

Status: Arbovirus

SALS Level: 2

Antigenic Group: A

Taxonomic status: *Alphavirus*

Other Information: None.

Select Agent:

SALS Basis: S

HEPA Filtration:

Section I - Full Virus Name and Prototype Number**Full Virus Name:**

Ross River

Prototype Number:

T48

Information from: R.L. Doherty

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Date:

1/5/1985

Address: Queensland Institute of Medical Research, Herston N9, Brisbane, Australia

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Reviewed by editor

Section II - Original Source**Isolated by:** R.L. Doherty, et al. (1)**at:** Brisbane**Genus and species:** *Aedes vigilax***Sentinel** X**Age/Stage:** Adult**Sex:** F**Isolated From****Isolation detail****Signs and symptoms of illness:**

Arthropod engorged depleted gravid

Time held alive before inoculation:**Collection date:** 2/1/1959 **Method:** Aspirated from man; light trap; resting sites**Place collected:** Townsville, Queensland, Australia**Latitude:** 19° 41' " S **Longitude:** 146° 51' " E**Macrohabitat:** East coastal plain of Queensland**Microhabitat:** In mangroves along the Ross River**Method of storage until inoculated:** Deep freeze at -15dC for 10 days; dry ice or Revco subsequently**Footnotes:****Section III - Method of Isolation and Validity****Inoculation Date:** 5/15/1963**Animal:** nb mice **Embryonated egg:** **Tissue Culture:**

(Details in Section VI - Biologic Char.)

Route inoculated: Intracerebral **Reisolation:** Yes**Other reasons:****Homologous antibody formation by source animal (See Section II):****Test used:** HI CF NT**Other:****Footnotes:**

Section IV - Virus Properties

Physicochemical:

RNA:	DNA:	Single Strand:	Double Strand:
Pieces:	Infectivity:	Sedimentation coefficient(s): /strong>	
Percentage wt. of virion protein		, lipid	carbohydrate
Virion polypeptides:			
Number:	Details:		
Non-virion polypeptides:			
Number:	Details:		
Virion density:			
Nucleocapsid density		Sedimentation coefficient:	Sedimentation coefficient:

Stability of infectivity (effects) pH

Lipid solvent:			
(ether)	After treatment titer	Control titer	
(chloroform) 1:400	After treatment titer <2 dex	Control titer 5.2 dex	
Detergent:			
(deoxycholate)	After treatment titer	Control titer	
Other (formalin, radiation):			

Virion morphology:

Shape	Dimensions 40-50 nm		
Mean (nm)	range (nm)	how measured	Electron microscopy (5)
Surface projections, envelope Envelope present			
Nucleocapsid dimensions, symmetry 30nm nucleocapsid morphologically			

Morphogenesis:

Site of constituent formation in cell
Site of virion assembly
Inclusion bodies
Other

Hemagglutination:

Hemagglutination	Yes	Antigen source	SMB, carcass, blood ext. by acetone-ether or sucrose-acetone + prot. tr.		
Erthrocytes	Goose	pH range	6.0-6.4	pH optimum	6.4
Temperature optimum	37dC	used routinely	range	Not tested	
Remarks Good antigens obtained by sucrose-acetone ext.of whole blood col. 48 hours after ip inoc. of SM with 4 dex LD50					
Serologic methods recommended HI, CF, NT					
Footnotes: Good antigens obtained by sucrose-acetone ext.of whole blood col. 48 hours after ip inoc. of SM with 4 dex LD50					

Section V - Antigenic Relationship And Lack of Relationship To Other Viruses

Immune Seras	T48 Antigen		
	HI Ht/Ho	CF Ht/Ho	NT Ht/Ho
Getah (N544)	20/40	16/64	3.6/>5.7
Bebaru (Amm2354)	20/80	<8/32	1.5/>5.3
Sindbis (MRM39)	20/80	<16/256	0.3/>5.0
Sagiyama (Mag 132)	40/320		

Antigens	T48 Mouse Antiserum		
	HI Ht/Ho	CF Ht/Ho	NT Ht/Ho
Getah (N544)	<10/160	8/64	3.6/>4.6
Bebaru (AMM2354)	<10/160	<8/64	2.4/>4.6
Sindbis (MRM39)	<10/160	8/64	1.0/>4.6
Sagiyama (A588)	40/320		

Relationships by HI with other Group A viruses are shown in the table below:

Serum	Antigen		
	T48	Mayaro	Semliki
T48	5120	40	80
Mayaro	5120	20480 or +	
Semliki	2560		20480 or +

Serum titers: 4-8 units of antigen.

