

Virus Name: Koongol		Abbreviation: KOOV
Status Probable Arbovirus	Select Agent No	SALS Level 2
SALS Basis Results of SALS surveys and information from the Catalogue.		
Other Information		
Antigenic Group Bunyavirus		

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation MRM31	Accession Number	Original Date Submitted 1/5/1985
Family Bunyaviridae	Genus Bunyavirus	
Information From R.L. Doherty	Address Queensland Institute of Medical Research, Herston N9, Queensland, Australia	
Information Footnote Reviewed by editor		

Section II - Original Source

Isolated By (name) Doherty, et al (1)	Isolated at Institute Brisbane	
Host Genus Culex annulirostris	Species	Host Age/Stage Adult
Sex Female		
<u>Isolated From</u>	<u>Isolation Details</u>	
Signs and Symptoms of Illness	Arthropod	
Time Held Alive before Inoculation		
Collection Method Aspirated from man or horse	Collection Date 4/2/1960	
Place Collected (Minimum of City, State, Country) Mitchell River Mission, Australia		
Latitude 15° 30' S	Longitude 141° 40' E	
Macrohabitat Low-lying plain bordering Gulf of Carpentaria; open forest- grassland	Microhabitat On bank of creek near aboriginal mission	Method of Storage until Inoculated Dry ice and Revco
Footnotes		

Section III - Method of Isolation

Inoculation Date
4/27/1960

Animal (Details will be in Section 6)
nb mice

Route Inoculated Intracerebral	Reisolation Yes
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Other Reasons
Other isolations in the same area

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) 1:500	After Treatment Titer <2.0 dex	Control Titer 5.8 dex
Other (formalin, radiation)		

Virion Morphology

Shape Bunyavirus-like (4)	Dimensions 90-95 nm	
Mean nm	Range nm	
Measurement Method Electron microscopy (4)	Surface Projections/Envelope Envelope observed	Nucleocapsid Dimensions, Symmetry

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Inclusion Bodies	Other	

Hemagglutination

Hemagglutination Yes	Antigen Source SMB ext. by sucrose-acetone	Erythrocytes (species used) Goose
pH Range 5.8-6.2	pH Optimum 6.0	
Temperature Range Not tested	Temperature Optimum 37dC used routinely	

Remarks
The MRM97 and MRM150 strains yield higher titre HA than the prototype.

Serologic Methods Recommended
HI, CF, NT

Footnotes
The MRM97 and MRM150 strains yield higher titre HA than the prototype.

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

Studies in Brisbane [1] showed no relation to MVE, Kunjin, Kokobera, Edge Hill, Stratford, Getah, Bebaru, Sindbis, Corriparta and Mapputta. A relationship to Wongal (MRM168) was demonstrated.

Immune Serum	Koongol (MRM97) antigen					Antigen	Koongol mouse serum				
	HI		CF		NT		HI		CF		NT
	Ht/Ho	Ratio	Ht/Ho	Ratio	Ht/Ho		Ht/Ho	Ratio	Ht/Ho	Ratio	Ht/Ho
Wongal	10/40	1/4	8/16	1/2	<1.8/3.3	Wongal	10/640	1/64	8/16	1/2	1.4/3.3

NT: LNI in dex

Detailed studies at the Rockefeller Foundation Virus Laboratories confirmed the relationship of Koongol and Wongal and found no evidence of relationship of Koongol to groups A, B, C or Bunyamwera, and to: Kairi, Guama, Catu, Anopheles A, Simbu, Colorado tick fever, SF Sicilian, SF Naples, Rift Valley fever (Lunyo), Tacaiuma, Witwatersrand, Ketapang and Bakau. A questionable reaction with Pongola was checked, and no reaction found with Pongola or Bwamba by HI, or with Bwamba by CF. No reaction to Guaroa, California encephalitis, Wyeomyia. Koongol has been placed in the Bunyamwera Supergroup [10].

Virus Source (all VERTEBRATE isolates)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Newborn mice

Cell system (a)	Virus passage history (b)	Evidence of Infection						
		CPE			PLAQUES			Growth Without CPE +/- (g)
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)	
BHK-21 (CL)	MB 7	2	4+	8.5* (8)				
Vero (CL)	P-1				15	1 mm	4.7* (9)	
LLC-MK2 (CL)					10	2 mm	3.0 (9)	

CPE has been produced in BHK-21 (8) and plaques in Vero (9) cell lines, but unpublished studies at QIMR have given no usable cell culture system in these or PS cells.

* Expressed in dex

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Culex annulirostris	7/6,703		Mitchell R., Queensland, AS; 1960
Culex annulirostris	1/753		Mitchell R., Queensland, AS; 1963
Culex annulirostris	1/970		Normanton, Queensland, AS; 1961
Anopheles bancroftii	1*		
Anopheles farauti	1*		
Animals and birds		See below	
Ficalbia spp. (pool of 7)	1		Joinjakaka, Sepik Dist. New Guinea(11)

* Single unrepeatable isolations of uncertain significance

Low titre HI reactions have been found in cattle (5,6), domestic fowl (6,7), Wallabies (6), wild birds (6), and bandicoots (6), but confirmation has not been obtained by 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 log ₁₀ /ml
Mice (nb)	SMB 4 (MRM31)	ic 0.01	Death	5.0	7.9
Mice (nb)		ip 0.03	None		
Mice (nb)		sc			
Mice (wn)		ic 0.03	Death	10.1	6.7
Mice (wn)		ip 0.03	Antibody production only		
embryonated egg (7 days)		ys 0.01	None		
	CAM 0.05	Irregular pock production to 10 ⁻⁵ dilution (2)			

Section IX - Experimental Arthropod Infection and Transmission

Arthropod species & virus source(a)	Method of Infection log ₁₀ /ml (b)		Incubation period (c)		Transmission by bite (d)		Assay of arthropod, log ₁₀ /ml (e)		
	Feeding	Injected	Days	°C	Host	Ratio	Whole	Organ	System
Culex quinquefasciatus:	Adult mosquitoes intrathoracically inoculated; virus content of mosquitoes titrated in mice. 3.2/mosquito at 15 days (3). Adults exposed to virus by membrane feeding; 1.87/mosquito at 12-20 days (2.6 after feeding) (3).								

Section X - Histopathology

Character of lesions (specify host)		
<u>Inclusion Bodies</u>	<u>Intranuclear</u>	
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, New Guinea
Suspected (Antibody only detected)

Section XIII - References

<ol style="list-style-type: none">1. Doherty, R.L., et al. 1963. Aust. J. Exp. Biol. Med. Sci. 41:17-40.2. Carley, J.G. Personal communication. 1963.3. Standfast, H.A. and Carley, J.G. Personal communication. 1963.4. Holmes, I.H. Personal communication. 1971.5. Sanderson, C.J. 1969. AM. J. Trop. Med. Hyg. 18:433-439.6. Doherty, R.L., et al. 1970. Trans. R. Soc. Trop. Med. Hyg. 64:748-753.7. Doherty, R.L., et al. 1970. Trans. Ro. Sco. Trop. Med. Hyg. 64:740-747.8. Karabatsos, N. and Buckley, S.M. 1967. Am. J. Trop. Med. Hyg. 16:99-105.9. Stim, T.B. 1969. J. Gen. Virol. 5:329-338.10. Casals, J. 1963. Anais de Microbiologia, XI (Parte A):13-34.11. Marshall, I.D. Personal communication. 1971.

Remarks
