

Virus Name: African Horsesickness		Abbreviation: AHSV
Status Arbovirus	Select Agent No	SALS Level
SALS Basis		
Other Information USDA Restricted, USDA High Consequence Agent		
Antigenic Group African Horsesickness		

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation	Accession Number	Original Date Submitted 2/21/1985
Family Reoviridae	Genus Orbivirus	
Information From Chief, Veterinary Research Institute	Address P.O. Onderstepoort, Republic of South Africa	
Information Footnote Reviewed by editor		

Section II - Original Source

Isolated By (name) J. McFadyean (1)	Isolated at Institute London, England	
Host Genus Horse	Species	Host Age/Stage Aged
Sex Female		
<u>Isolated From</u> Whole Blood	<u>Isolation Details</u>	
Signs and Symptoms of Illness Cardiac form of disease	Arthropod	
Time Held Alive before Inoculation		
Collection Method By venipuncture from sick horse before death	Collection Date 1/1/1899	
Place Collected (Minimum of City, State, Country)		
Latitude 25° S	Longitude 28° E	
Macrohabitat	Microhabitat	Method of Storage until Inoculated Glycerine and water
Footnotes		

Section III - Method of Isolation

Inoculation Date
6/23/1932

Animal (Details will be in Section 6)
ad mice

Route Inoculated Intracerebral	Reisolation Yes
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Other Reasons

Homologous Antibody Formation by Source Animal
Yes

Test(s) Used
CF, NT

Footnotes

Section IV - Virus Properties

Physicochemical
RNA, Double Strand

Pieces (number of genome segments)	Infectivity	Sedimentation Coefficients(s) (S)
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Percentage wt, of Virion Protein	Lipid	Carbohydrate
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Virion Polypeptides: Number	Details RNA-RNA homology relationship with BLU, not with reovirus (8); dsRNA has at least 10 segments (28).
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Non-virion Polypeptides: Number	Details
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Virion Density	Sedimentation Coefficients(s) (S)
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Nucleocapsid Density	Sedimentation Coefficients(s) (S)
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Stability of Infectivity (effects)

pH (infective range)
Sensitive to pH 3.0; resis. to trypsin (6)

Lipid Solvent (ether - % used to test) 20%	After Treatment Titer 7.75 dex	Control Titer 7.5 dex (9)
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Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
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Lipid Solvent (deoxycholate) 0.1%	After Treatment Titer 3.5 dex	Control Titer 3.5 dex (9)
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Other (formalin, radiation)
NaCl, CaCl₂, MgCl₂ inactivate virus at -22C and -30C, not at -70C (19)

Virion Morphology

Shape Icosahedral shape (17)	Dimensions 50 nm (5)
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Mean nm	Range nm
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Measurement Method	Surface Projections/Envelope	Nucleocapsid Dimensions,
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Ultrafiltration, ultracentrifugation (5)

Pseudoenvelopes may be present (21)

Symmetry

Capsid diameter 71 (18); 32 capsomeres (17)

Morphogenesis

Site of Constituent Formation in Cell
Intranuclear and intracytoplasmic filaments (18)

Site of Virion Assembly

Site of Virion Accumulation

Inclusion Bodies

Other

Hemagglutination

Hemagglutination
Yes (10)

Antigen Source
SMB ext. by sucrose-acetone

Erythrocytes (species used)
Horse

pH Range

pH Optimum
6.4

Temperature Range

Temperature Optimum
37dC

Remarks

Serologic Methods Recommended
HI, CF, NT; direct, indirect IFA (group specific)

Footnotes

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

As there are at least nine immunologically distinct types ([13]) these are grouped under the designation "African horsesickness".

So far no serologic relation with other viruses has been demonstrated.

The neutralization and HI tests ([10]) are relatively specific; the CF test ([20]) is group-reactive. Some strains which cross-neutralize in mice are not cross-protective in horses ([13]).

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)
 Blood (LV), spleen (LV), milk (LV), urine (LV)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
 Newborn and weanling mice; chick embryo fibroblasts (11)
 and lamb kidney cell cultures

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)	
Hamster kidney (PC)		4	CPE	6.0 ** (14)				
Chick embryo (PC)	l/isol.	4	Titred in SM	5.0(11,15)				
Monkey kidney (CL)		2-4	CPE	7.0		Plaques (16)		
Aedes albopictus (CL)		Infective	virus	recovered;	persistent	infection	(7).	

** Expressed in dex

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Horse	Numerous		Africa, Near East, Middle East
Mule	Numerous		
Donkey	Numerous		
Dog (Fox Hound)	1/7	19/20 NT	South Africa (29)
Culicoides spp.	Numerous		South Africa

The vertebrate reservoir(s), if any, are not known.

