

<b>Virus Name: Dhori</b>		<b>Abbreviation: DHOV</b>
Status <b>Possible Arbovirus</b>	Select Agent <b>No</b>	SALS Level <b>3</b>
SALS Basis <b>Results of SALS surveys and information from the Catalogue.</b>		
Other Information		
Antigenic Group <b>Ungrouped</b>		

**SECTION I - Full Virus Name and Prototype Number**

Prototype Strain Number / Designation <b>611313</b>	Accession Number	Original Date Submitted <b>6/5/1984</b>
Family <b>Orthomyxoviridae</b>	Genus	
Information From <b>Virus Research Centre</b>	Address <b>20-A, Wellesley Road, Poona, India</b>	
Information Footnote		

**Section II - Original Source**

Isolated By (name) <b>C.R. Anderson (1,3)</b>	Isolated at Institute <b>Virus Research Centre, Poona</b>	
Host Genus <b>Hyalomma dromedarii (pool of 100)</b>	Species	Host Age/Stage <b>Adult</b>
Sex <b>Female</b>		
<u>Isolated From</u>	<u>Isolation Details</u>	
Signs and Symptoms of Illness	Arthropod	
Time Held Alive before Inoculation		
Collection Method <b>Removed from camels</b>	Collection Date <b>3/14/1961</b>	
Place Collected (Minimum of City, State, Country) <b>Dhori, Kutch Dist., Gujarat State, India</b>		
Latitude <b>23° 30' N</b>	Longitude <b>69° 45' E</b>	
Macrohabitat <b>Camel breeding farm</b>	Microhabitat <b>Camel</b>	Method of Storage until Inoculated <b>In Revco at -50dC as whole ticks</b>
Footnotes		

**Section III - Method of Isolation**

Inoculation Date  
**3/26/1961**

Animal (Details will be in Section 6)  
**nb mice**

Route Inoculated <b>Intracerebral</b>	Reisolation <b>Yes</b>
--	---------------------------

Other Reasons

Homologous Antibody Formation by Source Animal

Test(s) Used

Footnotes

**Section IV - Virus Properties**

Physicochemical  
**RNA, Single Strand**

Pieces (number of genome segments) <b>7 (6)</b>	Infectivity	Sedimentation Coefficients(s) (S)
--	-------------	--------------------------------------

Percentage wt, of Virion Protein	Lipid	Carbohydrate
----------------------------------	-------	--------------

Virion Polypeptides: Number <b>6</b>	Details <b>Nucleocapsid: vp54-56, MW 54-56 x 10<sup>3</sup>, matrix: vp28, MW 28 x 10<sup>3</sup>; glycoprotein: gp65, MW 65 x 10<sup>6</sup>; minor proteins: vp85, MW 85 x 10<sup>3</sup>; vp89, MW 89 x 10<sup>3</sup>; vp90, MW 90 x 10<sup>3</sup> (6)</b>
---	--

Non-virion Polypeptides: Number	Details
---------------------------------	---------

Virion Density <b>1.16-1.18 gm/cm<sup>3</sup> in glycerol-tartrate (6)</b>	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	Control Titer
--	-----------------------	---------------

Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
----------------------------	-----------------------	---------------

Lipid Solvent (deoxycholate) <b>1:1000</b>	After Treatment Titer <b>2.3 dex</b>	Control Titer <b>6.0 dex</b>
---	---	---------------------------------

Other (formalin, radiation)

**Virion Morphology**

Shape <b>Spherical filamentous particles</b>	Dimensions <b>92-110 nm (6)</b>
---	------------------------------------

Mean nm	Range nm	
Measurement Method <b>Electron microscopy (6)</b>	Surface Projections/Envelope <b>Envelope present; surface projections 8-12nm long</b>	Nucleocapsid Dimensions, Symmetry
<b><u>Morphogenesis</u></b>		
Site of Constituent Formation in Cell	Site of Virion Assembly <b>Budding from cell surface plasma membrane (6)</b>	Site of Virion Accumulation <b>Interstitial spaces between cells (6)</b>
Inclusion Bodies	Other	
<b><u>Hemagglutination</u></b>		
Hemagglutination <b>Yes</b>	Antigen Source <b>Infected Vero cult. fl. tr.by Tween 80-ether (7).</b>	Erythrocytes (species used) <b>Goose*</b>
pH Range <b>6.0-7.0</b>	pH Optimum <b>6.0</b>	
Temperature Range	Temperature Optimum	
Remarks <b>Conc. by LKB filter; precipitation with PEG 6000; or sucrose centrifugation (7). * HA activity also demonstrated with sheep, monkey and human O erythrocytes(7).</b>		
Serologic Methods Recommended <b>HI, CF, NT</b>		
Footnotes <b>Conc. by LKB filter; precipitation with PEG 6000; or sucrose centrifugation (7). * HA activity also demonstrated with sheep, monkey and human O erythrocytes(7).</b>		

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

Dhori virus has been tested in neutralization test with the following antisera: dengue 1, 2, 3, 4, Japanese encephalitis, West Nile, Kyasanur Forest disease, Kaisodi, Batai (Chittor), Sathuperi, Sindbis, chikungunya, Umbre, and Chandipura, as well as several as yet unidentified viruses isolated at the Virus Research Centre, Poona. None of the antisera neutralized the Dhori virus.

