Virus Name: San Angelo	Abbreviation: SAV

Status
Arbovirus

Select Agent
No

SALS Level
2

SALS Basis
Results of SALS surveys and information from the Catalogue.

Other Information

Antigenic Group
Califronia

SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
20230

Accession Number

Original Date Submitted
12/3/1984

Family
Bunyaviridae

Genus
Bunyavirus

Information From
J.E. Grimes

Address
Dept. of Veterinary Microbiology, A and M University, College Station, Texas, USA

Information Footnote
Reviewed by editor

Section II - Original Source

Isolated By (name)
Grimes, et al. (1)

Isolated at Institute
Texas State Dept. of Health, Austin

Host Genus
Anopheles p. pseudopunctipennis

Species

Host Age/Stage
Adult

Sex
Female

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod
Engorged

Time Held Alive before Inoculation

Collection Method
Hand collected

Collection Date
7/16/1958

Place Collected (Minimum of City, State, Country)
Near city of San Angelo, Tom Green County, Texas

Latitude
31° 20' N

Longitude
100° 30' W

Macrohabitat
1,847 ft. A.S.L., grassy area, liveoak, mesquite trees; temperate climate

Microhabitat
Collected from inside walls of a chicken house in daytime.

Method of Storage until Inoculated

Footnotes

Section III - Method of Isolation

Inoculation Date
7/18/1958

Animal (Details will be in Section 6)
wn mice

Route Inoculated
Intracerebral

Reisolation
Yes

Other Reasons

Homologous Antibody Formation by Source Animal

Test(s) Used

Footnotes

Section IV - Virus Properties

Physicochemical

Pieces (number of genome segments)	Infectivity	Sedimentation Coefficients(s) (S)
Percentage wt, of Virion Protein	Lipid	Carbohydrate
Virion Polypeptides: Number	Details	
Non-virion Polypeptides: Number	Details	
Virion Density	Sedimentation Coefficients(s) (S)	
Nucleocapsid Density	Sedimentation Coefficients(s) (S)	

Stability of Infectivity (effects)

pH (infective range)

Lipid Solvent (ether - % used to test) **1:5**	After Treatment Titer **2.5 dex**	Control Titer **4.0 dex**
Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
Lipid Solvent (deoxycholate) **1:1000**	After Treatment Titer **1.25 dex**	Control Titer **3.25 dex**

Other (formalin, radiation)

Virion Morphology

Shape	Dimensions	
Mean nm	Range nm	
Measurement Method	Surface Projections/Envelope	Nucleocapsid Dimensions, Symmetry

Morphogenesis

Site of Constituent Formation in Cell	Site of Virion Assembly	Site of Virion Accumulation
Inclusion Bodies	Other	

Hemagglutination

Hemaggiutination	Antigen Source	Erythrocytes (species used)
Yes	**SMB ext. by sucrose-acetone plus sonication (7)**	**Goose**

pH Range	pH Optimum
6.0-7.0	

Temperature Range	Temperature Optimum
RT	

Remarks

Serologic Methods Recommended
CF, NT

Footnotes

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

No neutralization of San Angelo obtained with WE (1.4 LNI) or SLE (1.7) antisera. No significant neutralization of WE, SLE, CoISK, MM or EMC viruses by San Angelo antiserum (3.8). No HI of WE or SLE viruses by San Angelo antiserum. Antigenic relationship [1] with immune sera prepared in guinea pigs by multiple ip injections of active virus (except California, BFS-283; immune rabbit serum used in NT was kindly supplied by Dr. W. McD. Hammon).

	San Angelo Virus Antigen				
	HI		CF		NT
Immune Sera or Antigens	Ht/Ho	Ratio	Ht/Ho	Ratio	Ht/Ho
California (BFS-283)	No HA/320		64/256	1/4	2.9/2.0
Trivittatus	No HA		8/512	1/64	2.1/4.4

	San Angelo Virus Immune Serum				
	HI		CF		NT
Immune Sera or Antigens	Ht/Ho	Ratio	Ht/Ho	Ratio	Ht/Ho
California (BFS-283)	320/No HA		64/128	1/2	4.3/3.8
Trivittatus	No HA		8/64	1/8	3.3/3.8

Cross CF testing with La Crosse virus and three Texas isolates of California group viruses by Feild, et al. [8] showed the following results.

Immune Sera or Antigens	San Angelo Antigen CF Ht/Ho	San Angelo Immune Serum CF Ht/Ho
La Crosse	256/512	32/64
Houston 46713	32/128	32/64
San Benito 41079	64/64	64/64
Lubbock EM 507	256/512	64/64

NT: LNI in dex

For detailed immunologic comparisons with other members of the California complex, refer to the California encephalitis virus registration card of the Arthropod-borne Information Exchange Catalogue and references [2] , [5] , and [6] .
SIRACA considers San Angelo virus as a subtype of California encephalitis virus [13] .

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)	SM 16				6	2 mm	5.6* (9)		
LLC-MK2 (CL)					3	2 mm	6.2 (9)		
BHK-21 (CL)			CPE (12)						

* 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
Anopheles p. 40;1) pseudopunctipennis	1/29 pools		Texas, USA, 1953-1959 (1)
Psorophora signipennis	1		Las Cruces, New Mexico, USA (14)
Man		0/6 NT	
Man		0/182 CF	
Coyote		1/1 NT	
Raccoon		1 *1/1 NT	
Opossum		3 *7 NT	
11 spp. of rodents and carnivores		0/20 NT	Texas, USA
Chicken		0/11 NT	
Man		1/255 **	
White-tailed deer		4/187 NT	Texas, USA (10)

* HI <20 with CE (BFS-283) (1)

** CF titer rise obtained with La Crosse antigen and confirmed by NT. Patient was 3 years old (8).

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)	AM2 CE1 AM1 SM1	ic .02	CNS signs and death	3-5	6
Mice (nb)		ip .1	CNS signs and death	5-7	
Mice (nb)		sc			
Mice (wn)	AM2	ic .03	CNS signs and death	4	4.5
Mice (wn)	AM2	ip .1	CNS signs and death	9-14	<1.0
Mice (nb)	AM2 CE1 AM1 SM3	ic .02	CNS signs and death	2	5.5-6.0
chick embryo (8 days)	AM2 CE4	am.s. .25	Death with hemorrhagic embryos in some	5	
chick (nb)	AM2 CE1 AM2	sc .1	No illness, no viremia		
guinea pig (ad)	AM1	ip 3.0	No illness, but antibody		

AM = adult mice

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 albopictus	Transovarial transmission (11)								

Section X - Histopathology

Character of lesions (specify host)

Inclusion Bodies — Intranuclear

Organs/Tissues Affected

Category of tropism

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)
Texas, USA (1)

Suspected (Antibody only detected)

Section XIII - References

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Remarks