Virus Name: Ilheus	Abbreviation: ILHV

Status
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

Accession Number

Original Date Submitted
2/10/1985

Family
Flaviviridae

Genus
Flavivirus

Information From
H.W. Laemmert, Jr.

Address
Instituto Oswaldo Cruz, C.P. 89, Rio de Janeiro, Guanabara, Brazil

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Laemmert and Hughes (1)

Isolated at Institute
Near Ilheus, Brazil

Host Genus
Pool of Aedes and Psorophora

Species

Host Age/Stage
Adult

Sex
Female

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod

Time Held Alive before Inoculation

Collection Method
By hand, human bait

Collection Date
3/10/1944

Place Collected (Minimum of City, State, Country)
Fazenda Pirataquisse (near Ilheus), Brazil

Latitude
15° S

Longitude
39° W

Macrohabitat
Old secondary growth and virgin forest

Microhabitat
Forest floor and canopy of old secondary growth and virgin forest

Method of Storage until Inoculated
Alive

Footnotes

Section III - Method of Isolation

Inoculation Date
3/12/1944

Animal (Details will be in Section 6)
Rhesus*

Route Inoculated
Subcutaneous

Reisolation
Not tried

Other Reasons
New virus; second monkey inoc. with other pool of Aedes and Psorophora developed NT antibody

Homologous Antibody Formation by Source Animal
Yes

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) **1:1000**	After Treatment Titer **Inactivated (3)**	Control Titer

Other (formalin, radiation)
Sensitive to trypsin, chymotrypsin and papain (34)

Virion Morphology

Shape	Dimensions **18-26 nm**	
Mean nm	Range nm	
Measurement Method **Gradocol filtration (33)**	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 acetone-ether; sucrose-acetone; alkaline aqueous**	**Goose**
pH Range	pH Optimum	
6.1-6.8	**6.4**	
Temperature Range	Temperature Optimum	

Remarks
HA also produced in supernatant fluid of infected BHK cells, using 1 day-old chick erythrocytes (28). * NT antibody developed in inoculated rhesus (Macaca mulatta) monkey.

Serologic Methods Recommended
HI, CF, and NT

Footnotes
HA also produced in supernatant fluid of infected BHK cells, using 1 day-old chick erythrocytes (28). * NT antibody developed in inoculated rhesus (Macaca mulatta) monkey.

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

Ilheus belongs in Group B and in the original study by Casals [4] was found to be more closely related to West Nile, Japanese B and St. Louis than to any of the then-classified members of the group. For subsequent studies and relation to other Group B members, refer to the Catalogue cards of viruses in this group.
As far as is known at present, it is not related to any viruses not classified in Group B.

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (M)(LV)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn and weanling mice; rhesus monkey and primary hamster kidney cell culture

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)	

CPE in HeLa (20) primary GP and hamster kidney cells (25,28), CPE and plaques in primary rhesus monkey kidney cells (26), plaques in pig kidney (31,32), BHK-21 cells, plaques in Vero and LLC-MK2 cells (46). No CPE, plaques in primary chick embryo (25,26) plaques (in bottles) in primary chick embryo cell culture (22).

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	3		Belem, Brazil (5,39)
Man		36% NT	Amazon, Brazil (7)
Man	3	31% NT	Trinidad (6,8)
Man	1	3.4% NT	Foothills, Colombia, (9,23)
Man		15% NT	Valley, Colombia (9) Argentina (42)
Man	1		
Man	1	15% NT	Panama (24) Belem, Brazil (30)
Monkeys (Sentinel Cebus)	2		
Monkeys (Sentinel Cebus)		8/287 NT	Venezuela (36)
Monkeys (Sentinel Cebus)		58/89 NT	Peru (43)
Rodents, marsupials, edentates, cattle, equines, pigs, reptiles	0	10% HI	(Tamarin) Amazon, Brazil(30)
		10% HI	(Rodents) Belem, Brazil(30)
Birds	7		Trinidad (12,41,45)
Birds	3		Panama (10,11)
Mosquitoes: Numerous isolations from species of Psorophora (most frequent) Aedes, Culex, Sabethes Haemagogus, Coquillettidia, Wyeomia, Trichoprosopon			Brazil (1,5,30);Colombia (13,44); Panama; Honduras; Panama; Honduras; Guatamala (10,14); Trinidad; Colombia (13,44)

Additional antibody surveys: Nectomys, 2/4 NT, Panama; Sigmodon, 1/42 NT, Panama; marsupials, 15% HI,Belem, Brazil (30); Bradypus, 4% HI, Belem, Brazil (30); Cattle, 23/206 HI, Para, Brazil; equines, 35% HI, South Brazil (35); pigs, 9/745 NT, Para, Brazil; reptiles, 4/13 HI, Belem, Brazil (30); birds, 7% NT, 15% NT Trinidad (21), Panama (10); Columbigallina 11% HI, Belem, Brazil (30).

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)		ic 0.03	Death (2)	5.0	8.9
Mice (nb)		ip 0.03	Death	5.7	8.7
Mice (nb)		sc			
Mice (wn)		ic 0.03	Death	5.3	8.2
Mice (wn)		ip 0.03	Death		3.3
man (ad)		sc	Viremia, fever (17)		
monkeys		ic 0.06	Viremia, occasional death antibody (2)		
		sc 1.0			
rodents		ic 0.06	Viremia, antibody		
		sc 1.0	production (2)		
rabbits		ic 0.06	Viremia, antibody production(2)		
marsupials		ic 0.06-6.0	Viremia (2)		
		sc 1.0-2.0	Viremia (2)		
birds		ic 0.03	Little viremia, no antibody produced(2)		
bats		ic 0.03	Viremia, no tests done for antibody(2)		
eggs (10 day)		ys 0.03	Death (2,19)	4+	5.8

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 aegypti, Ae serratus and Ps ferox infected by feeding, trans. by bite to infant mice (1). Above 3 species plus Ae scapularis, Cx fatigans, and Ps albipes infected by inoc.; trans. by bite to infant mice and chicks (27).									

Section X - Histopathology

Character of lesions (specify host)
In mice, common type virus encephalitis. Nothing noteworthy in other animals.

Inclusion Bodies — Intranuclear

Organs/Tissues Affected

Category of tropism

Section XI - Human Disease

In Nature — Residual — Death
Reported

Subclinical — Overt Disease
Reported

Clinical Manifestations
Fever (R), headache (R), prostration (R), myalgia (R), arthralgia (R), CNS signs (including encephalitis) (R), respiratory involvement (R), CNS pleocytosis (R). Other significant symptoms: Photophobia.

Number of Cases

Category (i.e. febrile illness, etc.)
Febrile illness; encephalitis (qestionable)

Section XII - Geographic Distribution

Known (Virus detected)
Brazil, Trinidad, Colombia, Panama, Honduras, Guatamala, Argentina

Suspected (Antibody only detected)
In view of cross-reactions with other group B viruses, serology difficult to interpret. Thus, findings of NT antibody in Malaya (37), Thailand (37), Philippines (38) probably represent heterologous reactions

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Remarks