At YARU, a Dhori virus immune serum of adequate titer has been tested against 31 other tick-borne viruses without any evidence of relationship. Also, Dhori virus antigen has been tested against 3 or 4 immune sera to other tick-borne agents without evidence of a relationship (Casals, J. 1970. Personal communication).

## Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)

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)	
Ps (CL)		4	4+	5.5**	8	Plaques (4)		
Vero (CL)			CPE (7)		3	Plaques (6)		
BHK-21 (CL)			CPE		3	Plaques (6)		
LLC-MK2 (CL)			CPE		4-6	Plaques (6)		
BS-C-1 (CL)			No CPE (6)					
CV-1			No CPE (6)					

\*\* Expressed in dex

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
<i>Hyalomma dromedarii</i>	4/41 pools (5,234 ticks)		Kutch district, India
<i>Hyalomma marginatum</i>	1		Portugal (5)
<i>Hyalomma dromedarii</i>	1		Egypt (2)
<i>Hyalomma p. plumbeum</i> (= <i>H. m. marginatum</i> )	1		Volga River delta, USSR (3)
<i>Dermacentor marginatus</i>	1		Armenian SSR, USSR (8)
<i>H. p. plumbeum</i> (= <i>H. m. marginatum</i> )	1		Azerbaijan SSR, USSR (8)
Man		12/81	Saurashtra, India
Man		0/60	Kashmir, India
Sheep		0/20	Saurashtra, India
Cow		0/18	
Horse		4/20	
Camels		48/48 NT	India (7)
Horses		6/31 NT	
Cattle		0/52 NT	
Sheep		0/64 NT	
Goats		1/56 NT	
Dogs		0/5 NT	
Pigs		0/10 NT	

**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 log <sub>10</sub> /ml
Mice (nb)	P-5	ic 0.02	Death	2-3	7-8
Mice (nb)		ip 0.03	Death	3-4	6-8
Mice (nb)		sc			
Mice (wn)	P-7	ic 0.03	Death	3-4	7-8
Mice (wn)		ip 0.03	Death	5-6	
rabbits (ad)		ip 0.5	No viremia, antibody(3)		
rabbits (ad)		ic 0.1	Antibody		
embryonated eggs (10 day)		am.s.4-6 dex	No virus growth (6)		<3.0
—		al.c.4-6 dex	No virus growth (6)		<3.0

**Section IX - Experimental Arthropod Infection and Transmission**

Arthropod species & virus source(a)	Method of Infection log <sub>10</sub> /ml (b)		Incubation period (c)		Transmission by bite (d)		Assay of arthropod, log <sub>10</sub> /ml (e)		
	Feeding	Injected	Days	°C	Host	Ratio	Whole	Organ	System

**Section X - Histopathology**

Character of lesions (specify host)

Inclusion BodiesIntranuclear

Organs/Tissues Affected

Category of tropism

**Section XI - Human Disease**

In Nature

Residual

Death

**Significant, Reported**

Subclinical

Overt Disease

Clinical Manifestations

**Acute febrile illness, 2/5 patients developed encephalitis (10).**

Number of Cases

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

5

**Febrile illness/encephalitis****Section XII - Geographic Distribution**

Known (Virus detected)

**India, Egypt, USSR, Portugal (5)**

Suspected (Antibody only detected)

**Section XIII - References**

1. Subcommittee on Information Exchange. 1970. Catalogue of Arthropod-Borne Viruses of the World. Am. J. Trop. Med. and Hyg. (Supplement) 19:1089.
2. Williams, R.E., et al. 1973. J. Med. Ent. 10:143-146.
3. Anderson, C.R. and Casals, J. 1973. Ind. J. Med. Res. 61:1416-1420.
4. Cogate, S.S. 1976. Ind. J. Med. Res. 64:83-86.
5. Filipe, A.R. and Casals, J. Intervirology 11:124-127.
6. Clerx, J.P., et al. 1983. Virology 127:205-215.
7. Sokhey, J., et al. 1977. Ind. J. Med. Res. 66:726-731.
8. Semashko, I.V., et al. Unpublished data. 1975.
9. Fuller, F.J., et al. 1987. Virology. 160:81-87.
10. Butenko, A.M., et al. 1987. Vop. Virusol. No. 6. 724-729.

**Remarks**

**The complete nucleotide sequence of the fifth segment of single-stranded RNA of Dhori virus was determined. The data suggest that Dhori viruses are orthomyxoviruses but that they are more distantly related to the influenza viruses than type A, B, and C viruses are to each other. (9)**