

# Foreign Body Granulomas and Pearls

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## *I. Causative Agent and Disease*

Foreign body granulomas are inflammatory cell foci within host tissues in response to a non-self object or irritant. These granulomas are usually benign and are found incidentally when examining histologic sections of bivalve molluscs. The foreign body stimulating the formation of a granuloma often cannot be identified by examining the section due to degradation by the host response or because it is outside the plane of section. Foreign bodies that cause granulomas most commonly include trematode metacercariae, cestode and nematode larvae and parasitic copepods (see other chapters). Bacterial, fungal and protozoan agents may also be responsible for granulomas as well as inert material that may become embedded in shellfish tissues. Pearls are calcium carbonate concretions precipitated in the soft tissues by bivalve molluscs in response to the same irritants or foreign bodies that cause granulomas.

## *II. Host Species*

Unidentified foreign body granulomas and pearls may be found in a variety of marine and freshwater bivalve mollusc species worldwide including clams, oysters, cockles, scallops and mussels. In Alaska, foreign body granulomas have been observed in Pacific oysters, blue mussels, basket cockles, littleneck clams and weathervane scallops while pearls have been found in weathervane scallops, Pacific oysters and most commonly in the blue mussel.

## *III. Clinical Signs*

Generally, there are no obvious clinical signs of either foreign body granulomas or pearls, both of which are too

small to be observed except when tissues are examined histologically.

## *IV. Transmission*

Additional details regarding transmission of metazoan parasites and Sporozoa that may cause either unidentified foreign body granulomas and/or pearls may be found in other sections of this booklet. Granulomas and pearls caused by non-infectious foreign bodies (sand, shell, debris) occur spontaneously and are not transmissible. An exception is found in the Japanese pearl industry where artificial transmission of a non-infectious foreign body is accomplished by manual insertion of nacreous shell material between the mantle layers of pearl oysters. These shell chips cause tissue irritation that is walled off by calcareous secretions which form cultured pearls.

## *V. Diagnosis*

Diagnosis of unidentified foreign body granulomas and pearls is generally made by routine histological examination. Granulomas are composed of variably sized foci of host inflammatory cells sometimes surrounding a necrotic center. Pearls appear as eosinophilic layered concretions within soft host tissues, most often the mantle.

## *VI. Prognosis for Host*

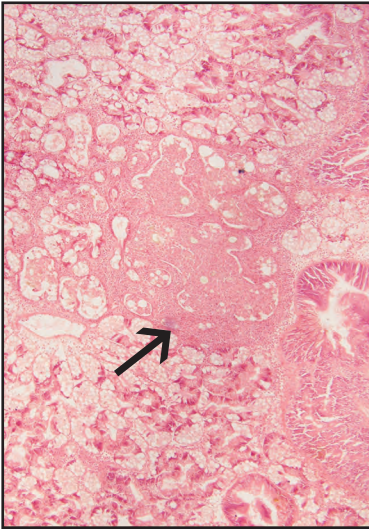
Unidentified foreign body granulomas and pearls in bivalve molluscs are considered benign unless present in large numbers that may impair normal tissue functions. High intensities of metacercarial infestation that may cause either or both conditions can result in host mortality and debilitation. However, in the

Pacific Northwest and Alaska, trematode metacercariae are usually encountered at low prevalences and intensities causing no significant harm to bivalve hosts.

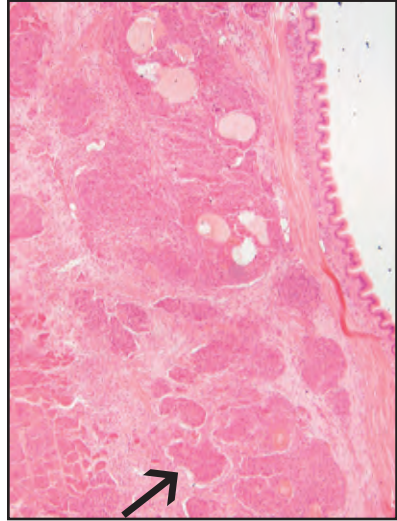
**VII. Human Health Significance**

Unidentified foreign body granulomas and pearls in bivalve molluscs are of no direct zoonotic human health concern. Bivalve tissues containing high numbers of calcareous pearl concretions

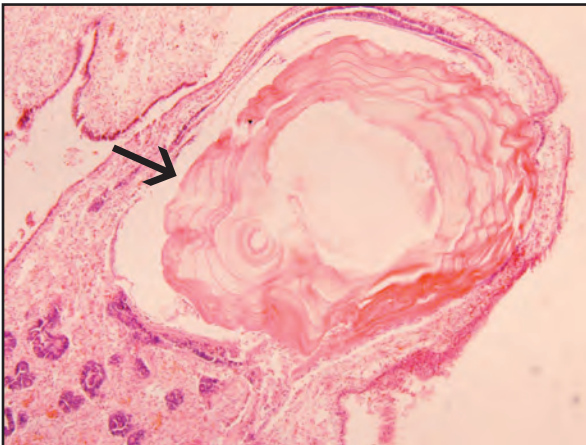
may be unfit for human consumption for obvious reasons. Some concern may be warranted in cases where metacercarial infestation is implicated as causing granulomas or pearls. Echinostome metacercariae, such as *Himasthla* sp., have been implicated in human gastrointestinal disturbances when present in bivalve tissues consumed raw.



Unidentified foreign body granulomas (arrow) encompassing digestive tubules in weathervane scallop, histological section



Unidentified foreign body granulomas (arrow) in the mantle connective tissue of blue mussel, histological section



Histological section of a pearl (arrow) with concentric layers in the mantle tissue of blue mussel