Virus Name: Klamath	Abbreviation: KLAV

Status
Possible 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
M-1056

Accession Number

Original Date Submitted
8/21/1984

Family
Rhabdoviridae

Genus
Vesiculovirus

Information From
Harald N. Johnson

Address
California Department of Health, Viral and Rickettsial Disease Laboratory

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Harald N. Johnson (1

Isolated at Institute
Berkely, California

Host Genus
Microtus montanus

Species

Host Age/Stage
Immature ,<3mos

Sex
Female

Isolated From	Isolation Details
Organs/Tissues	**Brain and lung**

Signs and Symptoms of Illness
Found dead on 5 Feb. 1962 while under observation

Arthropod

Time Held Alive before Inoculation

Collection Method
Live trap

Collection Date
1/29/1062

Place Collected (Minimum of City, State, Country)
Geary ranch, Klamath Falls, Oregon, USA

Latitude
42° N

Longitude
122° W

Macrohabitat
Irrigated pasture, upper Klamath Lake area, >4000 ft. ASL

Microhabitat
Grass meadow, traps set in 2 x 2 ft. clearings in 2 ft. of snow

Method of Storage until Inoculated
Tissue specimens inoculated on day of collection

Footnotes

Section III - Method of Isolation

Inoculation Date
2/5/1962

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
No

Other Reasons
Three isolates from same animal, 2 from brain and 1 from lung. All 3 positive after subpassage.

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 **2.6 dex**	Control Titer **4.1 dex (3)**

Other (formalin, radiation)

Virion Morphology

Shape **Bullet-shaped (4)**	Dimensions **167 x 80 nm**	
Mean nm	Range nm	
Measurement Method **Negative contrast (4)**	Surface Projections/Envelope **Envelope present; projections**	Nucleocapsid Dimensions, Symmetry

prominnen

Helical nucleocapsid (4)

Morphogenesis

Site of Constituent Formation in Cell
Cytoplasmic matrix of massed nucleocapsids beneath siteof budding.

Site of Virion Assembly
At site of budding through endoplasmic reticulum.

Site of Virion Accumulation
Cisternae of endoplasmic reticulum

Inclusion Bodies
Cytoplasmic, prominent, small diameter. Not identifiable by light microscopy (4)

Other

Hemagglutination

Hemaggiutination
No

Antigen Source
SMB ext. by sucrose-acetone

Erythrocytes (species used)
Goose

pH Range
5.8-6.6

pH Optimum

Temperature Range

Temperature Optimum

Remarks

Serologic Methods Recommended
CF, NT

Footnotes

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

Klamath virus is related by IFA to Cocal, VSA and the unregistered Maraba virus, all members of the Vesicular Stomatitis group [9] .
Klamath virus antigen diluted 1:16 failed to react in the CF test with antisera to 154 viruses, including viruses of Gr. A, B, C, BUN, CAL, BWA, BLU, KOO, ANA, ANB, HUG, KSO, TCR, PHL, MAP, CTF, TUR, as well as herpesvirus, GD-7, LCM and EMC. Klamath antigen was positive with homologous antiserum.
Klamath virus antigen did not react in the CF test when tested against a 1:4 dilution of antisera for VSNJ (256/512), VSI (256/512), Cocal (256/512), Piry (128/32), Chandipura (128/64), Flanders (64/16), Hart Park(256/64), Mokola (256/512), CVS rabies (1024/512), Lagos bat (8/128), Mt. Elgon bat (64/64), Kern Canyon (256/512) and Marburg (64/32), although it reacted with homologous antiserum to give a result of 256/64.
In addition, Klamath antiserum, at a dilution of 1:4, did not react in the CF test with antigens for the above cited viruses although the homologous reaction was 256/64.
The fluorescent rabies antibody test on Klamath infected mouse brain specimens was negative [2] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (LV)

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)	
Grivet monkey kidney (PC)	SM-5		CPE	6.0*					
Hela (CL)			CPE						
Hamster kidney (PC)			CPE						
Rhesus monkey kidney (PC)								+	
Human diploid cells (CL)								+	
Chick embryo(PC)								+	
Calf kidney(PC)								+	
Vero (CL)	SM-2				4	3mm (Max)	5.6* (5)		
LLC-MK2 (CL)					11	1mm (Max)	4.7 (5)		
BHK-21 (CL)	SM-3	2-3	3+	4.8 (6)					
Vero (CL)		4-5	CPE	8.3 (8)					
E6 (CL)		4-5	CPE	8.7 (8)					
CER (CL)		5	+ -	6.7 (8)					
C6/36 (CL)			No CPE					-(8)	

* 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
Microtus montanus	1/10		Klamath County, Oregon USA (2)
Clethrionomys rutilus	1		Dot Lake, Alaska, USA (7)
Microtus oeconomus	1		U. of Alaska, USA (7)

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)	SM-5	ic 0.015	Illness and death	6	7.0
Mice (nb)		ip 0.015	Illness and death	10	6.0
Mice (nb)		sc			
Mice (wn)		ic 0.015	Illness and death	6	6.0
Mice (wn)		ip			
chicken embryonated eggs		ys 0.1	Virus multiplication		

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)
Klamath County, Oregon (2); Alaska, USA (7)

Suspected (Antibody only detected)

Section XIII - References

1. Johnson, H.N. 1965. California's Health. 23:37.
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5. Stim, T.B. 1969. J. Gen. Virol. 5:329-338.
6. Karabatsos, N. and Buckley, S.M. 1967. Am. J. Trop. Med. Hyg. 16:99-105.
7. Ritter, D.G. and Calisher, C.H. Personal communication. 1976.
8. Kerschner, J. Personal communication. 1983.
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Remarks