

<b>Virus Name: Chandipura</b>		<b>Abbreviation: CHPV</b>
Status <b>Arbovirus</b>	Select Agent <b>No</b>	SALS Level <b>2</b>
SALS Basis <b>Results of SALS surveys and information from the Catalogue.</b>		
Other Information		
Antigenic Group <b>Vesicular Stomatitis</b>		

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

Prototype Strain Number / Designation <b>653514</b>	Accession Number	Original Date Submitted <b>6/5/1984</b>
Family <b>Rhabdoviridae</b>	Genus <b>Vesiculovirus</b>	
Information From <b>The Virus Research Centre, Poona, India</b>	Address <b>Yale Arbovirus Research Unit</b>	
Information Footnote <b>Revised by R.B.Tesh</b>		

**Section II - Original Source**

Isolated By (name) <b>Staff, Virus Research Centre</b>	Isolated at Institute <b>Poona, India (1)</b>	
Host Genus <b>Man</b>	Species	Host Age/Stage <b>Adult</b>
Sex <b>Female</b>		
<u>Isolated From</u> <b>Serum/Plasma</b>	<u>Isolation Details</u>	
Signs and Symptoms of Illness <b>Chills, fever, myalgia, arthralgia, vomiting and weakness (1)</b>	Arthropod	
Time Held Alive before Inoculation		
Collection Method <b>Venipuncture</b>	Collection Date <b>6/10/1965</b>	
Place Collected (Minimum of City, State, Country) <b>Chandipura, Nagpur City, Maharashtra, India</b>		
Latitude <b>21° 10' N</b>	Longitude <b>79° 12' E</b>	
Macrohabitat <b>Rural community</b>	Microhabitat	Method of Storage until Inoculated <b>At -50dC and on dry ice for last 12 hours</b>
Footnotes		

Inoculation Date  
**6/12/1965**

Animal (Details will be in Section 6)  
**nb mice, BS-C-1 (cells) (Tissue Culture)**

Route Inoculated  
**Intracerebral**

Reisolation  
**Yes**

Other Reasons

Homologous Antibody Formation by Source Animal  
**Yes**

Test(s) Used  
**NT**

Footnotes

## Section IV - Virus Properties

Physicochemical  
**RNA, Single Strand**

Pieces (number of genome segments) <b>1</b>	Infectivity <b>No</b>	Sedimentation Coefficients(s) <b>38-45(S)</b>
Percentage wt. of Virion Protein <b>protein 60-70%</b>	Lipid <b>lipid 20-25%</b>	Carbohydrate <b>3-13%, RNA: 0.7-5.0%</b>
Virion Polypeptides: Number <b>5</b>	Details <b>M (MW 150-200 x 10<sup>3</sup>), G (64 x 10<sup>3</sup>), N (54 x 10<sup>3</sup>), M (27 x 10<sup>3</sup>), NS (29-45 x 10<sup>3</sup>) (2,3)</b>	
Non-virion Polypeptides: Number <b>0</b>	Details	
Virion Density <b>1.18-1.20 in sucrose</b>	Sedimentation Coefficients(s) <b>625 (2)(S)</b>	
Nucleocapsid Density <b>1.32 in CsCl</b>	Sedimentation Coefficients(s) <b>140(S)</b>	

**Stability of Infectivity (effects)**

pH (infective range)

**Unstable at pH 3.0; stable in range pH 5-10**

Lipid Solvent (ether - % used to test)	After Treatment Titer	Control Titer
Lipid Solvent (chloroform)	After Treatment Titer <b>4.5 dex</b>	Control Titer <b>&gt;10.5 dex (1)</b>
Lipid Solvent (deoxycholate) <b>1:200</b>	After Treatment Titer <b>&lt;4.0 dex</b>	Control Titer <b>&gt;9.0 dex (1)</b>

Other (formalin, radiation)

