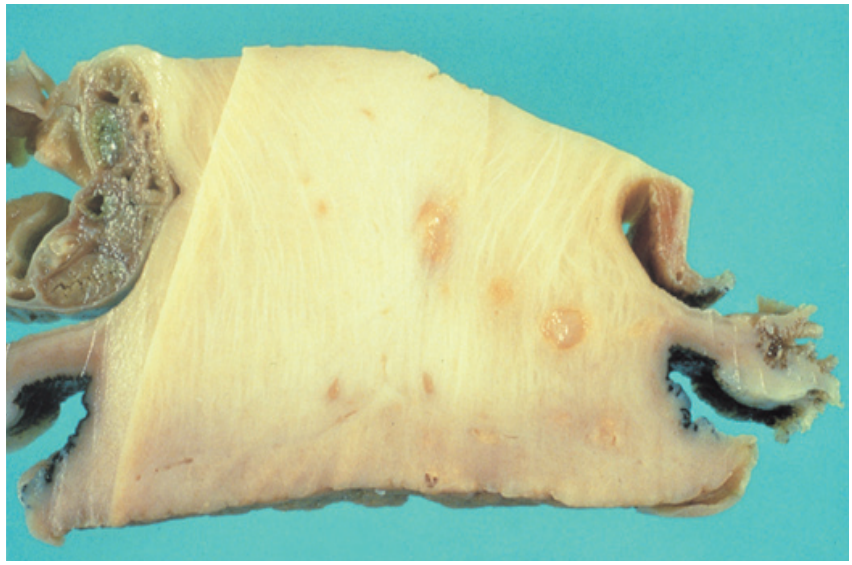
# Infection with *Perkinsus olseni*

Infection with *Perkinsus olseni* in abalone; note blisters on body tissue



*Source:* New South Wales Department of Primary Industries

## Signs of disease

***Important: Animals with disease may show one or more of the signs below, but the pathogen may still be present in the absence of any signs.***

**Disease signs at the farm, tank or pond level are:**

- morbidity observed in cultured greenlip (*Haliotis laevigata*) and blacklip (*H. rubra)* abalone
- gaping in bivalve species.

**Gross pathological signs are:**

- spherical brown abscesses up to 8 mm in diameter containing a caseous creamy-brown deposit in the foot and mantle of blacklip and greenlip abalone (these gross pathological changes impact on the marketability of abalone)
- thin, watery tissues with a pale digestive gland
- nodules in the mantle and gills.

**Microscopic pathological signs are:**

- large, multifocal lesions in connective tissue, containing haemocyte aggregations around *Perkinsus* cells.

## Disease agent

Several species of the genus *Perkinsus* are responsible for causing perkinsosis in molluscs such as oysters, mussels, clams and abalone worldwide. *P. olseni* is the only species known to cause this disease in the Asia–Pacific region and is responsible for perkinsosis in abalone, clams and pearl oysters. *P. atlanticus* is a junior synonym of *P. olseni*.

## Host range

Species known to be susceptible to infection with *P. olseni* are listed below.

| Common name | Scientific name |
|---|---|
| Asian littleneck clam **a** | *Venerupis philippinarum* |
| Blacklip abalone **a** | *Haliotis rubra* |
| Crocus clam **a** | *Tridacna crocea* |
| Elongated giant clam or rugose giant clam **a** | *Tridacna maxima* |
| European aurora venus clam **a** | *Venerupis aurea* |
| Giant clam **a** | *Tridacna gigas* |
| Greenlip abalone **a** | *Haliotis laevigata* |
| Grooved carpet shell or venerid clam **a** | *Ruditapes decussatus*, *R. semidecussatus* |
| Kumamoto oyster | *Crassostrea sikamea* |
| Manila clam | *Venerupis philippinarum* |
| New Zealand cockle **a** | *Austrovenus stutchburyi*, *Macomona liliana* and *Barbatia novae-zelandiae* |
| Pacific oyster **a** | *Crassostrea gigas* |
| Pearl oyster | *Pinctada sugillata*, *P. margaritifera* and *P. martensii* |
| Pullet carpet shell | *Venerupis pullastra* |
| Sand cockle | *Katelysia rhytiphora* |
| Silverlip pearl oyster | *Pinctada maxima* |
| Staircase abalone **a** | *Haliotis scalaris* |
| Sydney cockle | *Anadara trapezia* |
| Venerid commercial clam **a** | *Pitar rostrata* |
| Whirling abalone **a** | *Haliotis cyclobates* |

**a** Naturally susceptible (other species have been shown to be experimentally susceptible)

## Presence in Australia

*P. olseni* has been officially reported from New South Wales, South Australia and Western Australia. Although *P. olseni* was originally reported from abalone, recent studies suggest that, in Australia, a single species of *Perkinsus* occurs in a wide variety of molluscs, including clams and pearl oysters.

