

Virus Name: Rift Valley fever		Abbreviation: RVFV
Status Arbovirus	Select Agent Yes	SALS Level 3
SALS Basis Results of SALS surveys and information from the Catalogue.		
Other Information USDA Permit Required, DOC Permit Required, Hepa Filtration, USDA Restricted, USDA High Consequence Agent, Vaccination Recommended		
Antigenic Group Phlebotomus Fever		

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation	Accession Number	Original Date Submitted 2/3/1985
Family Bunyaviridae	Genus Phlebovirus	
Information From M.P. Weinbren	Address Puerto Rico Nuclear Center, Caparra Heights Station, San Juan,P.R.	
Information Footnote Reviewed by editor		

Section II - Original Source

Section 11 - Original Source		
Isolated By (name) Daubney, et al. (1)	Isolated at Institute Vet. Res. Lab., Kabete, Kenya	
Host Genus Sheep	Species	Host Age/Stage Lamb (newborn)
Sex Not Answered		
<u>Isolated From</u>	<u>Isolation Details</u>	
Whole Blood		
Signs and Symptoms of Illness Abortion and death in sheep, especially high mortality in young lambs.*	Arthropod	
Time Held Alive before Inoculation		
Collection Method Not stated	Collection Date 7/27/1930	
Place Collected (Minimum of City, State, Country) North of Lake Naivasha, Kenya		
Latitude 0° 44' S	Longitude 36° 26' E	
Macrohabitat Upland tropical savannah	Microhabitat Daylight, ground level, outdoors	Method of Storage until Inoculated Not stated
Footnotes		

Inoculation Date

7/28/1930

Animal (Details will be in Section 6)

Sheep

Route Inoculated

Intravenous

Reisolation

Yes

Other Reasons

Other isolations of identical virus in same outbreakHomologous Antibody Formation by Source Animal

Test(s) Used

Footnotes

Section IV - Virus Properties

Physicochemical

RNA

Pieces (number of genome segments)

3 (22)

Infectivity

Sedimentation Coefficients(s)
(S)

Percentage wt. of Virion Protein

Lipid

Carbohydrate

Virion Polypeptides: Number

3

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
<2.0 dexControl Titer
4.0 dex (9)

Lipid Solvent (chloroform)

After Treatment Titer

Control Titer

Lipid Solvent (deoxycholate)

After Treatment Titer
2.0 dex less (6)

Control Titer

Other (formalin, radiation)

Inact. by 0.25% formalin, 4C/3 days; by methylene blue+light (15).**Virion Morphology**

Shape

Dimensions
94-100 nm (20-22)Mean
nmRange
nm

Measurement Method

Surface Projections/Envelope

Nucleocapsid Dimensions,

Morphogenesis

Site of Constituent Formation in Cell

Site of Virion Assembly

Site of Virion Accumulation

Inclusion Bodies

Other

Hemagglutination

Hemagglutination

Yes

Antigen Source

**Mouse serum, acetone-ether; freezing 72 hours (7);
sucrose-acetone (8)**

Erythrocytes (species used)

Goose

pH Range

Varies

pH Optimum

Temperature Range

4-37dC

Temperature Optimum

25dC

Remarks

Frozen serum of naturally infected animal has been successfully used as antigen in HI test for diagnosis (11). * Short illness, loss of appetite, listlessness, asthenia.

Serologic Methods Recommended

HI, CF, NT

Footnotes

Frozen serum of naturally infected animal has been successfully used as antigen in HI test for diagnosis (11). * Short illness, loss of appetite, listlessness, asthenia.**Section V - Antigenic Relationship and Lack of Relationship to Other Viruses**

RVF virus antigenically related to viruses of the PHL serogroup by HI and plaque-reduction neutralization tests [23] .

Zinga virus has been shown to be identical to RVF virus by IFA and NT [30] , [31] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)

Blood (M) (LV), liver (LV), spleen (LV), milk (LV), urine (LV), feces (LV)

Lab Methods of Virus Recovery (ALL ISOLATIONS)

Newborn and weanling mice, baby chick, chick embryo, hamster, primates

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)		
Rift Valley fever virus grows readily in virtually all types of cell culture.										

