Family Birnaviridae

Birna = bisegmented viral genome (dsRNA)

General properties:

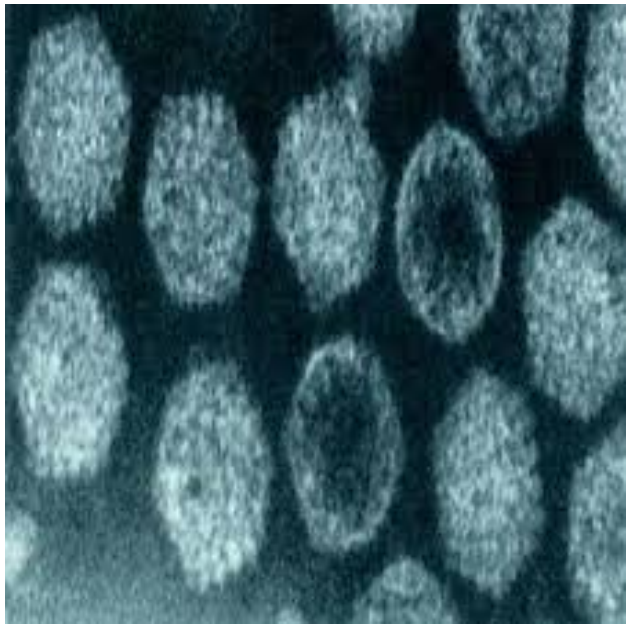
*** Morphological properties:**

Hexagonal Shaped (roughly spherical),

60 nm diameter,

icosahedral symmetry capsid,

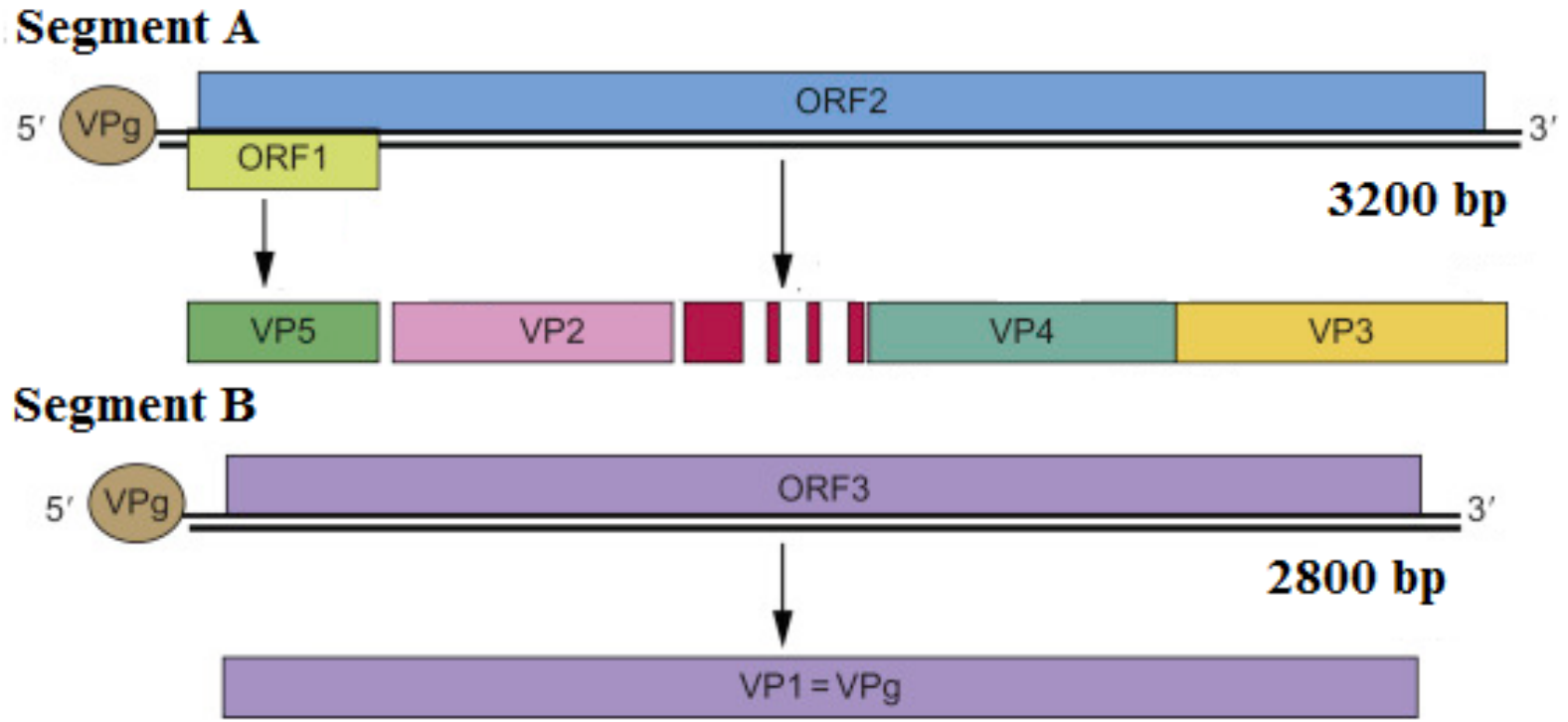
non enveloped.



