Virus Name: Cowbone Ridge	Abbreviation: CRV

Status
Probably not 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
W-10986

Accession Number

Original Date Submitted
10/22/1984

Family
Flaviviridae

Genus
Flavivirus

Information From
Arbovirology Unit (1)

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

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Dr. John Davie

Isolated at Institute
CDC, Atlanta, Georgia

Host Genus
Sigmodon hispidus (cotton rat)

Species

Host Age/Stage
Adult

Sex
Male

Isolated From	Isolation Details
Organs/Tissues	**Heart and lung pool**

Signs and Symptoms of Illness
None

Arthropod

Time Held Alive before Inoculation

Collection Method
Box trap

Collection Date
1/10/1965

Place Collected (Minimum of City, State, Country)
Cowbone, Hendry County, Florida, USA

Latitude
26° 17' N

Longitude
81° 5' W

Macrohabitat
Elevation=<25 feet; slash pine, palmettos, shrubs, grasses

Microhabitat
Open sandy grassland, planted to slash pine; limestone outcrops

Method of Storage until Inoculated
At -50dC in mechanical freezer

Footnotes

Section III - Method of Isolation

Inoculation Date
3/8/1965

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
Yes

Other Reasons
Isolation from serum specimen from same cotton rat; no virus of this type in laboratory before.

Homologous Antibody Formation by Source Animal
Not tested

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) **1:5**	After Treatment Titer **3.2 dex**	Control Titer **5.5 dex**
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) **1:100**	After Treatment Titer **<2.0 dex**	Control Titer **8.5 dex**

Other (formalin, radiation)

Virion Morphology

Shape	Dimensions **38 nm**	
Mean nm	Range nm	
Measurement Method **Electron microscopy**	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**	**Goose**
pH Range	pH Optimum	
5.9-6.2	**6.0**	
Temperature Range	Temperature Optimum	
4dC - 37dC	**37dC**	

Remarks
Thus far only low titer hemagglutinin has been produced.

Serologic Methods Recommended
HI, CF, NT

Footnotes
Thus far only low titer hemagglutinin has been produced.

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

	Cowbone Antigen				Cowbone Ascitic Fluid			
	HI		CF	NT	HI		CF	NT
	Ht/Ho	Ratio	Ht/Ho	Ht/Ho	Ht/Ho	Ratio	Ht/Ho	Ht/Ho
Cowbone	320	1:1	32	4.3 *	320	1:1	32	4.3 *
Dengue I	10/40	1:4	<8/32		<10/320	0	<8/32	
Dengue II	20/160	1:8	<8/32	0.6/3.5	10/320	1:32	<8/32	1.8/4.3
Dengue III	10/20	1:2	<8/32		<10/320	0	<8/32	
Dengue IV	10/80	1:8	<8/32		10/320	1:32	<8/32	
SLE	160/640	1:4	<8/51	2.5/4.8	20/320	1:16	8/32	4.6/4.3
MVE	40/160	1:4	<8/32		40/320	1:8	<8/32	
Ilheus	40/640	1:16	<8/32	1.2/4.0	40/320	1:8	<8/32	2.7/4.3
Yellow fever	10/80	1:8	<8/32	0.8/>4.5	10/320	1:32	<8/32	1.5/4.3
West Nile	40/160	1:4	<8/64	1.3/>4.5	10/320	1:32	<8/32	4.7/4.3
JBE	40/640	1:16	<8/64		40/320	1:8	<8/32	
Modoc	40/640	1:16	<8/64	1.3/>4.7	80/320	1:4	16/32	>4.8/4.3
Rio Bravo	<10/40	0	<8/32	0/>5.5	10/320	1:32	<8/32	2.1/4.3
Bussuquara	40/160	1:4	<8/256	0.2/>2.7	40/320	1:8	<8/32	3.8/4.3
Powassan	<10/40	0	-		<10/320	0	-	

* LNI in dex

Cross immunity tests: Not related by HI or CF to EEE, WEE, California, Tensaw, Flanders, Bwamba, Anopheles A, Anopheles B, Turlock, Buttonwillow, Tacaribe, Sicilian Sandfly fever or Oropouche.

Recent cross-neutralization studies have placed Cowbone Ridge in a complex containing the additional flaviviruses Modoc, Sal Vieja, Jutiapa and San Perlita viruses [2] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Heart (LV), lung (LV)

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)	
CRKL	SMB 4		No CPE						
HeLa (CL)			No CPE						
BHK-21 (CL)			No CPE						
GMK (CL)			No CPE						
Vero (CL)			No CPE						
Vero (CL)	SMB 7				12	Plaques	4.2* (3)		
LLC-MK2 (CL)					6	Plaques	5.0 (3)		
Duck embryo(PC)						No plaques	<3.0 (3)		
Duck embryo(PC)	SMB 4		No CPE						
L. cells (CL)					10-14	Plaques	6.1		

* 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
Mosquitoes	0/225,000		Hendry and Collier Co., S. Florida
Cotton rat	1/298	11/298 HI,NT	
Cotton mouse (Peromyscus gossypinus)	0/210	1/210 HI,NT	
Rice rat (Oryzomys palustris)	0/17	0/17 HI	
Bobcat	0/29	0/29 HI	
Raccoon	0/73	0/73 HI	
Opossum	0/58	0/58 HI	
Cottontail rabbit	0/24	0/24 HI	
Deer	0/6	0/6 HI	
Amphibia	0/8	0/8 HI	
Birds	0/151	0/151 HI	
Horses	0/33	0/33 HI	

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)	SMB 4	ic 0.02	See below *	10	8.5
Mice (nb)		ip			
Mice (nb)		sc			
Mice (wn)		ic 0.03	None		
Mice (wn)		ip			
hamster (2 day)		ic 0.02	None		
rats (2 day)		ic 0.02	None		
rats (3 wk)		ic 0.02	None		

* Posterior paralysis of one or both limbs on day 7-9; increased respiration rate; motor nerve involvement. Dead or with symptoms 7-11 days after inoculation; death generally 1-2 days after symptoms appear.

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

Section X - Histopathology

Character of lesions (specify host)

Inclusion Bodies — Intranuclear

Organs/Tissues Affected

Category of tropism
Motor involvement with posterior paralysis and respiratory distress (nb mice).

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)
Florida, USA

Suspected (Antibody only detected)

Section XIII - References

1. Calisher, C.H., et al. 1969. Am. J. Epidem. 89:211-216.
2. Calisher, C.H., et al. 1984. To be submitted.
3. Varelas-Wesley, I. and Calisher, C.H. 1982. Am. J. Trop. Med. Hyg. 31:1273-1284.

Remarks