

Virus Name: Thogoto		Abbreviation: THOV
Status Probable Arbovirus	Select Agent No	SALS Level 3
SALS Basis Results of SALS surveys and information from the Catalogue.		
Other Information		
Antigenic Group Thogoto		

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation IIA	Accession Number	Original Date Submitted 2/18/1985
Family Orthomyxoviridae	Genus Not listed	
Information From J.P. Woodall	Address YARU, Yale University Sch. Med., New Haven, Connecticut 06510	
Information Footnote Reviewed by editor		

Section II - Original Source

Isolated By (name) D.A. Haig and D. Danskin (1)	Isolated at Institute Veterinary Research Lab., Kabete, Kenya	
Host Genus Boophilus and Rhipicephalus ticks	Species	Host Age/Stage Adult
Sex Not Answered		
<u>Isolated From</u>	<u>Isolation Details</u>	
Signs and Symptoms of Illness	Arthropod	
Time Held Alive before Inoculation		
Collection Method Manual removal from cattle	Collection Date 9/6/1960	
Place Collected (Minimum of City, State, Country) Thogoto forest, near Nairobi, Kenya		
Latitude 1° 15' S	Longitude 36° 40' E	
Macrohabitat Forest ca. 5600 feet A.S.L.	Microhabitat Sentinel cattle	Method of Storage until Inoculated Held alive
Footnotes		

Section III - Method of Isolation

Inoculation Date
9/9/1960

Animal (Details will be in Section 6)
nb mice

Route Inoculated Intracerebral	Reisolation No
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Other Reasons
Unrelated to any other virus 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 Morphologically, morphogenetically and structurally resemble Orthomyxoviridae (18.	
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 <1.5 dex	Control Titer 5.3 dex
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate)	After Treatment Titer	Control Titer

Other (formalin, radiation)

Virion Morphology

Shape	Dimensions <250 nm	
Mean nm	Range nm	
Measurement Method Gradocol filtration	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

Hemagglutination Antigen Source Erythrocytes (species used)
Yes **SM liver ext. by sucrose-acetone; acetone-ether; flourocarbon** **Goose**

pH Range pH Optimum
5.8-5.9

Temperature Range Temperature Optimum
4dC

Remarks
HA antigens also prepared by PEG precipitation of infective BHK-21 cell cult. fluids (19)

Serologic Methods Recommended
HI, CF, NT

Footnotes
HA antigens also prepared by PEG precipitation of infective BHK-21 cell cult. fluids (19)

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

No reaction with antigen (A), immune serum (I), or both (X) of viruses listed:

	HI	CF	PT		HI	CF	PT		HI	CF	PT
Group A				Group B (cont)				Others (cont)			
Aura	A			Entebbe bat	I		I	Lagos bat		I	
Bebaru	A			Group C				Mossuril		I	
Chikungunya	X		I	Apeu			I	Nyando		640/256	I
EEE	A	A		Caraparu	A			RVF			I
Getah	A			Marituba	A			SF Sicilian	A		
Mayaro	A			Oriboca	A		I	Witwatersrand	A	I	I
Middelburg	X		I	Bunyamwera gr				Wad Medani		256/64	
Ndumu	I			Bunyamwera	X		I	Chenuda		64/64	
O'Nyong-Nyong	I		I	Germiston	X		I	CTF		64/128	
Semliki	X		I	Ilesha	X		I	Dalcairie		256/512	

Sindbis	X	I	California gr				Hughes	256/256	
VEE	A		California	A			Ganjam	256/64	
WEE	A		Lumbo		I		Bhanja	512/256	
Group B			Tahyna	A	A		Wanowrie	512/256	
Dengue 1	I	I	Simbu group				Kaisodi	512/512	
Dengue 2	A	I	Akabane	A			Kemerovo	I	
Dengue 4		A	Ingwavuma	X	I		NSD	I	I
Banzi	X		Manzanilla	A			Nyamanini	256/512	
Dakar bat	I		Sathuperi	A			Quaranfil	512/16	
JBE	A		Simbu		I	I	Semunya (Cong)	A	I
MVE	A		Bwamba group				Silverwater	512/512	
Ntaya	X	I	Bwamba	A	I	I	Thogoto	128/32	
SLE	A		Pongola		I	I	Mouse viruses		
Spondweni	X	I	Bakau group				EMC	A	I
Uganda S	I	I	Bakau	A			GD 7	A	I
Usutu	I		Ketapang	A			LCM	A	
Wesselsbron	X	I	Others				Reovirus type 3	I	
West Nile	X	I	AHS		I		Theiler's FA		I
Yellow fever	X	I	Bluetongue		I				
Zika	X	I	Koongol	A					
Powassan	A		SF Naples	A					
RSSE	A								

HI = Haemagglutination-inhibition, 4-8 units of antigen, antiserum diluted 1:20.

