Virus Name: Everglades	Abbreviation: EVEV

Status
Arbovirus

Select Agent
No

SALS Level
3

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

Other Information
Hepa Filtration, Vaccination Recommended

Antigenic Group
A

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
FE3-7C (1)

Accession Number

Original Date Submitted
11/25/1984

Family
Togaviridae

Genus
Alphavirus

Information From
Arbovirology Unit

Address
Centers for Disease Control, Atlanta, Georgia 30333, USA

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Chamberlain and Sudia

Isolated at Institute
CDC, Atlanta, Georgia

Host Genus
Culex (Melanoconion) sp., pool of 117

Species

Host Age/Stage
Adult

Sex
Female

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod

Time Held Alive before Inoculation

Collection Method
CDC light trap

Collection Date
5/31/1963

Place Collected (Minimum of City, State, Country)
Mahogany Hammock, Everglades Nat. Park, Florida

Latitude
28° 31' N

Longitude
81° 30' E

Macrohabitat
Tropical hardwood hammock, surrounded by sawgrass and shallow

Microhabitat

Method of Storage until Inoculated
Dry ice in field; Revco at -60dC in laboratory

Footnotes

Section III - Method of Isolation

Inoculation Date
6/15/1963

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
Yes

Other Reasons
No virus in this laboratory at time of isolation. New antigenic type (2).

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) **1:200**	After Treatment Titer **2.3 dex**	Control Titer **9.3 dex**

Other (formalin, radiation)

Virion Morphology

Shape **Typical group A virus**	Dimensions **68 nm**	
Mean nm	Range nm	
Measurement Method **Negative contrast electron microscopy (3)**	Surface Projections/Envelope **Envelope observed**	Nucleocapsid Dimensions, Symmetry **Nucleocapsid diameter = 32 nm**

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	
5.75-7.0	**6.2**	
Temperature Range	Temperature Optimum	
4dC - 37dC	**37dC**	

Remarks

Serologic Methods Recommended
HI, CF, NT

Footnotes

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

See reference by Young and Johnson [2] . This basic reference (particularly Figure 3 of reference) shows differentiation of FE3-7C from various other geographic strains of VEE virus by the kinetic HI test. These authors show the known VEE strains to comprise a complex of closely related viruses, inseparable by common serological techniques. They have assigned various strains to four antigenic divisions, as shown below:

Antigenic Group	No. Isolates Studied	Representative Strains	Year Isolated	Country	Locality
IA	2	Beck-Wyckoff	1938	Venezuela	Goajira
		Trinidad donkey No.1	1943	Trinidad	Debe-Penal (S.W.)
IB	4	Ica	1946	Peru	Ica
		Pergamino	1958	Argentina	Buenos Aires Prov.
IC	33	P676	1963	Venezuela	Sotillo
		V-198	1962	Colombia	Goajira
ID	21	V-209A	1960	Colombia	Santander
		3880	1961	Panama	Canal Zone
IE	35	Mena II	1962	Panama	Almirante
		63A216	1963	Mexico	Veracruz
II	4	FE3-7C	1963	USA	South Florida
III	21	Mucambo (BeAn8)	1954	Brazil	Belem
		Paramaribo	1963	Surinam	Paramaribo
		52049	1963	Trinidad	Bushbush
IV	4	Pixuna (BeAr 35645)	1961	Brazil	Near Belem

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
***Blood (LV), CNS (LV), heart (LV), lung (LV), liver (LV), spleen (LV), kidney (LV), salivary gland (LV), mammary gland (LV), lymph node (LV). Virus also in blood of adult male oppossum (4)**

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)	
BHK-21 (CL)			CPE			Plaques			
Duck embryo (PC)			CPE			Plaques			
Vero (CL)			CPE			Plaques			
LLC-MK2 (CL)			CPE			Plaques			

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
Man		38/65 HI	Big Cypress, S. Florida, 1960 (7)
Peromyscus gossypinus (cotton mouse)		22/72 HI	Everglades, S. Florida 1964-65(5)
Peromyscus gossypinus		108/325 HI	Everglades, S. Florida 1965-69 (4)
Signodon hispidis (cotton rat)		3/30 HI	Everglades, S. Florida 1964-65(5)
Signodon hispidis	1/130	63/304 HI	Everglades, S. Florida 1965-69(4)
Oppossum	1/118	20/118 HI	
Raccoon		9/107 HI	
Bobcat		2/17 HI	
Oryzomyz palustris (rice rat)		2/13 HI	
Cottontail and marsh rabbits		0/24 HI	
White-tailed deer		1/3	
Isolations in Everglades, S. Florida, 1963-1968 (6)			
Aedes atlanticus/tormentor	1		
Ae taeniorhynchus	8		
Anopheles crucians	2		
Culex nigripalpus	12		
Cx (Mel) sp.	69		

On preferred hammocks of Everglades National Park, south Florida, infection rates can be very high in Culex (Melanoconion) sp., ranging from 1:50 to 1:200 (5). Three human clinical cases documented in Florida (10, 11).

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)	FE3-7C SM2	ic	Death	2	10.4
Mice (nb)		ip	Death	2-3	9.5
Mice (nb)		sc			
Mice (wn)		ic	Death	3-4	9.4
Mice (wn)		ip	Death	5-6	8.8
mice (ad)	Mosq. pool	sc	Death (8)	8-10	
hamsters(ad)	Mosq. pool	sc	Death in 10/15 (8)	5-6	
cotton rats(ad)	Mosq. pool	sc	0/15(8)		
guinea pigs	FE3-7C SM2	sc	No illness		
rabbits (yg ad)		sc	No illness		
horse (ad)	FE3-7C DE-1	sc	No illness 2/6 with low viremia (0.5 - 2.2 dex/.02 ml. Resisted 30-day challenge with VEE type IB(9)		
dogs (5-6 mo)	FE3-7C SM 2	sc	2/5 with 1 to 2 day illness. Recovered.		
rats (ad)		sc	7/7 sick on days 3-6. All recovered.		

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
Experimental infection of Aedes triseriatus and Ae taeniorhynchus accomplished in lab by feed in on viremic suckling mice. 89% of Ae triseriatus transmission to normal SM at 32 days incub: 18% of taeniorhynchus at 24 days incubation.									

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

Reported

Subclinical — Overt Disease

Clinical Manifestations

Fever (R), headache (R), prostration (R), myalgia (R), CNS signs (including encephalitis) (R).

Number of Cases

3 in Florida, all in older persons (10,11)

Category (i.e. febrile illness, etc.)

Febrile illness and encephalitis

Section XII - Geographic Distribution

Known (Virus detected)

South Florida, USA

Suspected (Antibody only detected)

Section XIII - References

1. Chamberlain, R.W., et al. 1964. Science 145:272-274.
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Remarks