*** Virion structure:**

Genome structure:

Linear double stranded RNA (6000 bp), Segmented to two segments (A & B)



***Segment A 3.2 kbp codes for:**

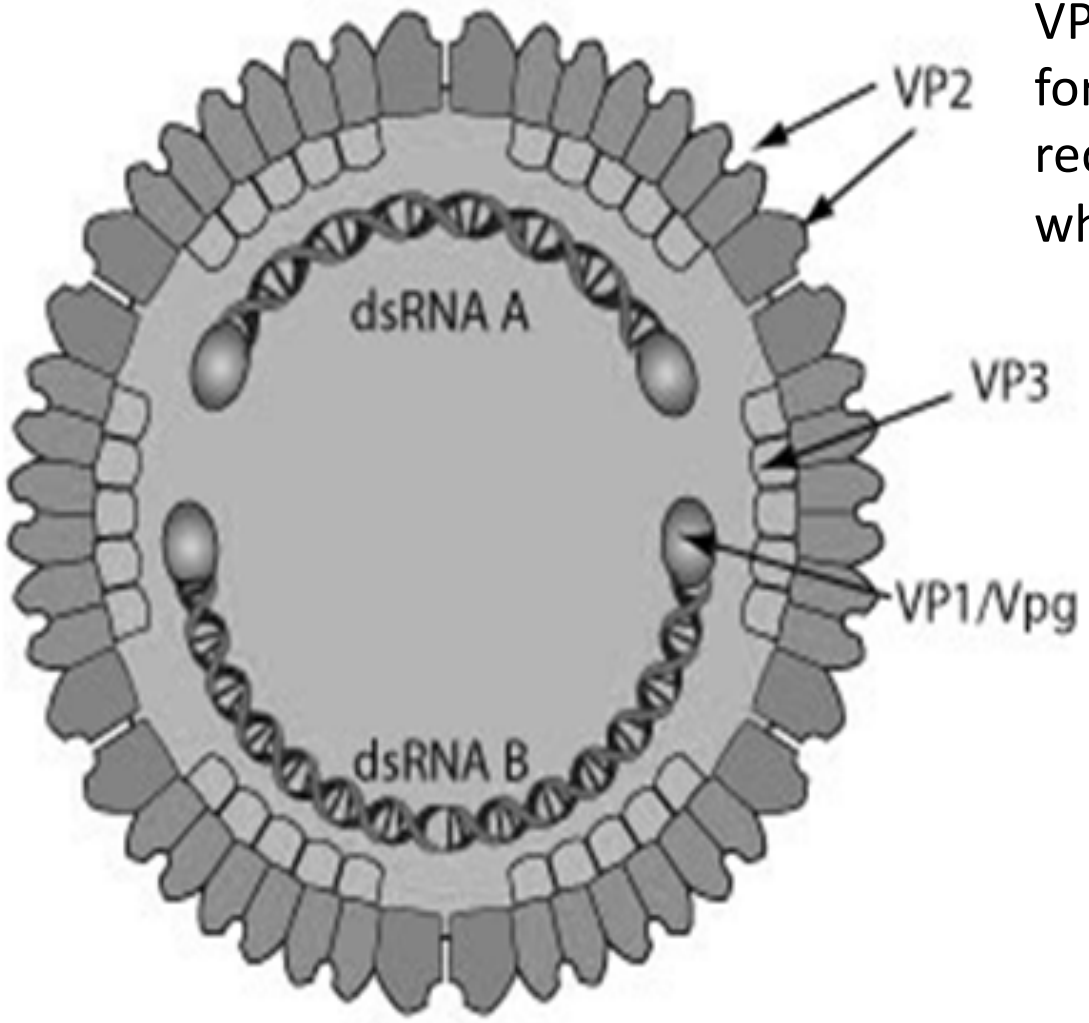
VP2 & VP3 capsid structural proteins,

VP4 (viral protease) & VP5 non-structural proteins

***Segment B 2.8 kbp codes for:**

VP1 (RNA polymerase) exists as a genome-linked protein (VPg) circulizing segment A & B

* Protein structure and antigenicity:



VP2: surface capsid protein responsible for attachment of the virus with cell receptor, type specific antigen against which neutralizing antibodies.

VP3: core capsid protein, group-specific antigen of the virus

VP1 core antigen exists as a genome-linked protein (VPg) for both segments A & B

Biological properties:

*** Virus Multiplication Cycle:**

- The virus enter the cell by endocytosis.
- Nucleic acid transcription, replication and assembly occurs in cell cytoplasm
- The virus release from the cell after cell lysis.

Physico-chemical properties:

- The virus is relatively heat stable (resist temperature of 37°C for 90 minutes and 56°C for 5 hours).
- The virus is resistant to pH 3 and to ether and chloroform.
- The virus has survived in a house for 122 days after removal of infected birds & in contaminated feed, water & feces for at least 52 days.
- It is inactivated by 1% formalin, 1% cresol and 1% phenol for one hour.

Family Birnaviridae,
Genus Avibirnavirus
Species Infectious Bursal Disease Virus (IBDV)
Gumboro disease

IBD virus is highly contagious infect young chickens (3-6 weeks old) causing an immunosuppressive disease (destruct B lymphocytes in bursa of Fabricius = lymph proliferative condition), Increase susceptibility to other infections and cause vaccine failure.

- The bursa became markedly enlarged and contains caseous material with severe edema followed by atrophy.
- Lesions in spleen, thymus and caecal tonsil.