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Man (many isolations from veterinarians and lab workers infected while handling animals, tissues or virus).	1	(Naturally infected case)	South Africa (10)
Man		146/2,223 CF	Nigeria (26)
Man	7		Uganda (19)
Lambs, sheep, cattle	Many		South Africa (1, 3, 4, 10, 11)
Man (serum)	10		Egypt (24)
Man (serum)	53		Egypt (25)
Wild rodents		0/106 NT	Uganda (19)
Mosquitoes of various species-numerous isolations, likely vectors: Eretmapodites chrysogaster group(2) Aedes (Ochlerotatus) caballus(4) Aedes (Neomelaniconion) circumluteolus(5) Culex (Culex) theileri(11)			
Culicoides spp.	1		Nigeria (32)
Micropteropus pusillus (bat)	1		Guinea (34)
Hipposideros abae (bat)	1		Guinea (34)

Primary hosts probably are sheep, cattle, buffalo, certain antelopes and rodents (1,3,4,10,11) all infected by mosquitoes; and man - most commonly infected while handling sick or dead animals, but sometimes by mosquitoes. Epizootics have caused enormous economic losses. Culex (Culex) theileri probably main epizootic vector (33).

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log ₁₀ /ml
Mice (nb)	Uganda	ic 0.03	Death	1-4	9.0
Mice (nb)		ip 0.03	Death	2-6	8.0
Mice (nb)		sc			
Mice (wn)		ic 0.03	Death	2-5	8.0
Mice (wn)		ip 0.06	Death	1-7	6.6
rhesus monkey (ad)		sc	Mild febrile or asymptomatic infection with resulting antibody response		
Cercopithecus aethiops (ad)		sc	Same as rhesus		
newborn merino lambs		sc	Death	1-2	
Pregnant ewes		sc	Abortion, fever, sometimes death		
Field voles, dormice, wood mice			Susceptible (12)		
kittens, puppies		sc	Death (18)		
5 African buffalo (Syncerus caffer)			1/2 pregnant aborted; 4/5 48 hr viremic (29)		

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
<p>Virus has been transmitted experimentally by the bite of Erchrysogaster(13), Ae caballus (4), Ae aegypti (8). The first two of these and other mosquitoes are probably natural vectors.</p> <p>Culex pipiens: Laboratory reared mosquitoes from Nile Delta epizootic area transmitted RVF virus following feeding on viremic hamsters. Infection rate = 87%; trans. rate = 40% (28).</p>									

Section X - Histopathology

Character of lesions (specify host)

Lambs,mice: generalized hepatic necrosis with intranuclear acidophilic histopath inclusions. Nuclear chromatin retains basophilia - distinguishing them from yellow fever. Hyaline acidophilic bodies in cytoplams in RVF - while in YF the whole cell is acidophilic and there are no cytoplasmic bodies.

Inclusion Bodies

Intranuclear

Lower Vertabrates

Organs/Tissues Affected

Brain (LV)*, liver (LV).

Category of tropism

*** Sheep, goats, hepatotropic.Mice convert to neurotropic on serial ic inoculation**

Section XI - Human Disease

In Nature Significant	Residual Significant	Death Reported
Subclinical Significant	Overt Disease Significant	
<p>Clinical Manifestations Fever, headache, prostration, conjunctival inflammation, stiff nect, myalgia, arthralgia, CNS signs (including encephalitis, hemorrhagic signs, lymphadenopathy, vomiting, central scotoma- detached retina (1,16,17).</p>		
Number of Cases 300 cases in detail; numerous others reported (8).	<p>Category (i.e. febrile illness, etc.) Febrile illness</p>	

Section XII - Geographic Distribution

Known (Virus detected)
Kenya, Uganda, South Africa (1,2,3,4,5,11), Egypt (24,25)

Suspected (Antibody only detected)
Sudan, Nigeria (26)

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Remarks

Many infections in veterinary field officers and laboratory workers - often with prolonged convalescence; eye complications common in man; herdsmen often become infected. Neuro-adapted virus used with success in South African Veterinary Service as a living virus vaccine. Dead virus vaccine recently prepared in U.S. evokes antibody response.