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log ₁₀ /ml
Mice (nb)	Numerous mouse	ic 0.03	Encephalitis and death	2-3	8.0
Mice (nb)	adapted strains	ip 0.5	Encephalitis and death	2-5	6.0
Mice (nb)		sc			
Mice (wn)		ic 0.03	Encephalitis and death	3-5	7.0
Mice (wn)		ip 0.5	Death, encephalitis in small percentage	3-8	5.0
guinea pigs (yg ad)		ic 0.25	Fever, paralysis(12)	8-12	6.0
guinea pigs (ad)		parenteral 1.0	Paralysis in small%(12)	8-16	6.0
embryonated eggs(8 day)	1d isolation	CAM + ys	Death of embryo (13)	3-6	6.0

Section IX - Experimental Arthropod Infection and Transmission

Transmission via horse-mosquito-horse by *Anopheles stephensi*, *Culex pipiens*, and *Aedes aegypti* (22,23).

Culicoides variipennis Transmitted AHS virus after intrathoracic inoc. or oral ingestion (26,27).

Section X - Histopathology

Character of lesions (specify host)

Horse: Pulmonary hyperaemia and oedema; hydrothorax, hydropericard and oedematous infiltration of subcutaneous intermuscular and peritracheal tissues; cardiac haemorrhages, hyperemia of stomach and intestines.

Inclusion Bodies

Intranuclear

Organs/Tissues Affected

Lungs (LV), Heart (LV)

Category of tropism

Horse: Pantropic; Mouse: Neurotropic

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) Continent of Africa, Sudan (25);India, Pakistan, Afghanistan, Iran, Iraq, Syria, Jordan, Israel, Turkey, and Cyprus.
Suspected (Antibody only detected)

Section XIII - References

<ol style="list-style-type: none"> 1. MCFADYEAN, J. 1900. J. Comp. Path. 13:1-20. 2. NIESCHULZ, O. 1932. Tydschr. V. Diergeneesk 59:1433-1445. 3. ALEXANDER, R.A. 1935. Onderstepoort J. Vet. Sci. 4:349-378. 4. MCINTOSH, B.M. 1956. Onderstepoort J. Vet. Res. 27:165-169. 5. POLSON, A. 1941. Onderstepoort J. Vet. Sci. 16:33-50. 6. OZAWA, Y. 1968. Jap. J. Med. Sci. Biol. 21:27-39. 7. MIRCHAMSY, H., et al. 1970. Am. J. Vet. Res. 31:1755-1761. 8. VERWOERD, D.W. and HUISMANS, H. 1969. Onderstepoort J. Vet. Res. 36:175-179. 9. HOWELL, P.G. 1962. Onderstepoort J. Vet. Res. 29:139-149. 10. PAVRI, K.M. 1961. Nature (Lond) 189, 249. 11. ERASMUS, B.J. 1964. Bull. Off.Int. Epiz. 61. 12. ERASMUS, B.J. 1963. Onderstepoort J. Vet. Res. 30:11-21. 13. MCINTOSH, B.M. 1958. in Onderstepoort J. Vet. Res. 27:465-538. 14. MIRCHAMSY, H. and TASLIMI, H. 1963. Nature (Lond.) 198:704-706. 15. ERASMUS, B.J. 1963. Nature (Lond.) 200:716. 16. OZAWA, Y. and Hazarati, A. 1964. Am. J. Vet. Res. 25:505-511. 17. OELLERMAN, R.A., et al. 1970. Arch. ges. Virusforsch. 29:163-174. 18. BREESE, S.S., et al. 1969. J. Am. Vet. Med. Assoc. 155:391-400. 19. OZAWA, Y. and BAHRAMI, S. 1968. Arch. ges. Virusforsch. 25:201-210. 20. MCINTOSH, B.M. 1956. Onderstepoort J. Vet. Res. 27:165-169. 21. LECATSAS, G. and ERASMUS, B.J. 1968. Arch. ges. Virusforsch. 22:442-450. 22. OZAWA, Y., et al. 1965. Am. J. Vet. Res. 26:744-748. 23. OZAWA, Y., et al. 1966. Ibid. 27:695-697. 24. DAVIES, F.G. and LUND, L.J. 1974. Res. Vet. Sci. 17:128-130. 25. EISA, M. 1974. Brit. Vet. J. 180:606-610. 26. BOORMAN, J., et al. 1975. Arch. Virol. 47:343-350. 27. MELLOR, P.S., et al. 1975. Arch. Virol. 47:351-356. 28. MATHEWS, R.E.F. 1982. Intervirology 17:81-84. 29. HAIG, D.A., et al. 1956. J.S. Afr. Vet. Med. Assoc. 27:245-249.

Remarks

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