

<b>Virus Name: Crimean Hemorrhagic Fever</b>		<b>Abbreviation: CHFV</b>
Status <b>Arbovirus</b>	Select Agent <b>No</b>	SALS Level <b>4</b>
SALS Basis <b>Level assigned to prototype or wild-type virus. A lower level may be recommended for laboratory strains or geographic variants of the virus with well-defined reduced virulence characteristics, as mentioned in the text.</b>		
Other Information		
Antigenic Group <b>CHF-Congo</b>		

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

Prototype Strain Number / Designation <b>Kodzha</b>	Accession Number	Original Date Submitted <b>10/16/1984</b>
Family <b>Bunyaviridae</b>	Genus <b>Nairovirus</b>	
Information From <b>Chumakov, M.P., Donets, M., Smirnova, S.</b>	Address <b>Institute of Poliomyelitis, Moscow, USSR</b>	
Information Footnote <b>Reviewed by editor</b>		

**Section II - Original Source**

Isolated By (name) <b>Dr. M.P. Chumakov, et al (2,3,5-7,9)</b>	Isolated at Institute <b>Inst. of Poliomyelitis, Moscow, USSR</b>	
Host Genus <b>Man</b>	Species	Host Age/Stage <b>33 years</b>
Sex <b>Male</b>		
<u>Isolated From</u>	<u>Isolation Details</u>	
<b>Clot</b>		
<b>Serum/Plasma</b>		
Signs and Symptoms of Illness <b>Fever, headache, vomiting, hem. syndrome, prostration and death (7 days)</b>	Arthropod	
Time Held Alive before Inoculation		
Collection Method <b>Venipuncture</b>	Collection Date <b>6/14/1967</b>	
Place Collected (Minimum of City, State, Country) <b>Samarkand region, Uzbek SSR (Central Asia)</b>		
Latitude <b>39° 45' N</b>	Longitude <b>69° 40' W</b>	
Macrohabitat	Microhabitat	Method of Storage until Inoculated <b>4dC to 8dC (8 days)</b>
Footnotes		

Inoculation Date  
**6/22/1967**

Animal (Details will be in Section 6)  
**nb mice**

Route Inoculated  
**ic and ip**

Reisolation  
**Not tried**

Other Reasons

Homologous Antibody Formation by Source Animal  
**Not tested**

Test(s) Used

Footnotes

## Section IV - Virus Properties

Physicochemical  
**RNA, Single Strand**

Pieces (number of genome segments)	Infectivity	Sedimentation Coefficients (s)
<b>3</b>	<b>No</b>	<b>32; 24; 16(S)</b>

Percentage wt, of Virion Protein	Lipid	Carbohydrate
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Virion Polypeptides: Number	Details
	<b>N protein, MW 40,000 (by gelfiltration) Soluble antigen, MW 40,000 (by gelfiltration) N protein and soluble antigen perhaps one protein with group reactivity by CF</b>

Non-virion Polypeptides: Number	Details
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Virion Density	Sedimentation Coefficients(s)
<b>1.17 gm/cc in sucrose (8)</b>	<b>425 + - 25 (8)(S)</b>

Nucleocapsid Density	Sedimentation Coefficients(s)
<b>1.32 - 1.33 gm/cc in CsCl</b>	<b>(S)</b>

**Stability of Infectivity (effects)**

pH (infective range)  
**Infectivity retained at pH 6.0 - 9.5 (8)**

Lipid Solvent (ether - % used to test)	After Treatment Titer	Control Titer
<b>20%</b>	<b>3.3 dex</b>	<b>6.6 dex</b>

Lipid Solvent (chloroform)	After Treatment Titer	Control Titer
<b>5%</b>	<b>2.8 dex</b>	<b>6.5 dex</b>

Lipid Solvent (deoxycholate)	After Treatment Titer	Control Titer
<b>1:1000</b>	<b>2.8 dex</b>	<b>6.2 dex</b>

Other (formalin, radiation)  
**UV inactivation : 99% (1 min by 15-w UV lamp)**

**Virion Morphology**

Shape	Dimensions
<b>Spherical</b>	<b>90 - 100 nm</b>

Mean	Range
<b>90 nm</b>	<b>90 - 100 nm</b>

Measurement Method <b>Electron microscope; gelfiltration (CPG)</b>	Surface Projections/Envelope <b>Projections, 8-10 nm long; envelope present</b>	Nucleocapsid Dimensions, Symmetry <b>Filaments, possibly helical</b>
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**Morphogenesis**

