| Virus Name: Silverwater | Abbreviation: SILV |
|---|---|

Status
**Probable Arbovirus**

Select Agent
**No**

SALS Level
**2**

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

Other Information

Antigenic Group
**Kaisodi**

## SECTION I - Full Virus Name and Prototype Number

Prototype Strain Number / Designation
**No. 131**

Accession Number

Original Date Submitted
1/21/1985

Family
**Bunyaviridae**

Genus
**Bunyavirus-like**

Information From
**Donald M. McLean, M.D.**

Address
**Division of Medical Microbiology, Univ. of British Columbia, Vancouver, B.C. V6T 1W5, Canada**

Information Footnote
**Reviewed by editor**

## Section II - Original Source

Isolated By (name)
**Donald M. McLean**

Isolated at Institute
**Hospital for Sick Children, Toronto, Canada**

Host Genus
**Haemaphysalis leporispalustris ticks**

Species

Host Age/Stage

Sex
**Not Answered**

Isolated From

Isolation Details

Signs and Symptoms of Illness

Arthropod
**Engorged**

Time Held Alive before Inoculation
**<1 week**

Collection Method

Collection Date
**6/12/1960**

Place Collected (Minimum of City, State, Country)
**Silverwater, Ontario, Canada**

Latitude
**46° N**

Longitude
**82° W**

Macrohabitat
**Rural lakeside area surrounded by grass and nearby mixed deciduous and coniferous forest**

Microhabitat
**Attached to two Lepus americanus (snowshoe hares)**

Method of Storage until Inoculated
**Held alive at <10dC for <1 week, then stored at -70dC**

Footnotes

## Section III - Method of Isolation

Inoculation Date
**8/23/1960**

Animal (Details will be in Section 6)
**nb 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<br>**Molecular studies conducted with Silverwater virus (Kaisodi serogroup) have indicated that its RNA species and its poly- peptides resemble those of Uukuviruses (12).** | |
| 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) | After Treatment Titer | Control Titer |
| Lipid Solvent (chloroform) | After Treatment Titer | Control Titer |
| Lipid Solvent (deoxycholate)<br>**1:1000** | After Treatment Titer<br>**3.5 dex** | Control Titer<br>**5.0 dex** |

Other (formalin, radiation)

**Virion Morphology**

| | | |
|---|---|---|
| Shape | Dimensions | |
| Mean<br>nm | Range<br>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<br>**No** | Antigen Source | Erythrocytes (species used) |
| pH Range | pH Optimum | |
| Temperature Range | Temperature Optimum | |

Remarks

Serologic Methods Recommended
**CF, NT**

Footnotes

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

Silverwater virus diluted to contain 30 to 100 intracerebral newborn mouse LD50 was not neutralized by antisera to the following viruses: EEE, WEE, SLE, POW, CTF, BUN.
No complement-fixation reactions with Silverwater antigen in the presence of antisera to the above-mentioned viruses, except CTF which was not tested. Antigens of POW, BUN, SLE, and EEE did not fix complement in the presence of SIL antiserum.
The Yale Arbovirus Research Unit showed that Silverwater is related to Kaisodi and Lanjan by cross CF tests and thus is a member of the Kaisodi group [4] .

## Section VI - Biologic Characteristics

Virus Source (all VERTEBRATE isolates)

Lab Methods of Virus Recovery (ALL ISOLATIONS)
**Newborn 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) | |
| Rhesus kidney (PC) | SMB 2 | | No CPE | | | | | | |
| BHK-21, Vero (CL) | | | CPE (8) | | | | | | |
| LLC-MK2 (CL) | P-5 | | | | 6 | 3 mm | 7.2* (10) | | |
| Vero (CL) | | | | | 15 | 2 mm | 5.0 (10) | | |

* 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 | | 0/156 CF | Manitoulin Is., Ontario, Canada (3) |
| Lepus americanus (snowshoe hare) | | 19/309 CF | |
| Lepus americanus | | 21/137 CF | Powassan, Ontario, Canada (5, 6) |
| Lepus americanus | | 292/1179 NT | Alberta, Canada (9) |
| Tamiasciurus hudsonicus (red squirrel) | | 2/23 NT | |
| Eutamias minimus (chipmunk) | | 1/1 NT | |
| Bos taurus (cattle) | | 4/37 NT | |
| Canis laterans (coyote) | | 2/5 NT | |
| Lepus americanus (blood) | 3 | | Rochester, Alberta, Canada (7, 8) |
| Haemaphysalis leporispalustris | 2/49 | | Manitoulin, Is., Ontario, Canada (3) |
| H. leporispalustris | 2/80 | | Powassan, Ontario, Canada (5, 6) |
| H. leporispalustris larvae, nymphs, adults | 13 | | Rochester, Alberta, Canada (7, 8) |
| H. leporispalustris eggs | 2 | | Rochester, Alberta, Canada (8) |
| H. leporispalustris adults | 1 | | Wisconsin, USA (8) |
| H. leporispalustris | 1 | | Dome, Alaska, USA (11) |

## 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) | No. 131, SMB 2 | ic 0.02 | Encephalitis, death | 5-6 | 5.0 |
| Mice (nb) | | ip | | | |
| Mice (nb) | | sc | | | |
| Mice (wn) | SMB 4 | ic 0.03 | Encephalitis, death | 12 | 1.0 |
| Mice (wn) | | ip | | | |
| hamster (ad) | SMB 2 | sc 0.03 | Viremia 4th, 6th days, survived; CF antibody 27th, 46th days | | |
| rabbit (ad) | | sc 0.03 | CF antibody 27th day, survived | | |
| guinea pig (ad) | | ip 0.01 | CF antibody 26th day, survived | | |
| Lepus americanus (yg,ad) | Low | ic,iv | Viremia in 3/9 animals (8) | 5 | 3.0-5.0 |

## 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 |

## Section X - Histopathology

Character of lesions (specify host)
**Minimal features of encephalitis in mouse brain**

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)
**Ontario, Alberta, Canada; Wisconsin, Alaska, USA**

Suspected (Antibody only detected)
**Utah (9)**

## Section XIII - References


1. McLean, D.M. 1961. Fed. Proc. 20:443.
2. McLean, D.M., et al. 1961. J. Infect. Dis. 109:19-23.
3. McLean, D.M., et al. 1962. Can. Med. Assoc. J. 86:971-974.
4. Casals, J. Personal communication.
5. McLean, D.M., et al. 1964. Am. J. Trop. Med. Hyg. 13:747-753.
6. McLean, D.M., et al. 1966. Can. Med. Assoc. J. 94:532-536.
7. Yuill, T.M., et al. 1969. Bull. Wildl. Dis. Assoc. 5:248-253.
8. Hoff, G.L., et al. 1971. Am. J. Trop. Med. Hyg. 20:320-325.
9. Hoff, G.L., et al. 1971. Am. J. Trop. Med. Hyg. 20:326-330.
10. Stim, T.B. 1969. J. Gen. Virol. 5:329-338.
11. Ritter, D.G. and Feltz, E.T. 1974. Can. J. Microbiol. 20:1359-1366.
12. Clerx, J.P.M. et al. Ann. Meeting Am. Soc. Trop. Med. Hyg., San Juan, Puerto Rico. Nov. 17-20, 1981.


## Remarks