**Inactivated by ultraviolet light and x-radiation**

**Virion Morphology**

Shape <b>Bullet-shaped (3)</b>	Dimensions <b>180 x 75 nm</b>
Mean nm	Range nm

Measurement Method <b>Electron microscopy</b>	Surface Projections/Envelope <b>Surf. proj. 6-10 nm; bilayer lipid membrane (2)</b>	Nucleocapsid Dimensions, Symmetry <b>Extended 3.5 nm; helical 30-35 turns; 49nm outer,</b>
<b>Morphogenesis</b>		
Site of Constituent Formation in Cell <b>Cytoplasm (2)</b>	Site of Virion Assembly <b>Buds from plasma membrane</b>	Site of Virion Accumulation <b>Extracellular and in cytoplasmic vesicles</b>
Inclusion Bodies <b>Not usually</b>	Other	
<b>Hemagglutination</b>		
Hemagglutination <b>No</b>	Antigen Source <b>SMB ext. by sucrose-acetone + prot.</b>	Erythrocytes (species used) <b>Goose**</b>
pH Range <b>6.0-6.8</b>	pH Optimum	
Temperature Range	Temperature Optimum <b>24-37dC</b>	
Remarks <b>Sucrose and acetone preparations with varying concentrations of protamine sulfate tried unsuccessfully (1) ** Human O erythrocytes also tried.</b>		
Serologic Methods Recommended <b>CF, NT</b>		
Footnotes <b>Sucrose and acetone preparations with varying concentrations of protamine sulfate tried unsuccessfully (1) ** Human O erythrocytes also tried.</b>		

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

CF Tests [5]

Antigens	Hyperimmune mouse sera or ascitic fluid												
	VSNJ	VSI	COC	PIRY	CHP	FLA	HP	Mokola	Rabies	LB	MEB	KC	KLA
VSNJ	256/512 <sup>a</sup>	0	0	0	0	0	0	0	0	0	0	0	0
VSI	0	256/512	32/128	0	0	0	0	0	0	0	0	0	0
COC	0	32/512	256/512	0	0	0	0	0	0	0	0	0	0
PIRY	0	0	0	128/32	8/4	0	0	0	0	0	0	0	0
CHP	0	0	0	0	128/64	0	0	0	0	0	0	0	0
FLA	0	0	0	0	0	64/16	32/4	0	0	0	0	0	0
HP	0	0	0	0	0	32/16	256/64	0	0	0	0	0	0
Mokola	0	0	0	0	0	0	0	256/512	32/32	0	0	0	0

Rabies	0	0	0	0	0	0	0	0	0	0	0	0	0
LB	0	0	0	0	0	0	0	64/128	64/128	8/128	0	0	0
MEB	0	0	0	0	0	0	0	0	0	0	64/64	0	0
KC	0	0	0	0	0	0	0	0	0	0	0	256/512	0
KLA	0	0	0	0	0	0	0	0	0	0	0	0	256/64
Normal	0	0	0	0	0	0	0	0	0	0	0	0	0

VSNJ (VS-New Jersey), VSI (VS-Indiana), COC (Cocal), CHP (Chandipura), FLA (Flanders), HP (Hart Park), LB (Lagos bat), MEB (Mt. Elgon bat), KC (Kern Canyon), KLA (Klamath).

<sup>a</sup> Serum titer/antigen titer; 0 = <4/<4

Virus	NT [5]						Plaque NT [6]						
	Titer-dex LD50	Virus					Immune Serum	Virus					ISF
		VSI	COC	VSNJ	PIRY	CHP		VSNJ	VSI	COC	PIRY	CHP	
VSI	7.1	6.2 <sup>b</sup>	4.2	1.9	0	2.6	VSNJ	10240 <sup>c</sup>	<10	<10	<10	<10	<10
COC	7.7	4.2	>7.0	2.7	1.7	1.8	VSI	<10	327680	320	<10	<10	<10
VSNJ	5.5	2.2	0	>5.0	0	0	COC	<10	160	5120	<10	<10	<10
							VSA	<10	20	20	<10	<10	<10
PIRY	7.9	2.3	2.6	2.5	5.7	3.4	PIRY	<10	<10	<10	163840	80	<10
CHP	7.3	2.5	2.7	0	4.6	>5.7	CHP	<10	<10	<10	<10	10240	<10
							ISF	<10	<10	40	<10	<10	163840

<sup>b</sup> LNI in dex; 0 = 1.5 or less

<sup>c</sup> Reciprocal of highest serum dilution producing >95% plaque inhibition.

See References [5] and [7] for additional PRNT results.

**Section VI - Biologic Characteristics**

Virus Source (all VERTEBRATE isolates)  
**Blood (M), liver (LV)**

Lab Methods of Virus Recovery (ALL ISOLATIONS)  
**Newborn mice and BS-C-1 cell cultures (1)**

Cell system (a)	Virus passage history (b)	Evidence of Infection						
		CPE			PLAQUES			Growth Without CPE +/- (g)
		Day (c)	Extent (d)	Titer TC50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)	
BS-C-1 (CL)	Few	1	4+	>11.6* (1)				
Monkey kidney(PC)	Few	1	4+	>11.6 (1)			11.2*	
Chick embryo(PC)	Few	1	4+	10.5 (1)				
Vero (CL)		1	4+		2	2-3 mm	8.0	
PS (CL)	SM22, Vero 2	1	4+		1	0.3 mm	7.5 (8)	

Chandipura virus also grows in *Aedes albopictus*, *Aedes aegypti*, *Aedes W-albus*, *Anopheles stephensi* and *Toxorhynchites amboinensis* cell lines without producing CPE (9,10).