Site of Constituent Formation in Cell	Site of Virion Assembly <b>Intracytoplasmic; smooth membrane interfaces, Golgi complex vesicles</b>	Site of Virion Accumulation <b>Cytoplasmic vacuoles</b>
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Inclusion Bodies <b>No</b>	Other
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**Hemagglutination**

Hemagglutination <b>Yes</b>	Antigen Source	Erythrocytes (species used) <b>Goose</b>
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pH Range <b>7.0-7.6</b>	pH Optimum
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Temperature Range	Temperature Optimum <b>37dC</b>
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Remarks

Serologic Methods Recommended  
**CF, AGDP test, IFA, NT**

Footnotes

Summary of studies on the antigenic relationships of the CHF-Congo group viruses [13]. For other pertinent studies, see References [1], [4], [14], and [16].

Tests	CF <sup>a</sup>			AGDP <sup>b</sup>			NT <sup>c</sup>			IFA <sup>d</sup>		
	CHF Khodzha	CON JD 206	HAZ JC 280	CHF Khodzha	CON JD 206	HAZ JC 280	CHF Khodzha	CON JD 206	HAZ JC 280	CHF Khodzha	CON IbAr 10200	HAZ JC 280
CHF, Khodzha	80/128	80/128	0	+	+	0	2.8	2.5	0.7	75%	70%	0
Congo, (CON) IbAr10200	80/128	80/128	0	+	+	0	2.3	2.8	1.0	85%	85%	0
Congo, JD 206	80/128	80/128	80/16	+	+	0	2.0	2.8	1.1	60%	65%	0
Hazara. (HAZ) JC 280	0	0	80/256	0	0	0	0.7	0.6	2.5	0	0	45%

<sup>a</sup> Antigen titer/serum titer; 0 = <5/<4

<sup>b</sup> + = precipitation bands present, 0 = negative result (tissue culture antigens concentrated with PEG were used in the tests).

<sup>c</sup> LNI determined in newborn mice and expressed in dex.

<sup>d</sup> Mean percent of the number of the antigen-containing cells to the number of the examined cells in each preparation (culture of 6619 cells).

Lack of relationship with viruses of tickborne encephalitis, Omsk hemorrhagic fever, hemorrhagic fever with renal syndrome, Bolivian hemorrhagic fever, Argentinean hemorrhagic fever, Kyasanur Forest disease, Kemerovo, Bandia, Bhanja, Chenuda, Colorado tick fever, Uukuniemi, Wad Medani, and West Nile.

## Section VI - Biologic Characteristics

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

Lab Methods of Virus Recovery (ALL ISOLATIONS)  
Newborn mice

Cell system (a)	Virus passage history (b)	Evidence of Infection							Growth Without CPE +/- (g)		
		CPE			PLAQUES						
		Day (c)	Extent (d)	Titer TCD50/ml (e)	Day (c)	Size (f)	Titer PFU/ml (e)				
GMK(PC), PS (CL) 6619 (CL)	P-20				5-7	1-3 mm	7.4e	+			

This strain Khodzha multiplied in the cell cultures without any cytopathic effect, but with the accumulation in the cell cytoplasm of fluorescent antigen, formation of cytoplasmic inclusions reacting for RNA, and infectious virus in the culture fluid in titers of 3.0-4.0 dex LD50/0.02 ml.

e 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
Man (blood)	35		European regions of the USSR
Man (blood)	17		Asian regions of the USSR
Man (blood)	5		Nosocomial outbreak, Rawalpindi, Pakistan(17)
Man (blood)	3		Iraq (18)
Man (blood)	1		Transvaal, S.Africa(21)
Hare (blood, liver)	6	3%	Crimea; Astrakhan oblast, USSR
Hyalomma plumbeum plumbeum	50		Crimea; Rostov and Astrakhan regions; Azerbaidzan; Armenia Kalmyk, USSR
Hyalomma plumbeum turanicum	3		Kirgizia; Uzbekistan, USSR
Hyalomma anatolicum anatolicum	8		Uzbekistan,, Tadzikistan(11);Armenia; Kasakhstan