CF = Complement fixation; first dilutions of antigens and antisera 1:4; where reciprocal cross tests were done, homologous antiserum/antigen titres are stated.

PT = Protection test; challenge dose was 160 ic LD50.

Many of the HI and CF tests were done at the Rockefeller Foundation Virus Labs., New York.

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
Blood (M)(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 +/- (g)	
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)		
Chick embryo(PC)	P-15						Plaques	2.3*	
Lamb testis (PC)			CPE						
LLC-MK2 (CL)							Plaques (6)		
BHK-21(CL)	MB 5	2-3	4+	5.5* (7)					
BSC-1(CL), Vero(CL)			Replication (8)						
Vero (CL)	P5SM3				4-6	4 mm	6.3 (16)		
LLC-MK2 (CL)	P5SM3				4-6	4 mm	6.2 (16)		

* 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	2		Nigeria (3)
Man		0/48 NT	Rift Valley, Kenya
Cattle	17		Nigeria (2, 3, 4)
Cattle		12/53 NT	Rift Valley, Kenya

Camel	1		Kano, Nigeria (5)
Sheep		3/47 NT	Rift Valley, Kenya
Goats		1/15 NT	
Cattle		15/15 NT	Entebbe, Uganda
Pool of <i>Boophilus decoloratus</i> (95), <i>Rhipicephalus simus</i> (14), <i>Rh appendiculatus</i> (14), <i>Rh evertsi</i> (4)	1/10 pools		Kenya (1)
Pool of <i>Bo decoloratus</i> (50)	1/17		Kenya (1)
Pools of <i>Amblyomma variegatum</i> , <i>Bo decoloratus</i> , <i>Bo annulatus</i>	20		Central African Republic (15)
<i>Rh bursa</i>	2		Sicily (9)
<i>Rh evertsi</i>	1		Ethiopia (20)
<i>Bo decoloratus</i>	103		Nigeria (3, 4)
<i>Bo decoloratus</i>	19/869		Nigeria (10)
<i>Am variegatum</i>	3		Nigeria (3, 4)
<i>Am variegatum</i>	1/850		Nigeria (10)
<i>Hyalomma truncatum</i>	1		Nigeria (3, 4)
<i>Hy anatolicum</i>	2		Iran (17)
<i>Hy anatolicum</i>	1		Egypt (11)
<i>Rh sanguineus</i>	2		Portugal (22)
<i>Am variegatum</i>	1		Uganda (23)

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-15	ic 0.01	Death	3	7.7
Mice (nb)		ip 0.01	Death	3	7.7
Mice (nb)		sc			
Mice (wn)	P-2	ic	Sporadic deaths	4-8	
Mice (wn)		ip	Same	4-8	
hamster (wn)	P-3	ip 1.0	Death	3	
hamster (wn)	hamster spleen	ip 1.0	Death	2-3	7.7
guinea pigs (wn)		ip	No reaction		
rabbits (wn)		ip	No reaction		
sheep (ad)	P-2	iv 5.0	Fever	Survived	

Section IX - Experimental Arthropod Infection and Transmission

Arthropod species & virus source(a)	Method of Infection log10/ml (b)		Incubation period (c)		Transmission by bite (d)		Assay of arthropod, log10/ml (e)		
	Feeding	Injected	Days	°C	Host	Ratio	Whole	Organ	System

Section X - Histopathology

Character of lesions (specify host)

In hamsters: hyperaemia of brain, liver and small intestine; degeneration of neurons of cerebellum, necrosis of Purkinje cells, pronounced oedema of brain with distension of Virchow-Robin spaces. No perivascular cuffing.

Inclusion Bodies

Intranuclear

Organs/Tissues Affected

Brain (LV), liver (LV)

Category of tropism

Pantropic

Section XI - Human Disease

In Nature

Residual

Death

Significant

Reported

Subclinical

Overt Disease

Clinical Manifestations

CNS signs (including encephalitis)(R). Other significant symptoms: optic neuritis, meningoencephalitis

Number of Cases

Category (i.e. febrile illness, etc.)

2 (12)

Section XII - Geographic Distribution

Known (Virus detected)

Egypt (11), Kenya, Nigeria, Central African Republic (15), Sicily (9), Iran (17), Ethiopia (20), Cameroun (21), Portugal (22), Uganda (23)

Suspected (Antibody only detected)

Uganda

Section XIII - References

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Remarks

Thogoto is antigenically related to a virus isolated in Sicily which is presently unregistered. It has not been finally determined that the Sicilian isolate represents a distinct serotype or another strain of Thogoto.