\* Expressed in dex

Vertebrate (species and organ) and arthropod	No. isolations/No. tested	No. with antibody/No. tested Test used	Country and region
Man (blood)	2/58	155/203 NT	Maharashtra State, India (1)
Man		293/972 NT	Variouz other states, India (1)
Phlebotomus sp.	1/2,070 (21 pools)		Aurangabad, Maharashtra State, India
Camels		1/50 NT	India (1)
Horses		13/71 NT	
Donkeys		13/40 NT	
Cows		11/18 NT	
Buffalo		2/8 NT	
Sheep		4/14 NT	
Goats		6/19 NT	
Rhesus monkeys		7/43 NT	
Atelerix spiculus (hedgehog)	1		Kware, Nigeria (7)
Atelerix albiventris	1		

**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)	Prototype (1)	ic 0.02	Death	1-3	>10
Mice (nb)		ip 0.02	Death	1-3	>10
Mice (nb)		sc	Death	1-3	
Mice (wn)		ic 0.03	Death	1-6	10
Mice (wn)		ip 0.03	Antibody and survival		

NOTE: Newborn mice develop high level of viremia after inoculation; adult mice have low-titered or no detectable viremia during infection (1).

**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
<p>Experimental transmission of Chandipura virus to mice demonstrated with orally infected <i>Aedes albopictus</i>, <i>Aedes aegypti</i>, <i>Anopheles stephensi</i> and <i>Culex quinquefasciatus</i> (10).</p> <p>Experimental transmission by <i>Phlebotomus papatasi</i> also demonstrated (14).</p> <p>Chandipura virus induces CO<sub>2</sub> sensitivity in <i>Culex quinquefasciatus</i>, <i>Toxorhynchites amboinensis</i> and <i>Drosophila melanogaster</i> following inoculation (11,12).</p>									

**Section X - Histopathology**

Character of lesions (specify host)

**See Reference 13 for discussion of pathology.**

Inclusion Bodies

Intranuclear

Organs/Tissues Affected

Category of tropism

**Epitheliotropic, neurotropic, viscerotropic (13)**

**Section XI - Human Disease**

In Nature

Residual

Death

**Reported**

Subclinical

Overt Disease

Clinical Manifestations

**Chills, fever, myalgia, arthralgia, vomiting and weakness (1)**

Number of Cases

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

**Two recognized**

**Febrile illness**

**Section XII - Geographic Distribution**

Known (Virus detected)

**India, Nigeria**

Suspected (Antibody only detected)

**Section XIII - References**

1. Bhatt, P.N. and Rodrigues, F.M. 1967. Ind. J. Med. Res. 55:1295-1305.
2. Bishop, D.H.L., editor. Rhabdoviruses, Vols. 1, 2, and 3. CRC Press, Florida. 1979 and 1980.
3. Knudson, D.L. 1973. J. Gen. Virol. 20:105-130.
4. Brown, F., et al. 1979. Intervirology 12:1-7.
5. Bishop, D.H.L. and Smith, M.S. In: Molecular Biology of Animal Viruses. D. Nayak, editor. M. Dekker, New York, 1977. pp. 167-280.
6. Tesh, R., et al. 1977. Am. J. Trop. Med. Hyg. 26:299-306.
7. Dragunova, J. and Zavada, J. 1979. Arch. Virol. 23:319-328.
8. Cogate, S.S. 1976. Ind. J. Med. Res. 64:83-86.
9. Dhanda, V., et al. 1970. Ind. J. Med. Res. 58:179-180.
10. Ramachandra Rao, T. 1967. Ind. J. Med. Res. 55:1306-1310.
11. Rosen, L. 1980. Science 207:989-991.
12. Bussereau, F. 1975. Ann. Microbiol. 126B:389-403.
13. Murphy, F.A. In: Viruses, Evolution and Cancer. E. Kurstak and K. Maramorosch, editors. Academic Press, New York. 1974. pp. 699-722.
14. Dandawate, C.N. Personal communication. 1980.

**Remarks**