



# VIRAL DISEASES II

# Infectious Haematopoietic Necrosis (IHN)

- **Rhabdovirus**
- It is characterized by necrosis of hematopoietic tissues in fish.
- This disease is a problem in America, it has not been reported in Europe.
- It is more common in salmonids.

# IHN

- **Clinical symptoms:** Very high mortality in 3-week to 6-month-old fish and mortality in 6 to 14 months old fish.
- Yolk sac hemorrhages.

# IHN

- Darkening and exophthalmia, abdominal distension, pale gills, white fecal casts trailing from the vent.
- Hemorrhages at the bases of the pectoral and pelvic fins and at the vent.
- Up to 5 % of the survivors show scoliosis and lordosis.

# IHN

## **Pathomorphological findings**

- Degeneration of gill lamellae.
- Lesions may be absent in cases of sudden mortality.

# IHN

- Till 6 months old: **severe necrosis of hematopoietic tissue** of the spleen and the kidney.
- Intracytoplasmatic and intranuclear inclusions are visible in the acinar and islet cells of the pancreas.
- Focal necrotic changes can occur in the liver.

# IHN

- No treatment. Epidemics can be controlled by quarantine, hygienic measures and disinfection, raise of temperature above 15 °C.

# SPRING VIRAEEMIA CARP(SVC)

- Spring viraemia of carp (SVC) is a **Rhabdovirus** infection capable of inducing an acute haemorrhagic and contagious viraemia in several carp species and of some other cyprinid.



# SVC

- Among animate vectors, the parasitic invertebrates *Argulus foliaceus* (Crustacea, Branchiura) and *Piscicola geometra* (Annelida, Hirudinea) transferred SVCV from diseased to healthy fish.
- Disease outbreaks in carp generally occur between 11 and 17°C.

# SVC

- Clinical signs:
- Increase in mortality in the population.
- Diseased fish usually appear darker in colour.

# SVC

- Typical clinical signs include exophthalmia, pale gills, haemorrhages on the skin, base of the fins and the vent, abdominal distension or dropsy and a protruding vent (anus), often with trailing mucoid faecal casts.

# SVC

- There are no pathognomonic gross lesions.
- Final diagnosis must await direct detection of viral antigen or nucleic acid in tissues or virus isolation and identification.

# SVC

- Lesions may be absent in cases of sudden mortality. Gross pathologies are mainly documented for common carp and may include excess **ascitic fluid** in the abdominal cavity, usually containing blood, **degeneration of the gill lamellae** and **inflammation of the intestine**, which contains mucus instead of food.

# SVC

- **Oedema and haemorrhage** of the visceral organs is commonly observed.
- **Focal haemorrhages** may be seen in the muscle and fat tissue, as well as in the swim bladder.

# SVC

- Histopathological changes:
- In the liver, blood vessels show oedematous perivasculitis progressing to necrosis. Liver parenchyma shows hyperaemia with multiple focal necroses and degeneration.
- The heart shows pericarditis and infiltration of the myocardium progressing to focal degeneration and necrosis.

# SVC

- In the kidney, damage is seen to excretory and haematopoietic tissue. Renal tubules are clogged with casts and the cells undergo **hyaline degeneration and vacuolation**.
- The intestine shows **perivascular inflammation**, desquamation of the epithelium and atrophy of the villi.
- In the swim bladder, the epithelial lamina changes from a monolayer to a discontinuous multi-layer and vessels in the submucosa are dilated with nearby **lymphocyte infiltration**.