Virus Name: Vesicular Stomatitis, New Jersey serotype	Abbreviation: VSNJV

Status
Possible Arbovirus

Select Agent
No

SALS Level
2

SALS Basis
Extensive laboratory experience and mild nature of aerosol laboratory infections justifies Level 2.

Other Information

Antigenic Group
Vesicular Stomatitis

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
Hazelhurst

Accession Number

Original Date Submitted
7/12/1984

Family
Vesiculovirus

Genus

Information From
Robert B. Tesh

Address
Yale Arbovirus Research Unit

Information Footnote
Revised

Section II - Original Source

Isolated By (name)
L. Mott

Isolated at Institute
National Animal Disease Laboratory

Host Genus
suis (domestic pig)

Species

Host Age/Stage
adult

Sex
Not Answered

Isolated From	Isolation Details
Organs/Tissues	**snout epithelium**

Signs and Symptoms of Illness
vesicle formation on snout, salivation, elevated temperature (1)

Arthropod

Time Held Alive before Inoculation

Collection Method

Collection Date
5/16/1952

Place Collected (Minimum of City, State, Country)
Hazelhurst, Georgia

Latitude
31° 50' N

Longitude
82° 35' W

Macrohabitat
farm, pigs, running into woodland

Microhabitat

Method of Storage until Inoculated
ice

Footnotes

Section III - Method of Isolation

Inoculation Date

Animal (Details will be in Section 6)
(Embryonated Egg)

Route Inoculated

Reisolation

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)
1

Infectivity
no

Sedimentation Coefficients(s)
38-45 S(S)

Percentage wt, of Virion Protein
60-70%

Lipid
20-25%

Carbohydrate
3-13% (2, 6); RNA 0.

Virion Polypeptides: Number
5

Details
L (MW: 150-200 x 10^3), G (MW: 64 x 10^3), N (MW: 52 x 10^3), M (MW: 24 x 10^3), NS (MW: 29-45 x 10^3) (3, 6)

Non-virion Polypeptides: Number
0

Details

Virion Density
1.18-1.20 in sucrose

Sedimentation Coefficients(s)
625 S (6)(S)

Nucleocapsid Density
1.32 in CsCl

Sedimentation Coefficients(s)
140 S (6)(S)

Stability of Infectivity (effects)

pH (infective range)
unstable at pH 3; stable in range pH 5-10

Lipid Solvent (ether - % used to test)
sensitive

After Treatment Titer

Control Titer

Lipid Solvent (chloroform)
sensitive

After Treatment Titer

Control Titer

Lipid Solvent (deoxycholate)
sensitive

After Treatment Titer

Control Titer

Other (formalin, radiation)
rapidly inactivated by ultraviolet and x-radiation (3)

Virion Morphology

Shape
bullet-shaped

Dimensions
180 x 75 nm (4 ,6)

Mean
nm

Range
nm

Measurement Method

Surface Projections/Envelope

Nucleocapsid Dimensions, Symmetry

electron microscopy	surface projections 6-10 nm; bilayer lipid membrane (3)	extended; 3.5 nm; helical: 30-35 turns, 49nm outer, 29 nm inner diameter (6)

Morphogenesis

Site of Constituent Formation in Cell
cytoplasm

Site of Virion Assembly
buds from plasma membrane (3, 4)

Site of Virion Accumulation
extracellular and in cytoplasmic vesicles

Inclusion Bodies
not usually

Other

Hemagglutination

Hemaggiutination
Yes

Antigen Source
infected BHK-21 cell cultures (6)

Erythrocytes (species used)
goose

pH Range

pH Optimum
6.4 (5)

Temperature Range

Temperature Optimum
low temperature

Remarks
hemagglutinin prepared from cells maintained in medium containing 0.4% bovine albumin and no serum (5)

Serologic Methods Recommended
CF and NT

Footnotes
hemagglutinin prepared from cells maintained in medium containing 0.4% bovine albumin and no serum (5)

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

CF tests (6):

	Hyperimmune Mouse Sera				
Antigens	**VS-New Jersey**	**VS-Indiana**	**Cocal**	**Piry**	**Chandipura**
VS-New Jersey	256/512 [a]	0	0	0	0
VS-Indiana	0	256/512	32/128	0	0
Cocal	0	32/512	256/512	0	0
Piry	0	0	0	128/32	8/4
Chandipura	0	0	0	0	128/64

