

Virus Name: Akabane		Abbreviation: AKAV	
Status Probable Arbovirus	Select Agent No	SALS Level 3	
SALS Basis Results of SALS surveys and information from the Catalogue.			
Other Information USDA Permit Required, Hepa Filtration, USDA Restricted, USDA High Consequence Agent			
Antigenic Group Simbu			

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation JaGAR 39	Accession Number	Original Date Submitted 2/14/1985
Family Bunyaviridae	Genus Bunyavirus	
Information From Akira Oya	Address Dept. of Virology and Rickettsiology, Natl. Inst. of Health, Shinagawa, Tokoyo	
Information Footnote Reviewed by editor		

Section II - Original Source

Isolated By (name) A. Oya, et al. (1,2)	Isolated at Institute Gumma, Japan	
Host Genus Aedes vexans nipponii, Theobald	Species	Host Age/Stage
Sex Not Answered		
<u>Isolated From</u>	<u>Isolation Details</u>	
Signs and Symptoms of Illness	Arthropod	
Time Held Alive before Inoculation		
Collection Method Caught by aspirator	Collection Date 8/20/1959	
Place Collected (Minimum of City, State, Country) Akabane Town, Gumma Prefecture, Japan		
Latitude 36° 13' N	Longitude 139° 34' E	
Macrohabitat Rural Kanto plain	Microhabitat Livestock pens, ground level; well irrigated rice field area	Method of Storage until Inoculated Stored in dry ice chest
Footnotes		

Section III - Method of Isolation

Inoculation Date

9/1/1959

Animal (Details will be in Section 6)

nb mice

Route Inoculated

Intracerebral

Reisolation

Not tried

Other Reasons

Not tried. Five other strains were isolated from five different places in Gumma Prefecture during 20 to 27 August, 1959.

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) 0.1%	After Treatment Titer <2.7 dex	Control Titer 3.6 dex

Other (formalin, radiation)

Infective particle in 10% SMB not precipitated by 2.5 mg/ml prot. sulfate

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

Hemagglutination

Hemagglutination

Antigen Source

Erythrocytes (species used)

Yes

SMB ext. by sucrose-acetone

Goose

pH Range

pH Optimum

6.0-6.2

6.1

Temperature Range

Temperature Optimum

37dC

Remarks

Limiting dilution passage was applied in order to obtain good HA yielder

Serologic Methods Recommended

CF, HI, NT *Infective titer does not decrease s

Footnotes

Limiting dilution passage was applied in order to obtain good HA yielder

A. Simbu , Oropouche and Sathuperi viruses were found to share antigens with Akabane in CF [4] .							
AKABANE (JaGAR 39) immune mouse	Simbu (SAAr 53)	Antigens of		AKABANE (JaGAR 39) Antigen	Immune Serum of		
		Oropouche (Tr 9760)	Sathuperi (IG 11155)		Simbu (SAAr 53)	Oropouche (Tr 9760)	Sathuperi (IG 11155)
serum	16/128 *	8/128	32/128		16/64 *	0/64	64/256+

* Ht/Ho in CF

B. Viruses demonstrated to be immunologically unrelated [2] , [3] , [4] .

HI:	Group A:	Getah , Sagiyama , Sindbis , Bebaru , chikungunya , BaH 306, Mayaro (Uruma)
	Group B:	JE (Nakayama), West Nile , RSSE, Negishi , Powassan , Modoc , dengue 1 , YF-17D
	Group C:	Marituba , Oriboca , Apeu
	Bunyamwera:	Batai , Cache Valley , Bunyamwera , Wyeomyia , Germiston
	Others:	California encephalitis , Witwatersrand, Ketapang, Nodamura , Guaroa , Kairi , Guama, Catu, Bwamba, Pongola, Turlock, Umbre, Bakau, SF Sicilian , SF Naples , Anopheles A , Lunyo , Manzanilla , EMC, Colorado tick fever , Tacaiuma, Tahyna
CF:	Group C:	Marituba , Oriboca , Apeu
	Bunyamwera :	Bunyamwera , Batai , Wyeomyia , Germiston
	Others:	Ketapang, California encephalitis , Kairi , Guaroa , Ilesha , Bakau, Tahyna , Junin , Manzanilla , Ingwavuma

SIRACA has classified Akabane virus as a distinct virus type and placed it in the AKA complex [15] .

Virus Source (all VERTEBRATE isolates)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn mice

Cell system (a)	Virus passage history (b)	Evidence of Infection						
		CPE			PLAQUES			Growth Without CPE +/- (g)
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)	
Hamster kidney (PC)	SMB3 HK4	3-4	4+	3.5 **				
Vero (CL)	P-18				8	1mm	4.3 **	
LLC-MK2 (CL)					3	4mm	8.0 (6)	
BHK-21 (CL)			CPE	5.0		Plaques	5.0	

** Expressed in dex

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Man (adults)	None	0/483	Gumma Prefecture, Japan ; 1960
Fetal calves (various tissues)	2 *		Japan (10)
Mosquitoes:			
<i>Aedes vexans nipponii</i>	4/120 pools		Plain area of Gumma Prefecture, Japan
<i>Culex tritaeniorhynchus</i>	2/169 pools		
<i>Culicoides brevitarsis</i>	2		Queensland, Australia ; 1968 (5)
Young bull , apparently healthy (blood)	1	NT antibody 1 mo. after isolation	Australia (11)
Adult cattle		490/2,301 NT	Japan (8)
Calves		52/70NT	

* During epizootic of congenital arthrogryposis-hydranencephaly in cattle

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log ₁₀ /ml
Mice (nb)	SMB 1	ic 0.02	Illness and death	2-5	9.7
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)	SM 3 Cow 1 SM 2	ic 0.03	Illness and death	3-6	8.1
Mice (wn)		ip			
pregnant ewes			Congenital malformations (arthrogryposis-hydranencephaly syndrome) in foetal lambs. NT antibody to AKA in lambs (9).		
bulls			Viremia 2-9 days pi for 3-5 days. NT antibody by 7-10 days. Virus not isol. from semen (13)		
embryonated eggs (4 days)		ys	Death or developmental abnormalities including arthrogryposis (12).		
embryonated eggs (6 days)		ys	Myopathy and encephalopathy (15).		
embryonated eggs (15 days)		iv	Foci of encephalitis including neuronal degeneration (15).		

Section X - Histopathology

Character of lesions (specify host)

Inclusion BodiesIntranuclear

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)

Japan, Australia (5), Kenya (14)

Suspected (Antibody only detected)

HI antibodies were found in pig sera in Taiwan, Viet Nam, Bandung, and in horse sera in Thailand (7)

Section XIII - References

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