Virus Name: Umatilla	Abbreviation: UMAV

Status
Arbovirus

Select Agent
No

SALS Level
2

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

Other Information

Antigenic Group
*

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
69V-2161

Accession Number

Original Date Submitted
11/19/1984

Family
Reoviridae

Genus
Orbivirus

Information From
P. Holden and J.S. Lazuick

Address
Fort Collins Laboratories, E.I.P. CDC, P.O. Box 551, Ft. Collins, Colorado

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
John Lazuick

Isolated at Institute
Arbovirus Disease Section, Ft. Collins

Host Genus
Culex pipiens (pool of 53)

Species

Host Age/Stage
Adult

Sex
Female

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod

Time Held Alive before Inoculation

Collection Method
Light trap

Collection Date
7/30/1969

Place Collected (Minimum of City, State, Country)
Umatilla County, Oregon, USA

Latitude
45° 50' N

Longitude
119° 10' W

Macrohabitat
Lester Hawk Ranch, 10 km. N.E. Hermiston, Columbia River Basin

Microhabitat
Irrigated pasture and hay cropland; mosquitoes and livestock abundant

Method of Storage until Inoculated
Solid CO2

Footnotes

Section III - Method of Isolation

Inoculation Date
8/18/1969

Animal (Details will be in Section 6)
(Tissue Culture)

Route Inoculated

Reisolation
Yes

Other Reasons
Six antigenically related agents isolated from other sources. An additional 20 candidate agents not yet tested.

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)
Infectivity inactivated at pH 3.0, 3 hrs., RT

Lipid Solvent (ether - % used to test) **1:20**	After Treatment Titer **6.0 dex**	Control Titer **5.9 dex**
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) **1:1000**	After Treatment Titer **4.3 dex**	Control Titer **5.4 dex**

Other (formalin, radiation)

Virion Morphology

Shape **Bluetongue virus-like**	Dimensions **57-67 nm**	
Mean nm	Range nm	
Measurement Method **Electron microscopy, thin-section**	Surface Projections/Envelope **Envelope absent**	Nucleocapsid Dimensions, Symmetry **Core = 30 nm diameter**

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Macrotubules, 20-24 nm in diam. Formed		
Inclusion Bodies	Other	
Intracytoplasmic inclusions		

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
No	**9th passage duck embryo cell; cell cult. harvests; tube HA tests.**	**Goose**
pH Range	pH Optimum	
6.0 - 7.3	**None**	
Temperature Range	Temperature Optimum	
37dC, 4dC	**None**	

Remarks
Negative results obtained with std. methods of detecting HA in "crude" cell harvests containing arboviruses or reoviruses. Harvests contained no serum. * Umatilla virus was determined to be antigenically related to Lla

Serologic Methods Recommended
PRNT

Footnotes
Negative results obtained with std. methods of detecting HA in "crude" cell harvests containing arboviruses or reoviruses. Harvests contained no serum. * Umatilla virus was determined to be antigenically related to Lla

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

Results to follow should be interpreted with caution for the following reasons:

1) Of the common laboratory animals inoculated with 69V-2161 virus, only rabbits produced PRNT antibodies of sufficient titer to be measurable in the duck embryo cell culture system. Supposedly immune serum from mice, chickens, and hamsters only minimumly neutralized the virus (LNI-0.5 to 0.9 dex) even though the agent could be recovered from tissues of these species for several days after they had received virus inoculations.
2) Comparable NT titers for morphologically similar viruses (BLU and EHD) were not available because these agents plaque poorly on duck embryo cell monolayers.

Immune Serum	Neut. Indices	
	Ho	Ht ***
SLE (Parton)	1.9	<0.3
TUR(960)	2.4	<0.3
CTF(37) *	5.9	<0.3
BLU (8) **	4.0	<0.3
BLU (262) **	4.2	<0.3
BLU Ox183 **	4.5	<0.3
EHD(NJ)	N.A.	<0.3

* Ho obtained by plaque-reduction in Vero cells

** Ho obtained in fluid cultures of primary lamb kidney cells

*** Ht obtained in NT test on duck embryo cell monlayers

NOTE: Umatilla virus was determined to be antigenically related to Llano Seco virus by IFR and Cr (see Llano Seco virus registration card).

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Spleen (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)
Duck embryo (PC)	1st to 15th		CPE at lower dilutions			Plaques		
Vero (CL)	12th plus					Delayed plaques; reduced efficiency as compared to duck embryo		
Vero (CL)	Orig. mosq. susp.					No plaques		

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
Passer domesticus (bird)	1/2,128		Texas, USA, 1967
Culex tarsalis	1/124 *		
Culex tarsalis	5/899		Texas, USA, 1969
Culex tarsalis	13/347		Colorado, USA, 1969
Culex tarsalis	1/45		Utah, USA, 1969
Culex tarsalis	2/100%		Colorado, USA, 1970
Culex pipiens	2/36		Oregon, USA, 1969
Culex pipiens	1/28		Colorado, USA, 1969

* = pools tested

NOTE: Most isolates so designated because of plaque characteristics in DECC, nonpathogenicity for suckling mice inoculated ic, and failure of original suspensions to produce plaques on Vero cells. However, significant PRNT antibodies against 69V-2161 were found in rabbits inoculated with one isolate from P. domesticus, 4 from Cx tarsalis, and 1 additional strain from Cx pipiens.

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)**		ic	None		
Mice (nb)		ip	None		
Mice (nb)		sc			
Mice (wn)		ic			
Mice (wn)		ip	None		
hamsters** (nb)		ic	Sporadic deaths,probably nonspecific		
hamsters (2 wk)		ic	None		
guinea pigs (1-3 day)		ic	None		
rabbits (2-4 mo)		im	Antibody production		
chickens (1-2 day)		sc	Viremia, no illness 0.1 ml inoculum contained 2.7 dex PFU. On 8th day post-inoculation, the 3 chicks inoculated had viremias, respectively of 3.8, 1.4, and 2.5 dex PFU/0.1 ml of whole blood. Maximum titer, 43 hours = 6.0 dex PFU/ml.		

** Virus remained nonpathogenic for suckling mice and suckling hamsters through 5 blind passages (ic). Virus (2.0 to 4.0 dex PFU/ml) was demonstrable in brain harvests at each passage level.

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
Culex tarsalis	oral, blood meal		After 14 days extrinsic incubation, 2/38 mosquitoes induced viremia in chicks by biting.						

Section X - Histopathology

Character of lesions (specify host)
Not studied in animals

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)
Oregon; Utah; Colorado; Texas, USA

Suspected (Antibody only detected)

Remarks

Inclusion bodies similar to those of BLU virus were observed in cultured duck embryo cells infected with Umatilla virus. However, negative fluorescent staining reactions were obtained in direct FA tests employing fluorescein- conjugated anti-bluetongue immunoglobulins.