[a] Titer of serum/titer of antigen; 0 = <4/4

Log Neutralization Tests (6)

	Hyperimmune Mouse Sera

Virus	Titer dex LD50	VS-New Jersey	VS-Indiana	Cocal	Piry	Chandipura
VS-New Jersey	5.5	>=5.0 [b]	2.2	<1.5	<1.5	<1.5
VS-Indiana	7.1	1.9	>=6.2	4.2	<1.5	2.6
Cocal	7.7	2.7	4.2	>=7.0	1.7	1.8
Piry	7.9	2.5	2.3	2.6	5.7	3.4
Chandipura	7.3	<1.5	2.5	2.7	4.6	>=5.7

[b] Log neutralization index in dex

Plaque Reduction Neutralization Tests (7)

Immune serum	Virus					
	VS-New Jersey	VS-Indiana	Cocal	Piry	Chandipura	Isfahan
VS-New Jersey	10240 [c]	<10	<10	<10	<10	<10
VS-Indiana	<10	327680	320	<10	<10	<10
Cocal	<10	160	5120	<10	<10	<10
Alagoas	<10	20	20	<10	<10	<10
Piry	<10	<10	<10	163840	80	<10
Chandipura	<10	<10	<10	<10	10240	<10
Isfahan	<10	<10	40	<10	<10	163840

[c] Reciprocal of highest serum dilution producing >=95% plaque inhibition

For additional serologic test results, see Vesicular Stomatitis Alagoas registration card and Reference [6] .

Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
Weanling mice

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)
Vero (CL)		1-2	Total		3	3-4 mm	6.5 [c]	

VE-New Jersey produces CPE and plaques in a wide variety of mammalian and avain cell lines (80). It also grows in a number of insect cell lines without producing CPE (9, 10, 11).

[c] 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
horse	many	384/611 NT	Panama (12, 13)
cow	many	319/885 NT	
pig	many	94/187 NT	
man (lab workers or animal handlers)	few		USA (14, 15)
man (adult rural inhabitants)		980/2042 NT	Panama (16)
man (adult rural inhabitants)		209/1160 NT	Guatemala (16)
man (adult rural inhabitants)		144/670 NT	Honduras (16)
man (adult rural inhabitants)		146/675 NT	El Salvador (16)
man (adult rural inhabitants)		119/723 NT	Nicaragua (16)
man (adult rural inhabitants)		141/975 NT	Costa Rica (16)

Culex nigripalpus (unfed)	1/95		Guatamala (19)
Mansonia indubitans	1		Ecuador (20)
Musca domestica	22		Larimer City, CO (31)
Musca autumnalis	2		
Chloropidae	1		
Anthomyidae	4		
Simuliidae	2		
Culicoides variipennis	2		Western Colorado (32)
Culicoides stellifer	1		
Culicoides selfia sp.	1		

A single isolation of VSNJ made from Simulium flies collected while feeding on clinically infected cows in Colombia (21).

VSNJ neutralizing antibodies also found in a wide variety of wild mammals (17, 18)

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)	any except ts	ic 3 dex	death	2-3	6.0-8.0
mice (nb)	mutants	ip	death	2-3	6.0-8.0
mice (nb)		sc	death	2-3	6.0-8.0
mice (wn)		ic	death	2-3	6.0-8.0
mice (wn)		ip	antibody and survival		
hamster (nb)		sc	death (22)	1-2	5.0-9.0
hamster (wn)		sc	antibody		
hamster (ad)		in	death (23)	5-6	
guinea pig (ad)		foot pad	vesicle on foot pad	2-4	4.0-5.0 (fluid)

Many wild mammals susceptible and develop inapparent infection and antibodies following subcutaneous inoculation (24)

Section IX - Experimental Arthropod Infection and Transmission

Arthropod species & virus source(a)	Method of Infection log10/ml (b)		Incubation period (c)		Transmision by bite (d)		Assay of arthropod, log10/ml (e)		
	Feeding	Injected	Days	°C	Host	Ratio	Whole	Organ	System
Aedes aegypti		1.4	7		mouse	10/10	2.9		plaques, BHK-21 (25)
Culex quinquefasciatus		2.0	9	28			5.4		plaques, Vero (26)

VSNJ multiplies and produces CO_2 sensitivity in Aedes albopictus, Culex quinquefasciatus, Toxorhynchites amboinensis and Drosophila melangaster following injection (27, 28). Transovarial transmission of VSNJ could not be demonstrated in Aedes albopictus or Culex quinquefasciatus (26).

