

Gill and Gut Ciliates

I. Causative Agent and Disease

The large thigmotrichid group of relatively non-pathogenic ciliated protozoa found in several species of bivalve molluscs occupy an existence between commensalism and parasitism. These ciliates include small unidentified thigmotrichs and *Sphenophrya* sp. found exclusively on the gills and palps and others found on the gills, palps and in the GI tract that include *Ancistrocoma* sp., *Stegotricha enterikos* and large unidentified ciliates.

II. Host Species

These protozoa are ubiquitous and commonly occur in Pacific, eastern and European flat oysters on the Atlantic, Pacific and Gulf coasts of North America but are also reported from several other bivalve species from Europe. In Alaska, these ciliates have been observed on the gills, palps and in the digestive tubules and intestines of Pacific oysters, blue mussels, basket cockles, rock and weathervane scallops and cultured juvenile littleneck clams.

III. Clinical Signs

There are no reported clinical signs of disease caused by these protozoa, although high intensities may cause localized tissues damage on histological examination and could be associated with physiological stress of the host. Occasionally, *Sphenophrya* sp. can produce xenomas (hypertrophied host cells containing one or many organisms) which do not appear to cause physical harm to bivalve hosts.

IV. Transmission

The mode of transmission is horizontal from host to host via ambient seawater.

V. Diagnosis

Small (4.5 X 7.0 μm to 6.5 X 10.0 μm) eosinophilic thigmotrich ciliates are commonly found on or slightly embedded within the gill or palps tissues by routine histological examination. Also occurring on the gill and palps tissues, *Sphenophrya* sp. is a larger basophilic crescent-shaped ciliate (maximum -15.0 X 23.0 μm) having a large elliptical macronucleus. The unidentified ciliates (possibly more than one species) are of variable size and found on the mantle, gills and within the GI tract. *Ancistrocoma* sp. and *Stegotricha* are spindle-shaped ciliates (50-70 μm in length) with large, granular, polymorphic nuclei. They are found mostly within the digestive tubule lumens (sometimes the intestine) by histological examination or by tissue squashes mounted in seawater where they can be observed as motile and attached forms. The morphology of these ciliates is more clearly observed by staining tissue smears with silver protein or iron hematoxylin. For the ciliates in the GI tract, the numbers and spacing of the somatic kineties (bands of cilia) are more clearly observed with these stains which are useful for determining species identification.

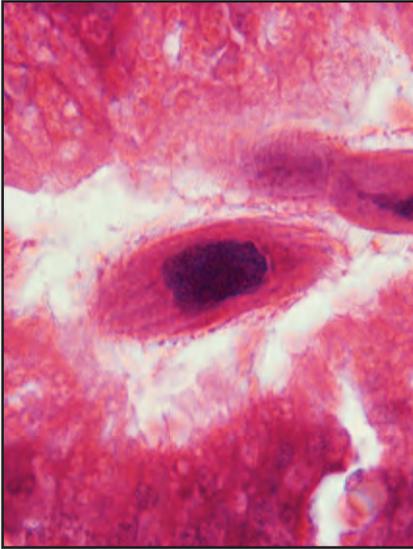
VI. Prognosis for Host

Often found at high prevalences but generally low intensities, these ciliates are relatively non-pathogenic. At high intensities they are capable of producing localized cell damage and excess mucus production. In gill infestations the laminar water flow essential for food particle transport across the epithelial surface may be disrupted. Because *Ancistrocoma* sp. is occasionally found on the gill tissues, the literature has suggested that those reported internally in both Pacific

and eastern oysters may be normal gill parasites which invade the GI tract during abnormal conditions of physiological stress. This may also be true for some of the unidentified ciliates.

VII. Human Health Significance

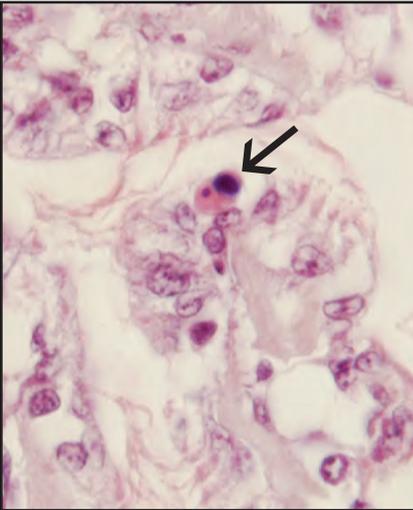
There are no zoonotic human health concerns regarding the presence of these ciliated protozoa on or within bivalve mollusc tissues.



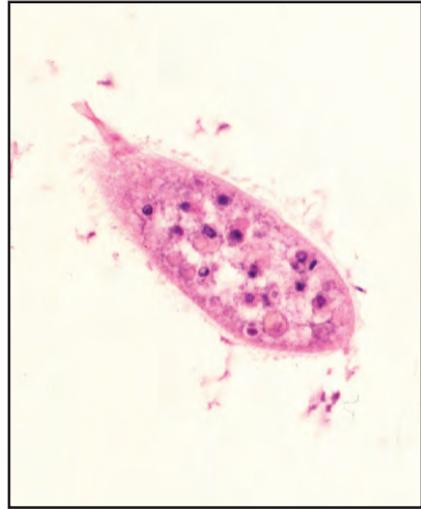
Histological section of *Ancistrocoma*-like ciliate in the digestive tubule of Pacific oyster



Xenoma of gill epithelial cell in blue mussel formed by *Sphenophrya* sp. (arrow)



Histological section of small thigmotrich ciliate (arrow) on gill epithelium of Pacific oyster



Histological section of large unidentified ciliate on gill tissues of native littleneck clam containing consumed host cells