## Epidemiology

- *P. olseni* has been associated with mass mortality of *Haliotis* spp. (both blacklip and greenlip abalone) in the Gulf of St Vincent, South Australia, and coastal New South Wales (mostly blacklip abalone).
- Horizontal transmission occurs directly from host to host. Some environmental conditions (temperature and salinity) can promote a lifelong carrier state.
- Infection intensity increases with the age of the host.
- Prezoosporangia that escape from necrotic pustules or decaying dead abalone undergo further development to zoosporangia in sea water.
- Within 9 days at 20 °C and 3 days at 28 °C, hundreds of motile, biflagellated zoospores (about 3 µm × 5 µm) exit from the zoosporangium. The zoospores are infective to abalone as well as to other molluscs.
- *P. olseni* can survive in salt water for several weeks at –20 °C, however fresh water is lethal to the pathogen.

## Differential diagnosis

The list of similar diseases below refers only to the diseases covered by this field guide. Gross pathological signs may be representative of a number of diseases not included in this guide, which therefore should not be used to provide a definitive diagnosis, but rather as a tool to help identify the listed diseases that most closely account for the gross signs.

## Similar diseases

Infection with *Perkinsus marinus*

The clinical signs of infection with *P. olseni* are similar to those of infection with other species of *Perkinsus* (i.e. occasional pustules in soft tissue, pale digestive gland, poor condition, emaciation, shrinkage of the mantle and retarded growth). It is difficult to make a presumptive diagnosis based on gross signs alone; any presumptive diagnosis requires further laboratory examination.

## Sample collection

Due to the uncertainty in differentiating diseases using only gross pathological signs, and because some aquatic animal disease agents might pose a risk to humans, only trained personnel should collect samples. You should phone your state or territory hotline number and report your observations if you are not appropriately trained. If samples have to be collected, the state or territory agency taking your call will provide advice on the appropriate course of action. Local or district fisheries or veterinary authorities may also provide advice regarding sampling.

## Emergency disease hotline

The national disease hotline number is 1800 675 888. This number will put you in contact with the appropriate state or territory agency.

## Further reading

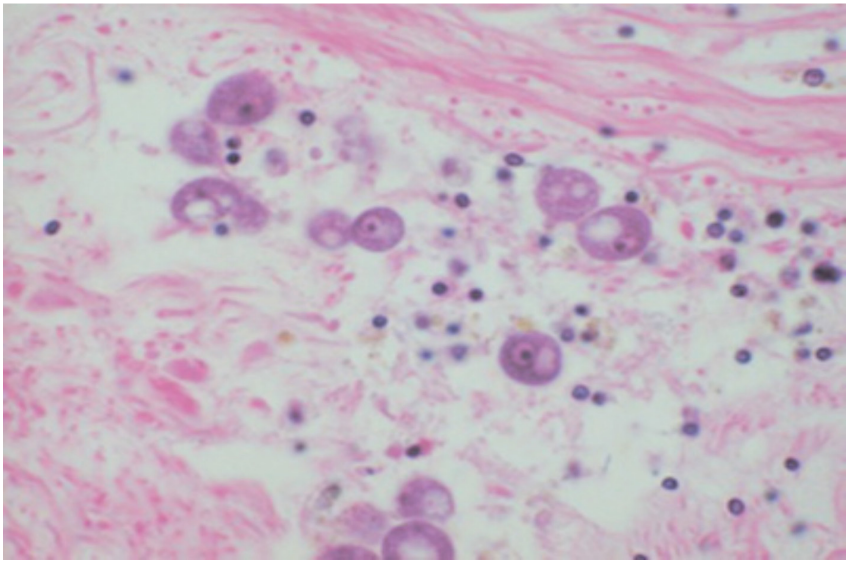
The accepted procedures for a conclusive diagnosis of infection with *P. olseni* are summarised in the World Organisation for Animal Health *Manual of diagnostic tests for aquatic animals 2011*, available at www.oie.int/en/international-standard-setting/aquatic-manual/access-online.

Further information is also available on the disease pages of Fisheries and Oceans Canada: www.pac.dfo-mpo.gc.ca/science/species-especes/shellfish-coquillages/diseases-maladies/index-eng.htm.

These hyperlinks were correct and functioning at the time of publication.

