Virus Name: O'nyong-nyong	Abbreviation: ONNV

Status
Arbovirus

Select Agent
No

SALS Level
2

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

Other Information
Hepa Filtration

Antigenic Group
A

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
Ang'mom reisolate

Accession Number

Original Date Submitted
2/3/1985

Family
Togaviridae

Genus
Alphavirus

Information From
M.C. Williams and J.P. Woodall

Address
YARU, Yale University School of Medicine, New Haven, Connecticut 06510, USA

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Williams and Woodall (1)

Isolated at Institute
Entebbe, Uganda

Host Genus
Man (Acholi tribe)

Species

Host Age/Stage
40 years

Sex
Female

Isolated From	Isolation Details
Serum/Plasma	

Signs and Symptoms of Illness
Fever (102F), severe joint pains, backache, headache, anorexia

Arthropod

Time Held Alive before Inoculation

Collection Method
Venipuncture with vacutainer

Collection Date
6/16/1959

Place Collected (Minimum of City, State, Country)
Bobi dispensary, Acholi, Uganda

Latitude
2° 34' N

Longitude
32° 21' E

Macrohabitat
Wooded savannah with cultivation; over 3000 ft. ASL

Microhabitat

Method of Storage until Inoculated
Vacutainer on water ice for 24 hours

Footnotes

Section III - Method of Isolation

Inoculation Date
7/17/1959

Animal (Details will be in Section 6)
nb mice

Route Inoculated
ic, ip and sc

Reisolation
Yes

Other Reasons

Homologous Antibody Formation by Source Animal
Yes

Test(s) Used
HI, NT

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) **1:1**	After Treatment Titer **4.7 dex**	Control Titer **6.7 dex**
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate)	After Treatment Titer	Control Titer

Other (formalin, radiation)

Virion Morphology

Shape	Dimensions	
Mean nm	Range nm	
Measurement Method	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 + protamine**	**Goose**
pH Range	pH Optimum	
5.9-6.2	**6.1**	
Temperature Range	Temperature Optimum	
	Used at room temp	

Remarks

Serologic Methods Recommended
HI, CF, NT, plaque-inhibition test

Footnotes

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

	Ang'mom Reisolate Antigen					Ang'mom Reisolate Imm. Serum				
	HI		CF		PI	HI		CF		PI
Immune Sera or Antigens/viruses	Ht/Ho	Ratio	Ht/Ho	Ratio		Ht/Ho	Ratio	Ht/Ho	Ratio	
Chikungunya	160/320	1/2	64/256	1/4	20	20/2560	1/128	<8/128	<1/16	0
Semliki(1 inj)	<20/2560	<1/128	<8/256	<1/32	7	<20/2560	<1/128	<8/128	<1/16	0
Semliki(6 inj)					20					
Sindbis	<20/1280	<1/64			0	<20/2560	<1/128			0
Middelburg	<20/320	<1/16			0	<20/2560	<1/128			0

Except for the plaque-inhibition results for chikungunya virus and antibody, all others were obtained with the MP 30 (Gulu) strain, not the prototype.
PI: Plaque inhibition: zone diam. in mm.

Antisera: prototype, chikungunya and Sindbis - mouse, 1 inoc. bled at 14 days Semliki and Middelburg - guinea pig.

Rabbit antisera, and multiple inoculation mouse antisera, to ONN inhibit chikungunya plaques to a similar degree.

SIRACA has antigenically classified ONN virus as a subtype of chikungunya virus. Both viruses have been placed in the Semliki Forest virus complex of serogroup A [7] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (M)

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)	
Chick embryo (PC)	Various				3-5	Plaques	7.3** (5)		
Hela (CL)			CPE (15)						
BHK-21 (CL)	MP 30, SMB 8	2	CPE	8.5** (15)					
Vero (CL)	MP 30,P-9				2	13 mm	7.2 (18)		
LLC-MK2 (CL)					4	1 mm	8.3 (18)		
Ae albopictus (CL)			Multiplication (16)						
Ae aegypti (CL)			Multiplication (16)						
An stephansi (CL)			Multiplication (17)						

** 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
Man	34/>200	up to 95% HI+	Uganda (1, 5, 11)
Man	3/7	up to 70% HI	Tanzania (10, 11)
Man	4/8	38/78 HI	Malawi (11)
Man	7/32	up to 51% HI	Kenya (11)
Man		up to 55% HI	Senegal (13)
Man		25/40 HI	Mozambique (11)
Sentinel infant mice	1		Senegal (12)
Anopheles funestus	22/3,654		Uganda (4, 11)
Anopheles funestus	17/2,130		Kenya (11)
An gambiae	8/5,299		Uganda (4, 11)
An gambiae	7/1,634		Kenya (11)

Human convalescent sera will protect against chikungunya as well as o'nyong-nyong (5), so that a higher titre in the HI test is the only reliable method of distinguishing the two infections.

