Virus Name: Mitchell River	Abbreviation: MRV

Status
Possible Arbovirus

Select Agent
No

SALS Level
2

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

Other Information

Antigenic Group
Warrego

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
MRM10434

Accession Number

Original Date Submitted
11/19/1984

Family
Reoviridae

Genus
Orbivirus

Information From
R.L. Doherty

Address
Queensland Institute of Medical Research, Brisbane, Q4006, Australia

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
R.L. Doherty, et al.

Isolated at Institute
Brisbane

Host Genus
Culicoides spp.

Species

Host Age/Stage
Adult

Sex
Female

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod

Time Held Alive before Inoculation

Collection Method
Truck trap

Collection Date
4/8/1969

Place Collected (Minimum of City, State, Country)
Mitchell River, Queensland, Australia

Latitude
15° 30' S

Longitude
141° 40' E

Macrohabitat
Low lying plain bordering Gulf of Carpentaria

Microhabitat
Arthropods taken on truck-trap route on edge of Arboriginal settlement

Method of Storage until Inoculated
5dC overnight on liquid nitrogen for transport, then in Revco at -60dC

Footnotes

Section III - Method of Isolation

Inoculation Date
5/29/1969

Animal (Details will be in Section 6)
nb mice

Route Inoculated
Intracerebral

Reisolation
No

Other Reasons
Distinct from virusespreviously isolated; antibody detected in cattle in area; evidence of multiplication in arthropods infected in laboratory

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) **50% final**	After Treatment Titer **5.6 dex**	Control Titer **5.8 dex**
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) **1:1000 final**	After Treatment Titer **2.3 dex**	Control Titer **3.5 dex**

Other (formalin, radiation)

Virion Morphology

Shape **Orbivirus morphology**	Dimensions **67 + 4 nm; 71 + 3 nm**
Mean nm	Range nm
Measurement Method	Surface Projections/Envelope

Nucleocapsid Dimensions,

Thin-section; neg. contrast EM (4)

Symmetry
Core=38+3 nm;spherical particles with obvious caps

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)
No	**SMB, blood ext. by sucrose-acetone followed by tr. with protamine, sonication, trypsin.**	**Goose**
pH Range **6.0-7.6**	pH Optimum	
Temperature Range	Temperature Optimum	

Remarks

Serologic Methods Recommended
CF, NT

Footnotes

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

Studies at Queensland Institute of Medical Research:

No antigenic relationship was detected by complement-fixation or neutraliza- tion tests between MRM10434 antigen or antiserum and the following arboviruses or suspected arboviruses isolated or available in Australia: Group A (Sindbis, Ross River, Getah, Bebaru); Group B (Murray Valley encephalitis, Kunjin, Kokobera, Edge Hill, Stratford, Alfuy, JBE, SLE, dengue types 1-4); Koongol group (Koongol, Wongal); Mapputta group (Mapputta, Trubanaman, MK7532); Quaranfil group (Abal); Simbu group (Akabane, Samford); Corriparta group (Corriparta); Eubenangee group (Eubenangee); others (Kowanyama, Almpiwar, Upolu, ephemeral fever, Belmont, Wallal, Charleville, Wongorr, Ngaingan and MRM 14556). Relationship to Warrego virus (Ch9935 strain); first observed by the International Reference Centre, was confirmed:

	MRM10434 Antigen			MRM10434 Immune Serum		
	CF		NT	CF		NT
Immune Serum, Antigen	Ht/Ho	Ratio	Ht/Ho	Ht/Ho	Ratio	Ht/Ho
Warrego	8/>128	1/>16	1.3/3.2	<8/64	<1/8	0.5/1.5

Studies at International Reference Centre, Yale Arbovirus Unit:

Comparison by complement-fixation test with 24 solvent-resistant arboviruses [3] showed two Australian strains Ch9935 and MRM10434 were related to each other but distinct from others tested.
Mitchell River virus was not closely related to other members of the Warrego serogroup by blot hybridization; it should be placed in the ungrouped set of orbiviruses [5] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (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)	
PS (CL)	SMB 5					Plaques	4.2*		
BHK-21 (CL)			CPE						
Vero (CL)			CPE						
VSW (CL)			CPE						

* 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
Culicoides spp	1/55,257		Mitchell River, Queensland, AS; 1969-70 (1).
Cattle		18/69 NT	Queensland, AS (1)
Wallaby		3/26 NT	
Kangaroo		1/25 NT	
Various vertebrate species		1/346 NT	

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 5	ic 0.015	Paralysis and death	4	8.9
Mice (nb)		ip 0.03	No overt signs of infection		<3.5
Mice (nb)		sc			
Mice (wn)		ic 0.03	None		<3.5
Mice (wn)		ip 0.1	Antibody production		

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, SMB 5	Intrathoracically inoculated with 0.0006ml = 0.8 LD50 per mosquito, virus content per mosquito assayed by titration in infant mice. No virus detected 0.5 and 1 days after inoculation; virus content increased from 2 days, reaching 5.0-5.4 LD50 per mosquito at 10-15 days (2).								

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

Clinical Manifestations

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

Section XII - Geographic Distribution

Known (Virus detected)
Australia

Suspected (Antibody only detected)

Section XIII - References

1. Doherty, R.L., et al. 1973. Trans. Roy. Soc. Trop. Med. Hyg. 67:536-543.
2. Carley, J.G., et al. 1973. J. Med. Ent. 10:244-249.
3. Borden, E.C., et al. 1971. J. Gen. Virol. 13:261-271.
4. Schnagl, R.D. and Holmes, I.H. 1971. Aust. J. Biol. Sci. 24:1151-1162.
5. Gonzalez, H.A. and Knudson, D.L., 1988. J. Gen. Virol. 69:125-134.

Remarks