

Status: Possible Arbovirus

Select Agent:  
SALS Basis: A3

SALS Level: 2

HEPA Filtration:

Antigenic Group: Vesicular Stomatitis

Taxonomic status:

Other Information: None.

**Section I - Full Virus Name and Prototype Number****Full Virus Name:** Prototype Number:

Vesicular Stomatitis, New Jersey serotype Hazelhurst

Information from: Robert B. Tesh  
\* Date: 7/12/1984

Address: Yale Arbovirus Research Unit

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Revised

**Section II - Original Source**

Isolated by: L. Mott at: National Animal Disease Laboratory

Genus and species: suis (domestic pig) Sentinel X

Age/Stage: adult Sex: ?

Isolated From	Isolation detail
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Signs and symptoms of illness: vesicle formation on snout, salivation, elevated temperature (1)

Arthropod engorged depleted gravid

Time held alive before inoculation:

Collection date: 5/16/1952 Method:

Place collected: 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 and Validity****Inoculation Date:**

Animal: Embryonated egg: X Tissue Culture:

(Details in Section VI - Biologic Char.)

Route inoculated: Reisolation:

Other reasons:

Homologous antibody formation by source animal (See Section II): Yes

Test used: HI CF NT X

Footnotes:

## Section IV - Virus Properties

### Physicochemical:

RNA: X DNA: Single Strand: X

Pieces: 1 Infectivity: no

Percentage wt. of virion protein 60-70%

#### 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

Nucleocapsid density 1.32 in CsCl

### Double Strand:

Sedimentation coefficient(s): /strong>38-45 S

, lipid 20-25% carbohydrate 3-13% (2, 6); RNA 0.

### Virion morphology:

Shapebullet-shaped

Mean (nm) range (nm)

Surface projections, envelope surface projections 6-10 nm; bilayer lipid membrane (3)

Nucleocapsid dimensions, symmetry extended; 3.5 nm; helical: 30-35 turns, 49nm outer, 29 nm inner diameter (6)

**Stability of infectivity (effects) pH** unstable at pH 3; stable in range pH 5-10

#### Lipid solvent:

(ether) sensitive After treatment titer

Control titer

(chloroform) sensitive After treatment titer

Control titer

#### Detergent:

(deoxycholate) sensitive After treatment titer

Control titer

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

### Virion morphology:

Shapebullet-shaped

Mean (nm) range (nm)

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### Morphogenesis:

Site of constituent formation in cell cytoplasm

Site of virion assembly buds from plasma membrane (3, 4)

Inclusion bodies not usually

Other

### Hemagglutination:

Hemagglutination Yes

Antigen source infected BHK-21 cell cultures (6)

Erthrocytes goose pH range

pH optimum 6.4 (5)

Temperature optimum low temperature range

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):

Antigens	Hyperimmune Mouse Sera				
	VS-New Jersey	VS-Indiana	Cocal	Piry	Chandipura
VS-New Jersey	256/512 <sup>a</sup>	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

<sup>a</sup> Titer of serum/titer of antigen; 0 = <4/4

Log Neutralization Tests (6)

Virus	Hyperimmune Mouse Sera					
	Titer dex LD50	VS-New Jersey	VS-Indiana	Cocal	Piry	Chandipura
VS-New Jersey	5.5	>=5.0 <sup>b</sup>	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

<sup>b</sup> 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 <sup>c</sup>	<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

<sup>c</sup> 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

Susceptibility of Cell Culture Systems:

Cell system (a)	Virus passage history (b)	Evidence of Infection									
		CPE			PLAQUES						
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)				
Vero (CL)		1-2	Total		3	3-4 mm	6.5 <sup>c</sup>				

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

<sup>c</sup> Expressed in dex

## Section VII - Natural Host Range

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 (Record 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)		Transmission 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<sub>2</sub> sensitivity in *Aedes albopictus*, *Culex quinquefasciatus*, *Toxorhynchites amboinensis* and *Drosophila melanogaster* 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:** spongiosis of the epithelium and multilocular intercellular edema; encephalitis in animals inoculated intracerebrally.

### Inclusion bodies:

**Cytoplasmic:(M) (LV)**      **Intranuclear: (M)**

**Organs-tissues affected:** see reference 30 for discussion of experimental pathology

**Category of tropism:** epitheliotropic, neurotropic, viscerotropic

## Section XI - Human Disease

<b>Human disease:</b>	<b>In nature:</b>	(S)	(R)	X
	<b>Death:</b>	(S)	(R)	
	<b>Residua:</b>	(S)	(R)	
<b>Laboratory infections:</b>	<b>Subclinical:</b>	(S)	X	
	<b>Overt Disease:</b>	(S)	X	
<b>Clinical manifestations:</b>	fever, headache, myalgia, arthralgia, prostration			
<b>Category:</b>	febrile illness	<b>No. of cases:</b> 30-40		

## **Section XII - Geographic Distribution**

### **Section XIII - References**

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**Section XIV - Remarks**

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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).