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)	P-6	ic 0.01	Death (1)	3-4	8.5
Mice (nb)	P-7	ip 0.02	Scattered deaths		
Mice (nb)		sc			
Mice (wn)	P-6	ic 0.03	Antibody		
Mice (wn)	P-6	ip 0.03	Antibody		
Mice (nb)	P-<6	ic,ip,ic 0.03	Alopecia, paralysis, sickness, runting, occasional death, antibody prod. (1,6)		
hamster (yg)	P-9	ip 0.1	Antibody		
chicks (wet)	P-10		Viremia		

Several brain passages from mice with runting and/or alopecia on days 5-7 are required before the virus becomes fully mouse-adapted.

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
An funestus	Osege, P-6 following ingestion, transmitted after 8 days to hanging drop (11)								
An gambiae	Acute human serum; following ingestion, transmitted after 9 days to mice								
An quadrimaculatus	MP 30; following ingestion; no infection or transmission detected (8)								
An quadrimaculatus	MP 30; haemocoele; serial passage successful (9)								
Ae aegypti	MP 30; haemocoele; serial passage successful (9)								
Ae aegypti	Osege; passage 6; following ingestion, no virus recoverable by mouse inoc. (11)								
Cx quinquefasciatus	MP 30; haemocoele; serial passage successful (9)								

Section X - Histopathology

Character of lesions (specify host)

Inclusion Bodies — Intranuclear

Organs/Tissues Affected

Category of tropism

Section XI - Human Disease

In Nature
Significant

Residual
Reported

Death

Subclinical

Overt Disease

Clinical Manifestations
Fever (S), headache (R), prostration (R), myalgia (R), arthralgia (S), respiratory involvement (R), rash (S), lymphadenopathy (S)

Number of Cases
Hundreds (3, 9,11)

Category (i.e. febrile illness, etc.)
Febrile illness with rash

Section XII - Geographic Distribution

Known (Virus detected)
Africa: Uganda, Kenya, Tanzania, Malawi, Senegal

Suspected (Antibody only detected)
Africa: Mozambique

Section XIII - References

1. Williams, M.C. and Woodall, J.P. 1961. Trans. R. Soc. Trop. Med. Hyg. 55:135-141.
2. Haddow, A.J., et al. 1960. Ibid. 54:517-522.
3. Shore, H. 1961. Ibid. 55:361-373.
4. Corbet, P.S., et al. 1961. Ibid. 55:463-480.
5. Williams, M.C., et al. 1962. Ibid. 56:166-172.
6. Walker, G.M., et al. 1962. Ibid 56:496-503.
7. Calisher, C.H., et al. 1980. Intervirology 14:229-232.
8. Philip, C.B., et al. Personal communication.
9. Whitman, L. Personal communication.
10. Williams, M.C., et al. 1964. E. Afr. Med. J. 41:271-275.
11. E. Afr. Virus Res. Inst. Reports 1959-63.
12. Bres, P. Personal communication.
13. Bres, P., et al. 1963. Bull. Soc. Path. Exot. 56:384-402.
14. Buckley, S.M. 1964. Proc. Soc. Exp. Biol. 116:354-358.
15. Karabatsos, N. and Buckley, S.M. 1967. Am. J. Trop. Med. Hyg. 16:99-105.
16. Singh, K.R.P. 1972. Adv. Virus Res. 17:187-206.
17. Buckley, S.M. Personal communication. 1972.
18. Stim, T.B. 1969. J. Gen. Virol. 5:329-338.

Remarks

The reisolate strain has been designated the prototype because it became mouse-adapted before the original strain, and most work has been done with it. The designation "Gulu" found in some publications refers to the MP 30 strain from Anopheles gambiae.