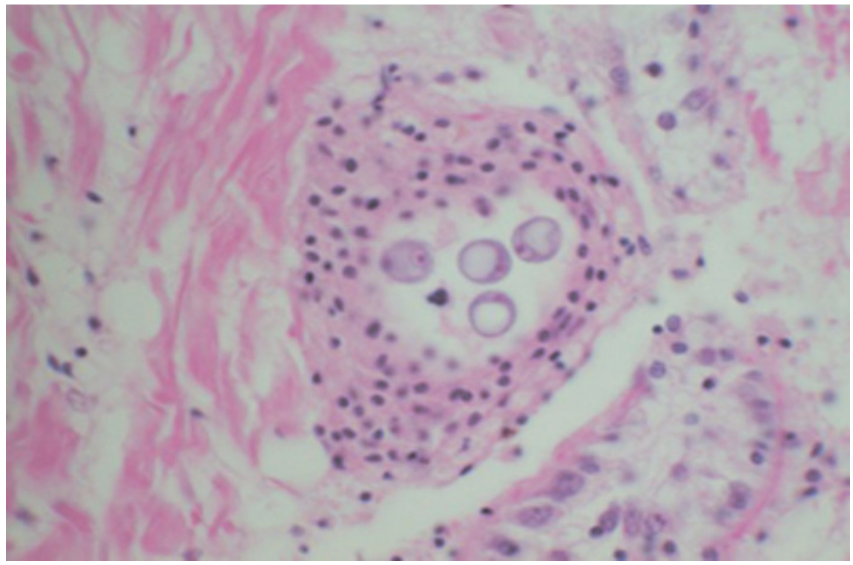
## Further images

(1) *P. olseni* in greenlip abalone (*Haliotis laevigata*)



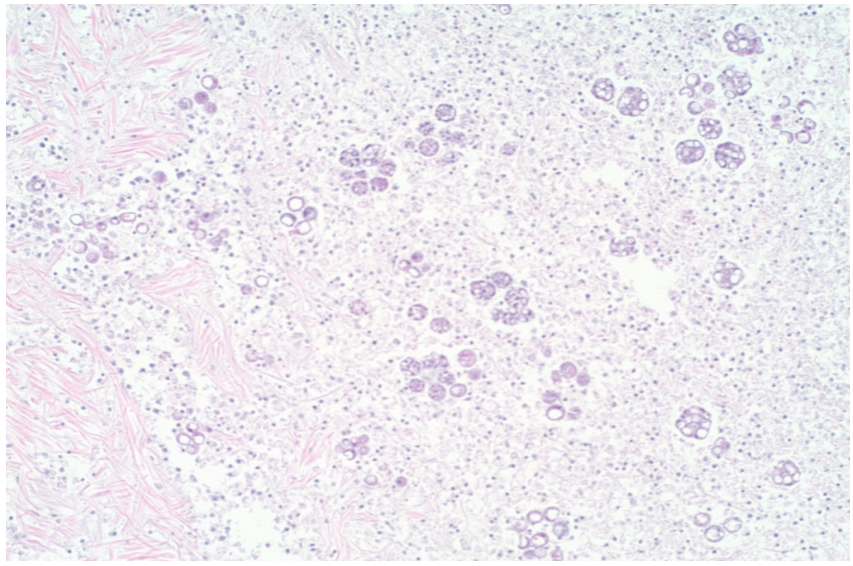
*Source:* E Burreson

(2) *P. olseni* in a clam (*Ruditapes* sp.)



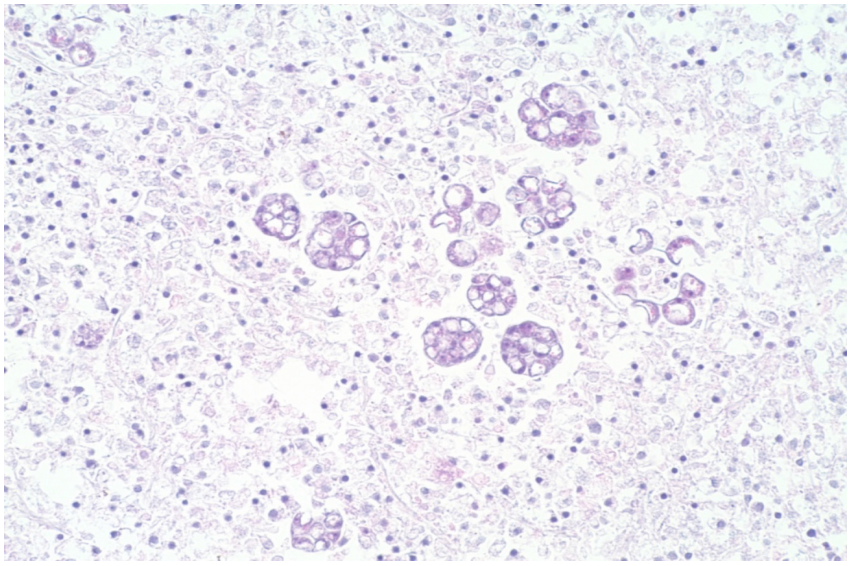
*Source:* E Burreson

(3) Pedal tissue with the edge of the cyst containing multilocular *Perkinsus* organisms among haemocytes and floccular debris (haematoxylin and eosin stain; 100×)



*Source:* Stella Bastianello/Gribbles VetLab

(4) Cyst with multilocular *Perkinsus* organisms, as well as some more mature crescent-shaped organisms among haemocytes and floccular debris (haematoxylin and eosin stain; 200×)



*Source:* Stella Bastianello/Gribbles VetLab