By permission of the Director, Rockefeller Foundation Virus Laboratory. 1963.

SIRACA virus considers Ross River virus to be a subtype of Getah virus [23].

Section VI - Biologic Characteristics

Virus source (all VERTEBRATE isolates): Blood (M)(LV), heart (LV)

Lab Methods of Virus Recovery (ALL ISOLATIONS): Newborn mice

Susceptibility of Cell Culture Systems:

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)			CPE			Plaques (9)		
BHK-21 (CL)	MB 3	1	4+	8.8* (10)				
Vero (CL)	MB 9				2	10 mm	7.0* (11)	
LLC-MK2 (CL)					5	11 mm	6.2 (11)	

* Expressed in dex

Section VII - Natural Host Range

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Aedes vigilax	1/9 pools (687 mosquitoes)		Townsville, Australia; 1959
Aedes normanensis	1		West N.S.W., Australia (21)
Culex annulirostris	3/12,667		Mitchell River, Australia; 1967-1968(7)
Aedes vigilax, Culex spp.	11		Nelson Bay, N.S.W., Australia (14)
Grallina cyanoleuca (bird)	1/9		Mitchell River, Australia; 1965 (6)
Microeca fascinans (bird)	1/9		
Wallabia agilis	2/150		Mitchell River, Australia; 1968 (7)
Man (blood)	1		Queensland, Australia; (15)
Anopheles amictus	1		Charleville, Kowanyama Australia (21)
Mansonia uniformis	1		
Man (serum)	1		American Samoa (20)
Man		44%/393 NT	
Dogs		20%/45 NT	
Pigs		13%/27 NT	
Horses		42/53 * HI	No. Victoria, Australia (22)
Horses		18/25 HI	

Antibody reacting to Ross River virus appears to be widespread in mammals in Queensland but rare (and of doubtful significance) in birds (4,7,8). Group A antibody in sera from patients with epidemic polyarthritis react by HI and CF to RR more frequently and to higher titer than to Getah, Bebaru or Sindbis (1,2).

* Horses clinically affected with an equine nervous disease (22).

Section VIII - Susceptibility To Experimental Infection (Record Viremia)

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log10/ml		
Mice (nb)	SM 4	ic 0.01	Death	3	7.9		
Mice (nb)		ip 0.03	Death	3-4	8.0		
Mice (nb)		sc					
Mice (wn)		ic 0.03	No deaths at 10-2 dilution				
Mice (wn)		ip 0.03	No deaths; antibody formation				
sheep	SM 25	6.2 LD50	Low viremia (18)				
pigs (4 wk)	SM 85		Viremia (18)				
rabbits, rats, bandicoots, marsupial, mice, day-old chicks			Viremia (12)				
Adult fowl, pigeons			None (12)				

Section IX - Experimental Arthropod Infection And Transmission

Arthropod species & virus source(a)	Method of Infection log10/ml (b)		Incubation period (c) Days	Transmision by bite (d)		Assay of arthropod, log10/ml (e)			
	Feeding	Injected		°C	Host	Ratio	Whole	Organ	
Culex quinquefasciatus Intrathoracic inoculation; virus titrated by inoculation of suckling mice; 3.5/mosq. at 25 days(3).									
Infected by membrane feeding, subsequent transmission by feeding (19).									

Section X - Histopathology

Character of lesions: sm, ic: late thinning of cerebral cortex, muscle necrosis, lesions in brown fat; myocardial necrosis. Necrosis of ependymal cells, hydrocephalus (16,17).

Inclusion bodies:

Cytoplasmic:(M) (LV)

Intranuclear: (M)

(LV)

Organs-tissues affected: Brain (LV), heart (LV)

Category of tropism:

Section XI - Human Disease

Human disease: In nature: (S) X

Death: (S) (R)

Residua: (S) (R)

Laboratory infections: Subclinical: (S) (R)

Overt Disease: (S) (R)

Clinical manifestations: Fever(S), headache(S), arthralgia(S), rash (S),lymphadenopathy (S)

Category: Febrile illness with rash **No. of cases:** More than 100 (2,13)**

Section XII - Geographic Distribution

Known (virus):

Australia; American Samoa (20)

Suspected (antibody):

Tasmania (23), Sepik District, New Guinea (14).

Section XIII - References

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Section XIV - Remarks

** Accumulated serological evidence firmly relates Ross River virus to epidemic polyarthritis in Australia.