

Some viruses, bacteria and protozoans can cause diseases in marine molluscs. These microorganisms cannot be seen with the naked eye. They can be found in the environment and in living organisms.

1 millimetre (mm) = 1 000 micrometre (μm)

0.1 μm

1 μm

10 μm

VIRUSES (OsHV-1)



Rudimentary
structure

x 100 000

A virus is made up of nucleic acid (DNA or RNA) surrounded by a protein coat (capsid) and sometimes a membrane (envelop) derived from the host cell (an oyster cell, for example).

No nucleus or organelles.

Viruses are not autonomous. They must penetrate a living cell and use its cellular machinery to multiply (often causing the death of the host cell).

Detection methods

- Molecular biology techniques: polymerase chain reaction (PCR) can amplify and detect viral DNA in the mollusc ;
- Observation of ultra-thin sections of (mollusc) tissue under a transmission electron microscope.

Species identification

Molecular biology techniques:

- Partial sequencing of the viral genome ;
- Localisation of the DNA or RNA in a histological section of mollusc tissue (*in situ* hybridisation, ISH).

BACTERIA (*Vibrio aestuarianus*, *Vibrio* from the *V. splendidus* group)



Simple
structure

x 35 000

A bacterium is composed of a single cell, without a nucleus (*prokaryote*).

It can be rod-shaped or spherical, surrounded by a lipid membrane and a cell wall with specific biochemical properties (Gram+ or Gram-).

Often just one chromosome (but *Vibrio* bacteria have two chromosomes) made up of a single circular DNA molecule.

With or without plasmids (small circular DNA molecules).

Bacteria multiply very quickly by dividing in the external environment or by invading internal tissues. They can adapt readily to their environment via genetic mutations.

Detection methods

- Bacterial cultures (on solid media; e.g. agar) ;
- Molecular biology techniques: polymerase chain reaction (PCR).

Species/strain identification

- partial sequencing of the bacterial genome.

PARASITIC PROTOZOANS (*Bonamia*, *Marteilia*, *Mikrocytos*, *Perkinsus* sp.)



Complex
structure

x 2 500

A protozoan is composed of a single cell with a nucleus (*eukaryote*).

DNA (the genome) is present in the nucleus, which is a special cellular compartment.

Presence of specialised organelles and a plasma membrane.

A large part of the life cycle of certain parasitic protozoans takes place within host cells (those of an oyster for example). This cycle can include several stages during which the parasite multiplies.

Detection methods

- Histology (observation of mollusc tissues under a microscope, after fixation and staining).

Species identification

Molecular biology techniques:

- Polymerase chain reaction (PCR) ;
- Partial sequencing of the genome of the parasitic protozoan ;
- Localisation of the DNA or RNA in a mollusc tissue section (*in situ* hybridisation, ISH).