Section X - Histopathology

Character of lesions (specify host)
spongiosis of the epithelium and multilocular intercellular edema; encephalitis in animals inoculated intracerebrally.

Inclusion Bodies

Intranuclear

Organs/Tissues Affected
see reference 30 for discussion of experimental pathology

Category of tropism
epitheliolotropic, neurotropic, viscerotropic

Section XI - Human Disease

In Nature
Reported

Residual

Death

Subclinical
Significant

Overt Disease
Significant

Clinical Manifestations
fever, headache, myalgia, arthralgia, prostration

Number of Cases
30-40

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

Section XII - Geographic Distribution

Known (Virus detected)

Suspected (Antibody only detected)

Section XIII - References

1. KARSTAD, L., et al. 1958. Am. J. Vet. Res. 19:233-236.
2. KNUDSON, D.L. 1973. J. Gen. Virol. 20:105-130.
3. BROWN, F., et al. 1979. Intervirology 12:1-7.
4. BERGOLD, G.H. and MUNZ, K.J. 1967. J. Ultrastructure Res. 17:233-244.
5. HALONEN, P.E., et al. 1968. Proc. Soc. Exp. Biol. Med. 127:1037-1042.
6. BISHOP, D.H.L., editor. Rhabdoviruses, Vols. 1, 2, and 3. CRC Press, Florida. 1979 and 1980.
7. TESH, R., et al. 1975. Am. J. Trop. Med. Hyg. 26:299-306.
8. American Type Culture Collection, Catalog of Strains 2. Second edition, Rockville, MD. 1979.
9. KNUDSON, D.L. and BUCKLEY, S.M. In: Methods in Virology, Vol. 6, K. Maramorosch and H. Koprowski, editors. Academic Press, New York. 1977. pp. 323-391.
10. TESH, R.B. 1980. J. Med. Ent. 17:338-343.
11. YUNKER, C.E. and CORY, J. 1975. Appl. Microbiol. 29:81-89.
12. HANSON, R.P. 1952. Bact. Rev. 16:179-204.
13. TESH, R.B. and JOHNSON, K.M. In: Diseases Transmitted from Animals to Man. W.T. Hubbert, et al., editors. 6th Edition. Charles C. Thomas, Springfield, IL. 1975. pp. 897-910.
14. HANSON, R.P.,et al. 1950. J. Lab. Clin. Med. 36:754-758.
15. FELLOWES, O.N., et al. 1955. Am. J. Vet. Res. 16:623-626.
16. CLINE, B.L. 1976. Am. J. Trop. Med. Hyg. 25:875-883.
17. TESH, R.B., et al. 1969. Am. J. Epid. 90:255-261.
18. HANSON, R.P. and KARSTAD, L. 1957. Proc. U.S. Livestock San. Assoc. 61:300-307.
19. SUDIA, W.D. Personal communication. 1978.
20. CALISHER, C.H. Personal communication. 1980.
21. MACKENZIE, R.B. Personal communication. 1970.
22. BRUNO-LOBO, M., et al. 1968. Anais Microbiol. 15:53-68.
23. BRUNO-LOBO, M., et al. 1968. Anais Microbiol. 15:69-80.
24. TESH, R.B., et al. 1970. Am. J. Epid. 91:216-224.
25. BERGOLD, G.H., et al. 1968. J. Invert. Pathol. 11:406-428.
26. TESH, R.B. Unpublished data.
27. ROSEN, L. 1980. Science 207:989-991.
28. BUSSEREAU, F. 1971. Ann. Inst. Pasteur 121:223-239.
29. COTTON, W.C. 1927. Vet. Med. 122:169-175.
30. MURPHY, F.A. In: Viruses, Evolution and Cancer. Kurstak, E. and Maramorosch, K., editors. Academic Press, New York. 1974. pp. 699-722.
31. FRANCY, D.B. Personal communication. 1982.
32. WALTON, T.E., et al. Personal communication. 1984.
33. Jonkers, A.H. 1967. Am. J. Epidem. 86:286-291.

Remarks

The original strain of VSNJ, isolated by Cotton in 1925 (29), has been lost. The basic epizootic unit considered to be the pasture rather than arthropods (33).