Virus Name: Keystone	Abbreviation: KEYV

Status
Arbovirus

Select Agent
No

SALS Level
2

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

Other Information

Antigenic Group
California

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
B64-5587.05

Accession Number

Original Date Submitted
12/12/1984

Family
Bunyaviridae

Genus
Bunyavirus

Information From
Enceph. Res. Ctr., Florida

Address
4000 W. Buffalo Ave., Tampa, Florida 33614

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Enceph. Res. Ctr. (1)

Isolated at Institute
Tampa, Florida

Host Genus
Aedes atlanticus/tormentor

Species

Host Age/Stage
Adult

Sex
Female

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod
Engorged

Time Held Alive before Inoculation

Collection Method
Stable bait trap, donkey bait

Collection Date
8/12/1964

Place Collected (Minimum of City, State, Country)
Fox's Corner, Hillsborough Co., FL, USA

Latitude
28° 7' N

Longitude
82° 35' W

Macrohabitat
Rural community, clear lakes, small cypress swamps, low sandy hills

Microhabitat
Stable trap under oak canopy adjacent to swamp

Method of Storage until Inoculated
-80dF

Footnotes

Section III - Method of Isolation

Inoculation Date
10/8/1964

Animal (Details will be in Section 6)
nb mice

Route Inoculated
ic and ip

Reisolation
Yes

Other Reasons

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)	After Treatment Titer	Control Titer

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	

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
Yes	**SMB ext. by sucrose-acetone + sonication, trypsin tr. Titer = 256**	**Goose**
pH Range	pH Optimum **6.0**	
Temperature Range	Temperature Optimum **37dC**	

Remarks

Serologic Methods Recommended

Footnotes

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

Summary of CF Cross Comparison with CAL Group

Immune sera or Antigens	Keystone Antigen Ht/Ho	Ratio	Keystone Immune Sera Ht/Ho	Ratio
Calif. (BFS-283)	64/128	1/2	16/256	1/16
La Crosse	16/256	1/16	64/256	1/4
Calif. (BFS-4474)	64/256	1/4	32/256	1/8
San Angelo	32/128	1/4	8/256	1/32
Greeley	16/64	1/4	32/256	1/8
Tahyna	64/256	1/4	64/256	1/4
Lumbo	64/256	1/4	32/256	1/8
Melao	64/256	1/4	32/256	1/8
Snowshoe Hare	32/512	1/16	64/256	1/4
Fla. Trivittatus B64-2503.02	16/256	1/16	16/256	1/16
Fla. Trivittatus B64-179.12	16/256	1/16	16/256	1/16
Fla. Trivittatus TB 3-1 (1)	16/256	1/16	16/256	1/16
Fla. Trivittatus B64-2207.01	16/128	1/8	16/256	1/16

Laboratory studies were carried out in the laboratory of Dr. W. McD. Hammon, University of Pittsburgh.

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (M)

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)	
Vero (CL)	SM 7				6	7 mm	5.6* (6)		
LLC-MK2 (CL)					3	4+10 mm	5.8 (6)		

* 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
Aedes atlanticus/tormentor	158/34,962		Tampa Bay Area, FL, 1963-1970 (3)
Aedes infirmatus	44/105,865		
Aedes taeniorhynchus	1/34,127		
Aedes spp.	3/1,302		
Culex nigripalpus	2/687,508		
Anopheles crucians	1/128,676		
Cotton rat	2/912		
Sentinel cotton rat	1/356	15/38 NT	Tampa Bay Area, FL (4)
Sentinel rabbit	8/746	2/88 NT	
White-tailed deer		1/187 NT	Texas (9)
Ae aurifer	1		Connecticut (11)
Chrysops obsoletus	1		

Other positive KEY isolations reported from Aedes canadensis, Ae sollicitans, Ae taeniorhynchus, Ae triseriatus, Ae vexans; Culex nigripalpus; and Cx (Melanoconion) sp. (5).

Transovarial transmission demonstrated in Ae atlanticus in nature (10).

Positive antibody findings by NT in following in Tampa Bay Area (4): Rice rat, 4/4; cottontail rabbit 2/4; horse 6/18; man 22/117. Also man 49/234 (5). For other finding see Reference 5.

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)	SM 3	ic	Death	3	
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)	SM 3	ic	Death	10	7.0
Mice (wn)		ip			

Viremia produced by sc inoculation of rabbits, cotton rat (5; table 8). Antibodies produced in dog, horse (5).

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 infirmatus mosquitoes fed on infected rabbit blood and tested for virus presence by inoculation in suckling mice. Virus present in mosquito abdomen on days 1, 2, 3, and 5; virus recovered from mosquito head, thorax and abdomen on days 6, 7, and 8. No virus isolated at 14 days (7).

Aedes atlanticus/tormentor neg. in infection-transmission attempt (5; table 5).

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	

Reported

Clinical Manifestations

Number of Cases — Category (i.e. febrile illness, etc.)

Section XII - Geographic Distribution

Known (Virus detected)
Florida; Texas; Louisiana; Mississippi; Georgia; N. Carolina; Virginia (5); Connecticut (11), USA

Suspected (Antibody only detected)

Section XIII - References

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Remarks