

Virus Name: **Tahyna**

Abbreviation: **TAHV**

Status: Arbovirus

Select Agent:

SALS Level: 2

SALS Basis: S

HEPA Filtration:

Antigenic Group: California

Taxonomic status: *Bunyavirus*

Other Information: None.

Section I - Full Virus Name and Prototype Number

Full Virus Name:

Prototype Number:

Tahyna

92

Information from: Dr. Vojtech Bardos

Date:

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7/25/1984

Address: Institute of Parasitology, Czechoslovak Acad. Sci., 16632 Praha-6, Czechoslovakia

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Revised

Section II - Original Source

Isolated by: V. Bardos, and V. Danielova (1) at: Inst. Epid. Microbiol., Bratislava

Genus and species: *Aedes caspius* (pool of 50)

Sentinel X

Age/Stage: Adult Sex: F

Isolated From	Isolation detail
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Signs and symptoms of illness:

Arthropod engorged depleted X gravid

Time held alive before inoculation:

Collection date: 7/17/1958 Method: Entomological nets

Place collected: Tahyna village, Czechoslovakia

Latitude: 48° ' ' N

Longitude: 2° ' ' E

Macrohabitat: Lowland near Tahyna village

Microhabitat: Lowland forest and pasture

Method of storage until inoculated: 12 hours at -20dC and 10 days at -35dC

Footnotes:

Section III - Method of Isolation and Validity

Inoculation Date: 7/28/1958

Animal: nb mice

Embryonated egg:

Tissue Culture:

(Details in Section VI - Biologic Char.)

Route inoculated: ic and sc

Reisolation: Yes

Other reasons: No other virus like this in the laboratory.

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

Test used: HI

CF

NT

Other:

Footnotes:

Section IV - Virus Properties

Physicochemical:

RNA: X DNA: Single Strand: X Double Strand:
Pieces: 3 Infectivity: No Sedimentation coefficient(s): 32;24;12-14 (2)
Percentage wt. of virion protein , lipid carbohydrate
Virion polypeptides:
Number: Details:
Non-virion polypeptides:
Number: Details:
Virion density: Sedimentation coefficient:
Nucleocapsid density Sedimentation coefficient:

Stability of infectivity (effects) pH

Lipid solvent:
(ether) 1:5 After treatment titer 4.7 dex Control titer 6.5 dex (3)
(chloroform) 1:5 After treatment titer <1.0 dex Control titer 6.5 dex
Detergent:
(deoxycholate) 1:1000 After treatment titer 3.8 dex Control titer 6.5 dex
Other (formalin, radiation): Formalin 1:500; ttr_aft_: <1.0 dex ; contrl_ttr: 6.5 dex

Virion morphology:

Shape	Dimensions
Mean (nm) range (nm)	how measured
Surface projections, envelope	
Nucleocapsid dimensions, symmetry	

Morphogenesis:

Site of constituent formation in cell
Site of virion assembly Cytoplasm
Inclusion bodies
Other

Hemagglutination:

Hemagglutination Yes Antigen source SMB ext. by sucrose-acetone; Vero cell cultures
Erythrocytes Goose pH range 5.7-6.3 pH optimum 6.1
Temperature optimum 4dC range 4dC - 22dC
Remarks
Serologic methods recommended HI, CF, NT, IFA, counter immunoelectrophoresis
Footnotes:

Section V - Antigenic Relationship And Lack of Relationship To Other Viruses

Not related to the viruses of groups A, B, C, Bunyamwera [5] .

Relationship between Tahyna and California encephalitis viruses by hemagglutination-inhibition test [5]			
Antibody to:	Number of injections	Antigen	
		Tahyna	CE
Tahyna, New York	1	80	10
Tahyna, New York	2	320	40
Tahyna, Porterfield		80	20
California enc.	5	1280	1280
California enc.	6	2560	2560

Relationship between Tahyna and California encephalitis virus by neutralization test				
Serum	Virus			
	Tahyna (Porterfield)		CE	
	Titer, dex	Neutralization index	Titer, dex	Neutralization index
Tahyna, New York	2.7	4000	4.0	300
California enc.	2.7	4000	2.4	12000
Normal	6.3		6.5	

Relationship by complement-fixation test between Tahyna and viruses of the California encephalitis serogroup (Whitman and Shope)					
Antibody to:	Number of injections	Antigen			
		Tahyna	CE	Melao	TVT
Tahyna	3	16/256 *	8/128	0	0
CE	6	64/512	128/512		
Melao	6	128/256		256/512	
TVT	6	16/128			64/512

* Serum titer/antigen titer; 0 = <4/<4

Section VI - Biologic Characteristics

Virus source (all VERTEBRATE isolates): CNS (M)

Lab Methods of Virus Recovery (ALL ISOLATIONS): Newborn mice

Susceptibility of Cell Culture Systems:

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)	
Chick embryo (PC)	Strain 92, P-3 to >P-67	2-3	4+	5.5**	2	0.5-1.0	7.8-8.8**	
HeLa (CL)		4-5	4+	6.5-7.0				
Vero (CL)		3-5	4+	6.8	3	0.4-1.1	7.1	
Aedes aegypti (CL)			No CPE					+ (20)
Ae albopictus (CL)			No CPE					+ (21)
Anopheles stephensi (CL)			No CPE					+ (22)
An gambiae (CL)			No CPE					+ (23)

CPE and plaques produced in many cell cultures of human, lower primate, lower animal and avian origin (12-19). A few important examples are given below.