Hyalomma asiaticum asiaticum	56	Turkmenia; Uzbekistan, USSR
Hyalomma detritum	5	Uzbekistan, USSR
Haemaphysalis punctata	2	Moldavia; Crimea, USSR
Rhipicephalus bursa	2	Armenia; Crimea, USSR
Rhipicephalus pumilio	2	Uzbekistan, USSR
Rhipicephalus sanguineus	1	Crimea, USSR
Rhipicephalus rossicus	13	Rostov region; Krasnodar area, USSR
Rhipicephalus turanicus	1	Uzbekistan, USSR
Dermacentor marginatus	4	Rostov regions;Moldavia; Uzbekistan, USSR-
Ixodes ricinus	6	Moldavia; Crimea, USSR
Boophilus calcaratus	2	Armenia;, Uzbekistan, USSR
Argas persicus	3	Uzbekistan, USSR
Alveonatus laborensis (engorged larvae)	1	Iran (20)

Antibody in cows (5.6-33%), sheep (12-32%), horses (2.8-52%), goats (3.9-62%), camels (2-19%), donkeys (17-26%), bats (15%; France), and wild rodents (2.9%) in the USSR, Bulgaria, Afghanistan, Senegal, Uganda, Iran, Turkmenia, Tadzikistan, Iran and France (9).

Experimental host and age	Passage history and strain	Inoculation Route-Dose	Evidence of infection	AST (days)	Titer log <sub>10</sub> /ml
Mice (nb)	Khodzha, 10-30p	ic	Death, viremia	4	7.5
Mice (nb)		ip	Death, viremia	5-6	5.5
Mice (nb)		sc	Death, viremia	5-6	5.5
Mice (wn)		ic	Death, viremia	6-7	4.5
Mice (wn)		ip	Death, viremia	7	3.5
white rats (nb)		ic	Death, viremia	4-5	6.5
white rats (wn)		ip	None		
cotton rats (nb)		ic	Death	4-5	6.5
cotton rats (nb)		ip	Death	5-6	4.5
hamsters (50 gm)		ip	None		
guinea pigs (200 gm)		ip	Viremia, no deaths		
rabbits (450 gm)		ip	Viremia, no deaths		
rhesus monkeys		ip	Viremia, no deaths		
sheep (40 kg)		iv	Viremia, no deaths		
donkeys (90 kg)		iv	Viremia, no deaths		
calves (100 kg)		iv	Viremia, no deaths		

**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
Hyalomma plumbeum plumbeum	5.0-5.5		5-6		rabbit	58/108	4.0-4.5		
		7.5-8.7	5	37C			5.0-5.5		

NOTE: Hyalomma p. plumbeum = Hyalomma m. marginatum of Hoogstraal.

**Section X - Histopathology**

Character of lesions (specify host)

**In newborn mice: The lesions detected in the CNS showed degenerative- necrotic changes in neurons and vascular inflammatory reactions. As a rule, there was only insignificant diffuse proliferation of glial elements (12).**

Inclusion Bodies

Intranuclear

Organs/Tissues Affected

Category of tropism

**Neurotropic**

**Section XI - Human Disease**

In Nature  
**Significant**

Residual

Death  
**Significant**

Subclinical

Overt Disease  
**Reported**

Clinical Manifestations

**Fever, headache, vomiting, hemorrhagic syndrome (10)**

Number of Cases  
**More than 2,000**

Category (i.e. febrile illness, etc.)  
**Hemorrhagic fever**

**Section XII - Geographic Distribution**

Known (Virus detected)

**European and Asian regions of the USSR, Bulgaria, Greece, Uganda, Senegal, Zaire, Nigeria, Pakistan, Kenya, Iraq (18), S. Africa (19), Iran (20), Mauritania (24)**

Suspected (Antibody only detected)

**Hungary, France, Afghanistan, India, Mauritania (22, 23, 24)**

### Section XIII - References

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### Remarks

**Crimean hemorrhagic fever virus is antigenically indistinguishable from the previously registered Congo virus. The registration for Crimean hemorrhagic fever virus contains information which is not found in the registration for Congo virus. (Editor)**