FAMILY Herpesviridae

- Introduction
- A large diverse family of DNA virus
- It infects Humans and a wide variety of animal host
- Are large in size and noted for their ability to cause latent infection
- Are divergent with regard to genome sequence and protein biological properties
- But are similar in overall virion structure
- And genome organization
- Viral characteristics
- They are enveloped, double stranded DNA Viruses (100 -200nm in diameter with an icosahedral capsid
- The virions consist of four structural units:

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1. The core of DNA around that Wrapped a protein fibrilar spool;
2. A capsid composed of 12 pentameric and 150 hexameric capsomeres
3. An amorphous protein layer between the capsid and the envelope
4. The envelope

- Viral characteristics (Contd)
- The envelep has projections (spikes) evenly distributed over its surface
- The dsDNA is used as a template for the production of progeny genomes and mRNAs,
- Following fusion of the viral envelope with the cell membrane, the nudeocapsid migrates to the cell nucleus, where replication takes place.
- Viral characteristics (Cond)
- Viral transcription is divided into immediate early, early, and late early transcription. The structural proteins and the genome (DNA and RNA) re assembled into icosahedral or helical virions, then released.
- Certain host cells can prevent the transcription of genes and thus the viral genome persist, does not replicate, and the host cell doesn't die. This constitutes a form of viral latency.
- All herpesviruses thus far examined have the capacity for latency in host cells
- There is no common antigen
- Classification of the family Herpesviridae
- Divided into three sub-families

These are

1. Alphaherpesvirinae
2. Betaherpesvirinae

3. Gammaherpesvirinae

Alphaherpesvirinae

- Have relatively short replication cycle (24 hrs)
- A variable host range
- Causes rapid destruction of cultured cells
- Members of this sub-family establish latent infections in nueral cells
- Most herpesviruses of vet importance are found in the geniu7s varicelloviruses

Betaherpesvirinae

- Are of little vet. Importance
- Contains three genera
  - (i) Cytomegalovirus
  - (ii) Muromegalovirus
  - (iii) Roseolovirus

Gamaherpesvirinae

- Contains two genera
  - (i) Lymphocrptovirus (Marine & Fresh Water Fish)
  - (ii) Rhadinovirus (Disease in marmosets and monkeys)

Unassigned Genera

- Porcine Herpesvirus2 e.g. inclusion body rhinitis
- Anatid herpesvirus1 e.g Duck viral enteritis
- **Herpesvirus Infection**: **General**
- All herpesvirus are thought to be capable of establishing latent infection
- The classic example is Human Herpesvirus 1 (HSV-1) which infects the dorsal root ganglia
- The Virus is latent between episodes of coldsores
- During latency, only a small region of viral genome is expressed
- Although no protein has been identified as a product of this transcription
- The mechanism of this reactivation of the infection is not understood
- Some virus species infecting eukaryotic hosts are cell-associated and a small number are uncogenic
- Many infections are silents or mild in natural hosts but serious in other hosts

For example, pseudorables virus has broad range host and causes fatal encephalitis in variety of animal specie but not in natural host-the adult pig

- **T**hey are widespread and are frequently recoverd in diagnostic laboratory ass they can be readily cultivated in cell cultures
- Some produce pocks on the**CAM**
- A general rule is that every animal specie harbors are least one Herpesvirus
- Herpes Virus of Veterinary Importance
- Family-Herpessviridae

A-subfamily-Aphaherpesvirinae

Genus: Varicellavirus

(i) Bovine Herpesvirus1

* Causes infections bovine rhinotrachitis(IBR) Pustular vulvovaginitis/balanoposthitis

(ii) Bovine Herpesvirus5

* Causes Meningo-encephalitis of cattle

(iii) Porcine Herpesvirus 1

- Causes pseudorabies or Aujesky's Disease
  - Clinical specimen – brain, lungs,m tonsils, spleen, kidney, liver & serum in other animals other than pig a portion of the subcuyanerus tissues is taken from site of piritus.
  - Herpes virus of Veterinary Importance (Contd.)

(iv) Canine Herpesvirus1

Clinical specimen, lung, kidney

(v) Equine Herpesvirus abortion

Clinical specimen- Foetal iver, spleen & thymus Natal swabs, wholeblood cercbrospinal fluid, acute and convalescent sera, brain from horses with CNS disease.

(vi) Equine herpesn3

- Causes equine coital exanthema
- Clinical specimen-scrapping from lesions

(vii) Feline Herpes 1

- Causes feline viral rhinotracheitis
- Clinical specimen- conjectural scrapping & swabs, nasal swabs, lung & trachea of necropied cat.
- Herpes Viruses of Veterinary Importance (Contd.)

2. Marek's Disease like Virus

(i) Gallid herpes virus

- Causes Marek's Disease
- Specimen-whole bird

3. Infectious Larygo-tracheitis like virus

- Gallid herpes virus1
- Causes infection larygotracheitis
- Clinical specimen-trachea and lung

4. Simplexvirus

- Bovine herpesvirus
- Causes ulcerative mammithitis, Pseudolumpy skin disease

(ii) Cercopithecine herpes 1 (B virus of monkey)

- Infects Asian malagne monkeys naturally, has created rare fatal encephalitis in monkey handlers
- Herpes Viruses of Veterinary Importance (Contd.)

B. Subfamily-Gammaherpesvirinae

Genus: Rhadinovirus

(i) Alcelaphine herpes Virus 1

* Causes malignant catarrhal fever in cattle, deer and other ruminants in Africa-natural host is the wildbeast.
  Clinical specimen-Fresh leucocyle (buffy coat), fresh thyroid and adrenal tissue, serum.

(ii) Ovine Herpes Virus 2

* Causes malignant catarrhal fever in cattle and some wild ruminant; sheep are the natural host-occurs worldwide.
* Herpes Viruses of Veterinary Importance (Contd.)

C. Unassigned Genera

(i) Porcine herpesvirus 2

* Causes inclusion body rhinitis

(ii) Anatid Herpes virus 1

- Causes Duck viral enteritis
- Family Poxiviridae

Introduction

- These are double stranded DNA virus
- Are the largest and the most complex of known animal viruses
- The infect many vertebrates and insect species
- Unlike the other viruses, some pox viruses are large enough to be seen with a leajet microscope

Viral Characteristics

- Large, enveloped (some virions contain double envelope), double stranded DNA virus

- The capsid/nucleocapsid is brick shaped to avoid containing the genome and lateral bodies (function unknown)

- The large complex genome consist of single, linear molecule of double stranded SNA that codes for approximately 200 proteins. The ends are ligated to each other so the DNA molecule is continuous, without free ends.

- There are the only DNA viruses known to complete their replication cycle in the cytoplasm

- **VIRAL CHARACTERISTICS (CONTD.)**

- Virus of this family posses at least 10 major antigen with a common nucleonprotein antigen, which accounts for cross-reactivity among species.

- There are at least 10 viral enzymes contained within the virus particle, many of which function in nucleic acid metabolism and genome replication.

- Poxviruses remain viable in scabs for long periods

- Some (mainly orthoxvirus) produce hemagglutinins that agglutinate red blood cells

- Eosinophilic inclusions called Gaurnieri bodies may be produced in infected cells/tissues