

Virus Name: Apoi	Abbreviation: APOIV	
Status Possible 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 Ezo encephalitis virus	Accession Number	Original Date Submitted 11/7/1984
Family	Genus Flavivirus	
Information From M. Kitaoka	Address National Institute of Health, 2-10-35 Kamiosaki Shinagawa-ku,Tokyo	
Information Footnote Reviewed by editor		

Section II - Original Source

Isolated By (name) Study group on Ezo fever (2,3)	Isolated at Institute Foothills of Mt. Apoi, Hokkaido	
Host Genus Apodemus spp. and Clethrionomys sp. Rodents	Species	Host Age/Stage Adult
Sex Not Answered		
<u>Isolated From</u> <u>Isolation Details</u>		
Organs/Tissues	Pooled spleens of 7 rodents	
Signs and Symptoms of Illness Apparently healthy	Arthropod	
Time Held Alive before Inoculation		
Collection Method By trapping rodents in the field	Collection Date 10/9/1954	
Place Collected (Minimum of City, State, Country) At the foothills of Mt. Apoi, Japan		
Latitude 42° 1' N	Longitude 143° 4' E	
Macrohabitat In the forest along the path	Microhabitat	Method of Storage until Inoculated In the morning immediately after the collection of rodents
Footnotes		

Section III - Method of Isolation

Inoculation Date
10/9/1954

Animal (Details will be in Section 6)
wn mice

Route Inoculated Reisolation
Intraperitoneal

Other Reasons
. Positive HI antibody in sera of rodents trapped there. A second isolation from Apodemus argenteus hokkaidi, 1956.

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 1.2 dex	Control Titer 5.5 dex
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate)	After Treatment Titer <2.0 dex	Control Titer 6.0 dex

Other (formalin, radiation)

Chloroform-sensitive

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
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Inclusion Bodies	Other	
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Hemagglutination

Hemagglutination	Antigen Source	Erythrocytes (species used)
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Yes	SMB ext. by sucrose-acetone	goose
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pH Range	pH Optimum
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6.0 - 6.8	
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Temperature Range	Temperature Optimum
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	37dC
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Remarks

Okubo, et al. (3) reported no HA activity of virus

Serologic Methods Recommended

CF, HI, NT

Footnotes

Okubo, et al. (3) reported no HA activity of virus

Eight HA units of Apoi antigen (homologous HI = 640) were tested against antibody to viruses of Group A: WEE, EEE; Group B: JE, SLE, MVE, WN, RSSE, POW, NEG, DEN-1, MOD, RB, BSQ; Group C: MTB, ORI, APEU ; Bunyamwera Group: BAT, BUN, CV; Others: AKA, CE, KET, NOD, WIT. Only antibody to viruses of Group B inhibited the HA of Apoi antigen.

Antigen	CF Test (1)						
	Immune Serum						
Nakayama	SLE	Modoc	RSSE	Negishi	Powassan	Apoi	
Nakayama	64/32a	64/8	0/0	0/0	0/0	0/0	8/4
SLE	16/16	256/64	8/8	0/0	4/4	0/0	16/8
Modoc	0/0	0/0	128/128	0/0	0/0	0/0	0/0
RSSE	0/0	0/0	0/0	128/128	32/64	32/16	0/0
Negishi	0/0	0/0	0/0	32/64	16/32	16/8	0/0
Powassan	0/0	0/0	0/0	64/32	32/16	128/128	0/0
Apoi	0/0	0/0	4/4	0/0	0/0	0/0	128/128
Normal	0/0	0/0	0/0	0/0	0/0	0/0	0/0

Antigen	CF Test (2)			
	Immune Serum			
	Apoi	Yellow Fever	Bussuquara	Rio Bravo
Apoi	64/64 ^a	4/4	0/0	8/4
Yellow fever 17D	0/0	128/32	0/0	4/4
Bussuquara	0/0	0/0	16/32	0/0
Rio Bravo	0/0	0/0	0/0	32/64
Normal	0/0	0/0	0/0	0/0

^a Antibody titer/antigen titer; 0/0 = <4/<4

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Spleen(LV)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn and weanling 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)	
BHK-21 (CL)		2-3		9.3 *			
Hamster kidney (PC)		2		9.5			
Vero (PC)		6		8.5			
FL (PC)		3		6.5			
HeLa (PC)		3-4		4.5			
Chick embryo (PC)					4	8.4 *	

* 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
Apodemus speciosus ainu (1), Clethrionomys ruf. bedfordiae (1)and Ap argenteus hokkaidi (5)	1		Hokkaido,Japan
Ap. sp. ainu	0/292		Hokkaido, Japan
Ap. arg. hokkaidi	1/283		Teshio Nakagawa, Japan
Cleth. ruf. bed.	0/762		
Rattus norv. ohto .	0/6		

<i>Ixodes persulcatus</i>	0/75	
Rodents	0/5,096	Honshu, Shikoku, Kyushu, Japan
Man	1/1,000 HI HI JE Apoi	Hokkaido
Horses	0/12 7/12	Wakkanai, Hokkaido
Horses	2/20 4/20	Haboro, Hokkaido
Horses	5/20 3/20	Tomakomai, Hokkaido
Horses	4/20 1/20	Shosanbetsu, Hokkaido
Horses	2/20 1/20	Odaira, Hokkaido
Horses	3/20 2/20	Rumoi, Hokkaido
Horses	0/20 0/20	Mashike, Hokkaido
Horses	7/10 3/10	Urakawa, Hokkaido
Rodents	N/A 2/9	Apoi, Hokkaido
Oxen	NA 0/9	Urakawa, Hokkaido
Horses	N/A 0/29	Tokyo, Japan

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 4	ic 0.02	Encephalitis	3-4	10.3	
Mice (nb)		ip 0.05	Encephalitis	4-5	9.3	
Mice (nb)		sc				
Mice (wn)		ic 0.03	Encephalitis		9.4	
Mice (wn)		ip 0.2	Encephalitis		7.9	
Mice (wn)		oral route	Encephalitis; some death, some surviving with HI antibody prod.			

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
C. tritaeniorhynchus		Infection attempted by feeding. Virus does not grow in mosquito body							

Section X - Histopathology

Character of lesions (specify host)

White mice: Encephalitis in mice

Inclusion Bodies

Intranuclear

Organs/Tissues Affected

Brain (LV), heart (LV), skeletal muscles (LV)

Category of tropism

Section XI - Human Disease

In Nature	Residual	Death
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Subclinical	Overt Disease
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Clinical Manifestations

Fever (R), headache (R), prostration (R), stiff neck (R), myalgia (R), arthralgia (R) CNS signs (including encephalitis) (R), sequela: paralysis in legs

Number of Cases	Category (i.e. febrile illness, etc.)
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One laboratory infection	Encephalitis
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Section XII - Geographic Distribution

Known (Virus detected)

Japan

Suspected (Antibody only detected)

Section XIII - References

1. Kitaoka, M., et al. 1967. Report of the 19th General Meeting of the Eastern Part of Japan. Jap. Assoc. Of Sanit. Zool. (in Japanese).
2. Saiki, K. 1955. Nihon Iji Shimpo. No. 1611. 1247 (in Japanese).
3. Okubo, K., et al. 1955. Ibid., 1247-1248 (in Japanese).

Remarks