

<b>Virus Name: Northway</b>		<b>Abbreviation: NORV</b>
Status <b>Probable Arbovirus</b>	Select Agent <b>No</b>	SALS Level <b>3</b>
SALS Basis <b>Insufficient experience with virus; i.e., experience factor from SALS surveys was less than 500 in laboratory facilities with low biocontainment.</b>		
Other Information		
Antigenic Group <b>Bunyamwera</b>		

**SECTION I - Full Virus Name and Prototype Number**

Prototype Strain Number / Designation <b>0234*</b>	Accession Number	Original Date Submitted <b>11/28/1984</b>
Family <b>Bunyaviridae</b>	Genus <b>Bunyavirus</b>	
Information From <b>Donald G. Ritter</b>	Address <b>Arctic Health Research Center, Virology Unit, Fairbanks, Alaska 99701 USA</b>	
Information Footnote <b>Reviewed by editor</b>		

**Section II - Original Source**

Isolated By (name) <b>Donald G. Ritter</b>	Isolated at Institute <b>AHRC, Fairbanks, Alaska</b>	
Host Genus <b>Aedes spp.</b>	Species	Host Age/Stage <b>Adult</b>
Sex <b>Female</b>		
<u>Isolated From</u>	<u>Isolation Details</u>	
Signs and Symptoms of Illness <b>None in sentinel rabbits from which other strains of NOR virus were isolated</b>	Arthropod <b>Depleted</b>	
Time Held Alive before Inoculation		
Collection Method <b>Hand netting</b>	Collection Date <b>8/25/1972</b>	
Place Collected (Minimum of City, State, Country) <b>Northway, Alaska, USA</b>		
Latitude <b>62° 58' N</b>	Longitude <b>141° 56' W</b>	
Macrohabitat <b>Mixed black spruce, birch, sphagnum bog with alder and willows bordering ponds and creeks</b>	Microhabitat	Method of Storage until Inoculated <b>Freeze-killed in liquid nitrogen, stored at -65dC</b>
Footnotes		

**Section III - Method of Isolation**

Inoculation Date  
**3/14/1972**

Animal (Details will be in Section 6)  
**nb mice (Tissue Culture)**

Route Inoculated <b>ic and ip</b>	Reisolation <b>Yes</b>
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Other Reasons  
**No Bunyamwera group virus in this laboratory previously**

Homologous Antibody Formation by Source Animal  
**Not tested**

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) <b>1:5</b>	After Treatment Titer <b>&lt;1.5 dex</b>	Control Titer <b>5.5 dex</b>
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) <b>1:500</b>	After Treatment Titer <b>&lt;2.5 dex</b>	Control Titer <b>6.2 dex</b>
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

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**Hemagglutination**

Hemagglutination                      Antigen Source                      Erythrocytes (species used)  
**No**                      **SMB ext. by sucrose-acetone**                      **Goose**

pH Range                      pH Optimum  
**5.8-7.0**

Temperature Range                      Temperature Optimum  
**4dC-37dC**

Remarks  
**\* Isolate 0234 selected as prototype because most studies were done with this isolate.**

Serologic Methods Recommended  
**CF, NT**

Footnotes  
**\* Isolate 0234 selected as prototype because most studies were done with this isolate.**

	0234 serum <sup>a</sup>		0234 antigen <sup>a</sup>	
	NT <sup>b</sup>	CF	NT	CF
Cache Valley	<10/320	32/64	<10/80	128/128
Tlacotalpan	<10/320	32/64	<10/80	32/64
Tensaw	20/320	32/64	40/160	32/64
Lokern	<10/320	8/64	<10/80	64/256
Main Drain	<10/320	16/64	<10/160	32/128
1-0923	320/320	64/46	- <sup>c</sup>	-
1-1188	160/320	64/64	-	-
71-1645	640/320	32/64	-	-
71-1647	160/320	128/64	-	-
71-1653	320/320	64/64	-	-

<sup>a</sup> Heterologous/homologous serum titer

<sup>b</sup> Serum dilution plaque reduction neutralization test

<sup>c</sup> - = not tested

Cross-neutralization studies with 23 BUN serogroup viruses have shown that Northway virus is a distinct virus type in the Bunyamwera complex. At that time, five complexes were defined [3].

**Section VI - Biologic Characteristics**

Virus Source (all VERTEBRATE isolates)  
**Liver, brain (LV)**

Lab Methods of Virus Recovery (ALL ISOLATIONS)  
**Newborn mice**

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)		
Vero (CL)	Vero 3	4	CPE						
Vero (CL)	Vero 3 SM 1				4	Plaques	7.7*		

\* Expressed in dex

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Aedes spp.	1/1,177		Northway, Alaska, USA, 1970
Culiseta alaskaensis	1/72		
Aedes hexodontus complex	1/1,037		
Aedes spp.	1/186		Northway, Alaska, USA, 1971
Cs alaskaensis	0/5		
Ae hexodontus complex	0/304		
Aedes excrucians	1		Alaska (4)
Sentinel rabbit	2/8		Ester, Alaska
Sentinel rabbit	1/4		Dome Spur, Alaska
Clethrionomys rutilus	2		Alaska (4)

**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 log <sub>10</sub> /ml
Mice (nb)	Vero 3 SM 2	ic 0.01	Paralysis and death	3	8.5
Mice (nb)		ip 0.03	Paralysis and death	5	7.8
Mice (nb)		sc			
Mice (wn)		ic 0.03	Paralysis and death	5	7.5
Mice (wn)		ip 0.03	Paralysis and death	6.5	6.0

**Section IX - Experimental Arthropod Infection and Transmission**

Arthropod species & virus source(a)	Method of Infection log <sub>10</sub> /ml (b)		Incubation period (c)		Transmission by bite (d)		Assay of arthropod, log <sub>10</sub> /ml (e)		
	Feeding	Injected	Days	°C	Host	Ratio	Whole	Organ	System
Aedes aegypti	Viral multiplication after intrathoracic inoculation and following incubation at 13C, 21C, 35C, and 39C (2).								

**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) <b>Alaska, USA</b>
Suspected (Antibody only detected)

**Section XIII - References**

1. Calisher, C.H., et al. 1974. Can. J. Microbiol. 20:219-223. 2. McLean, D.M., et al. 1975. Arch. Virol. 49:49-57. 3. Hunt, A.R. and Calisher, C.H. 1979. Am. J. Trop. Med. Hyg. 28:740-749. 4. Ritter, D.G., et al. 1974. Can. J. Microbiol. 20:1359-1366.
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**Remarks**

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