** 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
<p>ISOLATIONS - MAN (blood): 3/13, 2/11 Czechoslovakia; 3/79 USSR; 1/1 (lab.inf.) Norway. RABBIT (blood): 1/16 Czechoslovakia; 2/91 Austria (6-11).</p> <p>ANTIBODY - MAN: 157/948 NT Europe; 6/79 NT Lumbo, Mozambique, Africa; 10/400 NT Ndumu, Natal, South Africa; 156/925 NT Tadjik, USSR (23-25). ANIMALS: Erinaceus roumanicus 7/164 NT Czechoslovakia, Austria; Insectivora (3 species) 0/30 NT Austria; Chiroptera (4 species) 0/144 NT Czechoslovakia, Austria; Vulpes vulpes 1/7 NT Austria; Rodentia (7 species) 2/2 NT Czechoslovakia, Austria; Lepus aereopus 163/451 NT Czechoslovakia, Austria; 2/3 NT France; Oryctolagus cuniculus 17/181 NT Czechoslovakia, Austria; 21/39 NT France; Sus scrofa 1/3 NT Austria, 3/4 HI France; Capreolus capreolus 4/15 NT Czechoslovakia, Austria; Canis familiaris 3/9 NT Czechoslovakia; Sus scrofa domestica 93/195 NT Czechoslovakia, Austria; Bos taurus 97/895 NT Czechoslovakia, Austria, 27/1,165 HI Portugal; Equus caballus 65/103 NT Czechoslovakia, Austria; 21/61 HI Czechoslovakia, /150 (>50.0%) NT France. BIRDS: 37/513 (56 species) NT Czechoslovakia; Phasianus colchicus 0/44 NT Czechoslovakia; birds 0/400 (39 species) HI Portugal; Sturnus vulgaris 2/32 NT Austria; Birds 0/755 (27 species) HI Austria; Anseriformes 11/144 NT; Birds 0/280 (29 species) HI Czechoslovakia (26-44).</p> <p>ISOLATIONS - MOSQUITOES: Aedes (Aed) caspius 2; Ae vexans 3; Ae cantans 2; Culiseta annulata 1; Ae cinereus 6; Ae sticticus 1; Culex (Cux) modestus 1; Culiseta annulata larvae 1 Czechoslovakia; Ae caspius and Ae vexans 2, Italy; Culicidae (70% Ae vexans) 54 Fed. Rep. Germany; Ae (Sku) pemaensis 12 Mozambique; Anopheles hyrcanus 1 Azerbaijan, USSR; Ae sticticus, Ae dianteus, Norway; Ae vexans, Yugoslavia (9,24,45-53); Aedes communis 1 Murmansk region, USSR (54).</p>			

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)	SMB 11, ""92""	ic 0.15	Encephalitis and death	2-5	8.8
Mice (nb)		ip			

Mice (nb)	sc 0.03	Encephalitis and death	2-5	6.2
Mice (wn)	ic 0.03	Encephalitis and death	3-6	7.0
Mice (wn)	ip 0.1	Sporadic encephalitis	5-6	<1.0

Death produced in suckling mice (ic and ip), weanling mice (ic), suckling white rats (ic and sc), Syrian hamsters (ic), chick embryos (ys). No illness: weanling mice (ip), adult white rats (ic), guinea pigs (ic), rabbits (ic). Viremia produced in suckling pigs, horses, hares, rabbits, hedgehogs (5,10,).

Viremia and antibody production (NT, CF, HI) after sc inoculation in rhesus, *M. radiata*, *C. aethiops*, and *P. troglodytes*, Tahyna virus infection with illness transmitted to chimpanzees by *Culiseta annulata* (32,33).

Not susceptible: Squirrels, pheasants, frogs, sand lizards, ringed snakes (4,24,26,30).

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
Tahyna will multiply in or be transmitted to mice by bite of experimentally infected <i>Culiseta annulata</i> , <i>Aedes sticticus</i> , <i>Ae vexans</i> and <i>Ae communis</i> (18,24,26,28,32-).									
Ixodes ricinus nymphs do not maintain infection after feeding on viremic hamsters (18,26).									

Section X - Histopathology

Character of lesions: Neuronal degeneration, edema, glial cell proliferation and perivascular infiltration (7).

Inclusion bodies:

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

Organs-tissues affected: Brain (LV)

Category of tropism: Neurotropic

Section XI - Human Disease

Human disease: **In nature:** (S) X

Death: (S) (R)

Residua: (S) (R)

Laboratory infections: **Subclinical:** (S) (R)

Overt Disease: (S) (R)

Clinical manifestations: Headache (R), prostration, fever, conjunctival inflammation, myalgia, vomiting, stiff neck, CNS signs

Category: Febrile illness

No. of cases: Several hundred; seven cases with virus isolation from blood

Section XII - Geographic Distribution

Known (virus):

In many countries of Europe, Africa and Asia, USSR

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Section XIV - Remarks
