Virus Name: **O'nyong-nyong** **Abbreviation:** **ONNV**

Status: Arbovirus
SALS Level: 2
Antigenic Group: A
Taxonomic status: *Alphavirus*
Other Information: None.

Select Agent:
SALS Basis: S

HEPA Filtration: Yes

Section I - Full Virus Name and Prototype Number

Full Virus Name:
O'nyong-nyong

Prototype Number:
Ang'mom reisolate

Information from: M.C. Williams and J.P. Woodall *

Date: 2/3/1985

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

Reviewed by editor

Section II - Original Source

Isolated by: Williams and Woodall (1) **at:** Entebbe, Uganda
Genus and species: Man (Acholi tribe) **Sentinel** X
Age/Stage: 40 years **Sex:** F

Isolated From	Isolation detail

Signs and symptoms of illness: Fever (102F), severe joint pains, backache, headache, anorexia
Arthropod engorged **depleted** **gravid**
Time held alive before inoculation:
Collection date: 6/16/1959 **Method:** Venipuncture with vacutainer
Place collected: Bobi dispensary, Acholi, Uganda
Latitude: 2° ’ ” 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 and Validity

Inoculation Date: 7/17/1959
Animal: nb mice **Embryonated egg:** **Tissue Culture:**
(Details in Section VI - Biologic Char.)
Route inoculated: ic, ip and sc **Reisolation:** Yes
Other reasons:
Homologous antibody formation by *source animal* (See Section II): Yes
Test used: HI X **CF** **NT** X
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:
Sedimentation coefficient:
Nucleocapsid density **Sedimentation coefficient:**

Stability of infectivity **(effects) pH**
Lipid solvent:
(ether) 1:1 **After treatment titer** 4.7 dex **Control titer** 6.7 dex
(chloroform) **After treatment titer** **Control titer**
Detergent:
(deoxycholate) **After treatment titer** **Control titer**
Other (formalin, radiation):

Virion morphology:
Shape **Dimensions**
Mean (nm) **range (nm)** **how meansured**
Surface projections, envelope
Nucleocapsid dimensions, symmetry

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

Hemaggiutination:
HemaggiutinationYes **Antigen source** SMB ext. by sucrose-acetone + protamine
Erthrocytes Goose **pH range** 5.9-6.2 **pH optimum** 6.1
Temperature optimum Used at room temp**range**
Remarks
Serologic methods recommended HI, CF, NT, plaque-inhibition test
Footnotes:

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

Immune Sera or Antigens/viruses	Ang'mom Reisolate Antigen					Ang'mom Reisolate Imm. Serum				
	HI		CF		PI	HI		CF		PI
	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
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)	
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

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Man	/>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	7/1,6		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 (Record 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:
Inclusion bodies:
Cytoplasmic:(M) (LV) Intranuclear: (M) (LV)
Organs-tissues affected:
Category of tropism:

Section XI - Human Disease

Human disease:	**In nature:**	**(S)** X	
	Death:	**(S)**	**(R)**
	Residua:	**(S)**	**(R)** X
Laboratory infections:	**Subclinical:**	**(S)**	**(R)**
	Overt Disease:	**(S)**	**(R)**

Clinical manifestations: Fever (S), headache (R), prostration (R), myalgia (R), arthralgia (S), respiratory involvement (R), rash (S), lymphadenopathy (S)
Category: Febrile illness with rash **No. of cases:** Hundreds (3, 9,11)

Section XII - Geographic Distribution

Known (virus):
Africa: Uganda, Kenya, Tanzania, Malawi, Senegal
Suspected (antibody):
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.

Section XIV - 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.