

Virus Name: Ibaraki		Abbreviation: IBAV
Status Possible Arbovirus	Select Agent No	SALS Level 3
SALS Basis Insufficient experience with virus; i.e., experience factor from SALS surveys was less than 500 in laboratory facilities with low biocontainment.		
Other Information		
Antigenic Group Epizootic Hemorrhagic Fever		

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation Ibaraki-2	Accession Number	Original Date Submitted 8/21/1984
Family Reoviridae	Genus Orbivirus	
Information From T. Omori	Address National Institute of Animal Health, Kodaira, Tokyo, Japan	
Information Footnote Reviewed by editor		

Section II - Original Source

Isolated By (name) National Institute of Animal Health	Isolated at Institute Ibaraki Prefecture, Japan	
Host Genus Cattle	Species	Host Age/Stage 10 years
Sex Female		
<u>Isolated From</u> Whole Blood	<u>Isolation Details</u>	
Signs and Symptoms of Illness Fever, anorexia, lacrimation, deglutitive difficulty, ulceration of oral nasal mucosa	Arthropod	
Time Held Alive before Inoculation		
Collection Method UNKNOWN	Collection Date 9/20/1959	
Place Collected (Minimum of City, State, Country) Ibaraki Prefecture, Central parts of Japan		
Latitude 37° N	Longitude 140° E	
Macrohabitat Open rice field	Microhabitat	Method of Storage until Inoculated
Footnotes		

Section III - Method of Isolation

Inoculation Date 9/20/1959	
Animal (Details will be in Section 6) (Tissue Culture)	
Route Inoculated	Reisolation Yes
Other Reasons	
Homologous Antibody Formation by <u>Source Animal</u> Yes	
Test(s) Used CF, NT	
Footnotes	

Section IV - Virus Properties

Physicochemical RNA, Double Strand		
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)	
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<u>Stability of Infectivity (effects)</u>		
pH (infective range) Labile at pH 3.0; stable at pH 6.4		
Lipid Solvent (ether - % used to test) 20%	After Treatment Titer 4.8 dex	Control Titer 5.5 dex
Lipid Solvent (chloroform) 5%	After Treatment Titer 5.8 dex	Control Titer 5.5 dex
Lipid Solvent (deoxycholate) 0.1%	After Treatment Titer 6.2 dex	Control Titer 5.8 dex
Other (formalin, radiation) Sens. to trypsin, resistant to repeated freeze-thaw (4,6)		
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<u>Virion Morphology</u>		
Shape Spherical	Dimensions 55 nm (9)	
Mean 55 (9) nmnm	Range range 50-60 nmnm	
Measurement Method Negative contrast	Surface Projections/Envelope Pseudo-envelope (9)	Nucleocapsid Dimensions, Symmetry

Morphogenesis

Site of Constituent Formation in Cell Cytoplasm (9)	Site of Virion Assembly Budding from cell membrane, intracytoplasmic viral matrices (9)	Site of Virion Accumulation Cytoplasm, extra-cellular space (9)
Inclusion Bodies	Other Tubular structures in cytoplasm (9)	

Hemagglutination

Hemagglutination No	Antigen Source Inf. bovine kidney cell cult. fl. Acetone-ether ext. SMB	Erythrocytes (species used) Many*
pH Range 7.2	pH Optimum	
Temperature Range 37dC, 22dC, 4dC	Temperature Optimum	
Remarks * Cattle, horse, sheep, goat, guinea pig, mouse and chicken erythrocytes tested		
Serologic Methods Recommended NT, CF		
Footnotes * Cattle, horse, sheep, goat, guinea pig, mouse and chicken erythrocytes tested		

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

No evidence of a serological relationship between Ibaraki virus and bluetongue virus was recognized. Cross neutralization was not observed and cross complement-fixation was not shown between Ibaraki and bluetongue, type 10 [4], [6]. By CF, sheep antisera to bluetongue, types 1-16 which reacted with bluetongue, type 10 antigen, were negative with Ibaraki antigen [4]. Studies conducted elsewhere, employing neutralization tests in mice, BHK-21 and other cell culture systems, complement-fixation, and ferritin tagged antibody, also confirmed a lack of antigenic relationship between Ibaraki and bluetongue viruses [10]. Two-way cross relationships between Ibaraki virus and EHD virus, serotypes 1 and 2, demonstrated by agar gel precipitin and indirect fluorescent antibody tests [12]. By neutralization tests, Ibaraki virus was more closely related to EHD virus, serotype 2 ("Alberta strain"). Antigenic relationship not observed between Ibaraki virus and four serotypes of bluetongue found in USA.

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn mice, bovine embryo kidney-BEK, calf kidney, calf
passage to BEK (3,4)

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)		
Bovine embryo kidney (BEK) (PC)	1	21-50	3+ (3)						
Sheep kidney (PC)	10	5	3+	5.8**					
Hamster kidney (PC)	1	5	3+	5.5					
BHK-21 (CL)	1	5	3+	5.8					
Chick embryo (PC)	1	4	2+	5.5					

** 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
Cattle (blood)	5/15	764/1,312 NT	Ibaraki Prefecture, Japan (4)

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log ₁₀ /ml
Mice (nb)	Ibaraki-2, 10th	ic	Death	3-4.5	7.5
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)	Ibaraki-5, 1st	ic	Survival		
Mice (wn)		ip			
calves (1-2 yr)	Kyushu-1	iv, ocular instillation, mucous membrane scarification.	Virus serially passaged 7-8 times in calves by iv inoc. of blood. Fever, leukopenia consistently observed. In other instances additional signs of the disease were observed (2, 4).		
		iv			
eggs (4-5 day)	Ibaraki-2, 1st	ys	Death (4, 8)		
rabbits (yg ad)		iv, ic	Survival, no antibody (4, 8)		
guinea pigs (wn)		ic, ip, in	Survival, no antibody (4, 8)		
sheep		iv	No pathogenicity, low infectivity (4, 8)		

Section IX - Experimental Arthropod Infection and Transmission

Arthropod species & virus source(a)	Method of Infection log ₁₀ /ml (b)		Incubation period (c)		Transmission by bite (d)		Assay of arthropod, log ₁₀ /ml (e)		
	Feeding	Injected	Days	°C	Host	Ratio	Whole	Organ	System

Section X - Histopathology

Character of lesions (specify host)

Degeneration of mucous membranes of the digestive tract and striated muscles of naturally infected cattle (2,4). Lesions: hyperemia, edema, hemorrhage, and degeneration of musculature and epithelium (4,11). Ulceration may develop in skin of the muzzle and coronets (4).

Inclusion Bodies

Intranuclear

Organs/Tissues Affected

Esophagus, larynx, pharynx, tongue, abomasum (2,4)

Category of tropism

Striated muscle

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 (4), Bali (Indonesia), Taiwan (4)

Suspected (Antibody only detected)

Section XIII - References

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5. Inaba, Y., et al. 1966. Bull. Office Int. Epizoot. 66:329-340.
6. Inaba, Y., et al. 1970. Jap. J. Microbiol. 14:351-360.
7. Inaba, Y. 1975. Aust. Vet. J. 51:178.
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12. Campbell, D.H., et al. 1978. Vet. Microbiol. 3:15-22.

Remarks

Bluetongue-like virus disease (1,5), but little pathogenicity for sheep (8). Synonym: Kaeishi strain (4).