Virus Name: Tyuleniy	Abbreviation: TYUV

Status
Probable Arbovirus

Select Agent
No

SALS Level
2

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

Other Information

Antigenic Group
B

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
LEIV 6C

Accession Number

Original Date Submitted
11/14/1984

Family
Flaviviridae

Genus
Flavivirus

Information From
D.K. Lvov

Address
Institut of Viroloby, USSR Acad. Med. Sci., Gamaleya St., 16, Moscow, D-98, USSR

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
D.K. Lvov and co-workers

Isolated at Institute
Institut of Viroloby, USSR Acad. Med. Sci., Gamaleya St., 16, Moscow, D-98, USSR

Host Genus
Ixodes putus (= Ixodes uriae)

Species

Host Age/Stage
Adult

Sex
Not Answered

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod

Time Held Alive before Inoculation

Collection Method
Substrates collected from birds' nesting grounds

Collection Date
8/18/1969

Place Collected (Minimum of City, State, Country)
Tyuleniy Island, Sea of Okhotsk, USSR

Latitude
48° 30' N

Longitude
144° 43' E

Macrohabitat
Nesting grounds of sea birds Uria aalge (seashore colony)

Microhabitat
Rifts in rocks

Method of Storage until Inoculated
Alive at +4dC in refrigerator

Footnotes

Section III - Method of Isolation

Inoculation Date
9/29/1969

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
Yes

Other Reasons
No work with other arboviruses was conducted in the laboratory

Homologous Antibody Formation by Source Animal

Test(s) Used

Footnotes

Section IV - Virus Properties

Physicochemical
RNA

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) **50%**	After Treatment Titer **<2.0 dex**	Control Titer **6.5 dex**
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) **1:100**	After Treatment Titer **<1.0 dex**	Control Titer **6.5 dex**

Other (formalin, radiation)

Virion Morphology

Shape	Dimensions **45-50 nm**	
Mean nm	Range nm	
Measurement Method **By electron microscopy (8)**	Surface Projections/Envelope **Envelope observed**	Nucleocapsid Dimensions, Symmetry

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Inclusion Bodies	Other	

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
Yes	**SMB ext. by sucrose-acetone**	**Goose**
pH Range	pH Optimum	
6.2-7.0	**6.4-6.6**	
Temperature Range	Temperature Optimum	
	22dC	

Remarks

Serologic Methods Recommended
CF, HI, NT

Footnotes

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

Tyuleniy antigen in the HI and CF tests did not react with the antisera to arboviruses, namely, poly A, WEE, VEE, Kemerovo, Chenuda, Uukuniemi, Quaranfil, Nyamanini; it did react with antisera to group B arboviruses [3] , [4] .

	Tyuleniy Antigen		
Antisera	HI Ht/Ho	CF Ht/Ho	NT Ht/Ho
RSSE	20/160	20/40	<1.0/2.75 *
JBE	20/160	40/320	<1.0/2.75
SLE	20/	20/80	<1.0/2.75
West Nile	160/320	20/640	<1.0/2.75
Ntaya	160/		
Wesselsbron	40/		
Dengue-2	160/		
Dengue-3	40/		
Dengue-TH	80/		
Group B	640/20-640		

* LNI in dex.

In the CF test Tyuleniy antiserum was tested against the following group B antigens [6] : Serum titer = 128, with antigen Tyuleniy; 32 with antigens Alfuy, Ileus, Israel turkey meningoencephalitis, Kadam, RSSE, and yellow fever; 16 with antigens Apoi, Banzi, Edge Hill, Japanese enc., Lanjan, Murray Valley enc., Omsk hemorrhagic fever, Powassan, Tembusu, Usutu, Wesselsbron, West Nile; 8 with antigens Bussuquara, Central European tick-borne enc., dengue 4, Kunjin, Louping ill, Negishi, Ntaya, Spondweni; less than 8 (negative), with antigens Cowbone Ridge, Dakar bat, dengue 1, dengue 2, dengue 3, Royal Farm, Entebbe bat, Ibadan An 10069, Kokobera, MML, Modoc, Zika, Stratford.
In NT, Tyuleniy antiserum did not neutralize arboviruses RSSE, JBE, SLE, West Nile. [4]

The Tyuleniy virus has been found to be indistinguishable from the Three Arch virus isolated off the Oregon coast, USA [9] .

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)	
Chick embryo (PC)	SMB 2-3		No CPE	2.5*		1-1.5 mm		+	

* By interference assay; titer 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
Ixodes putus (= Ixodes uriae)	7/7,000		Tyuleniy Island, Sea of Okhotsk, USSR (1-4)
I. putus	1/420		Bering Island, Commodore Islands, USSR (7)
I. uriae (pool of 10 females)	1/5		Three Arch Rock Island, Oregon, USA (5)
I. uriae (nymphs and adults)	5/98		Coastal Oregon, USA (11)
Callorhinus ursinus (Northern Fur Seals)		14/64 HI	Commodore Island, USSR (7)
Man		2/33 HI	
Birds			
Common Murre		8/33 HI	
Tufted Puffin		6/26 HI	
Blacklegged Kittywake		2/18 HI	
Redlegged Kittywake		0/6 HI	
Pelagic Cormorant		0/5 HI	

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 5-6	ic 0.01	Paralysis, death	3-6	7.5
Mice (nb)		ip 0.03	Paralysis, death	4-8	7.0
Mice (nb)		sc			
Mice (wn)		ic 0.03	Paralysis, death	3-7	7.0
Mice (wn)		ip 0.10	Paralysis, death	4-8	6.0
guinea pigs (ad)		ip	None		
rabbits (ad)		ip	HI and CF antibodies		

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

Aedes aegypti are infected upon feeding virus-containing material, virus titer to 3.0 log10LD50/0.01 ml in suckling mice. Suckling mice bitten by infected mosquitoes, 7, 8 and 16 days after infective feeding developed HI antibodies (4).

Aedes aegypti and Culex pipiens molestus mosquitoes infected through a biologic membrane transmitted virus to suckling mice by bite from the 7th to the 19th day after infection (10).

Hyalomma asiaticum nymphs infected by feeding; virus detected in moulted imagos by ic inoculation of tick suspension into suckling mice (4).

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)
USSR; Oregon, USA

Suspected (Antibody only detected)

Section XIII - References

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Remarks