- Hemorrhages on the serosal surface and in leg muscles.
- The morbidity rate is 100% and the mortality reach 30% in a flock.

Antigenic properties: IBDV strains has 2 different serotypes;

Serotype 1: Pathogenic IBDV affecting poultry and include **classic**, **very virulent** & **variant** IBDV strains .

Serotype 2: Apathogenic IBDV.

Laboratory diagnosis of IBDV:

Lesions as swelling of bursa, gelatinous to yellowish or even hemorrhagic in appearance are suggestive of IBD.

* The preferred samples

Bursa and spleen (high concentration of virus), feces, cloacal swabs

• Virus isolation:

- Fertile egg:

- The virus inoculated on CAM, allantoic sac, yolk sac; death of egg embryo after 3 - 5 days and peak virus titers after 72 hrs.
- The embryo show subcutaneous edema, hemorrhages of feather tracts, spleen , liver, kidneys & congested lungs.
- There are small hemorrhages on the CAM.

- Tissue culture:

- The egg adapted virus grows in CEF and CEK cells and produce CPE after 3 - 5 days and peak titers after 48 hours of inoculation.
- Cell cultures derived from bursa of chicken and B Lymphocytes are highly susceptible.

*** Direct Identification:**

A- Serological identification:

Virus Neutralization Test (VNT): using specific antiserum.

Fluorescent Antibody Technique (FAT): Carried on Impression smears of bursal tissue using conjugated specific antiserum.

B- Non Serological identification:

RT-PCR: using primers specific for VP2 gene.

Electron Microscope examination:

detect the virus depending on its specific morphological characters.

*** Indirect serological identification as SNT and AGPT:** detect antibodies in serum from infected chickens at convalescent stage.

*** Vaccines:**

- Live attenuated egg adapted vaccine.
- Inactivated oil adjuvant vaccine.
- Recombinant virus vector vaccine expressing VP2 antigen in fowl pox virus.