, A.R., et al. 1979. Am. J. Trop. Med. Hyg. 28:740-749.
6. Crane, G.T., et al. 1983. J. Med. Ent. 20:294-300.
7. Calisher, C.H., et al. 1985. Am. J. Trop. Med. Hyg. Submitted.

Remarks

Additional isolates of Lokern virus have been recovered from Psorophora signipennis and Culicoides collected in Texas and Colorado respectively.