

Pacific Oyster Anatomy

A Dissection Guide

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Introduction

Oysters are anatomically fascinating organisms, with tissues and organs that perform with incredible reliability and efficiency. Knowing their basic anatomy is both educational for you and others, and as a farmer, provides insight into the life requirements of the shellfish that you are nurturing from seed to market size. This short document is intended to provide you with a basic understanding of the structural and functional anatomy of the Pacific oyster. While reading the text refer to the attached figures that include a line drawing and a photograph of a Pacific oyster.

Orientation

The first important process to aide your study of oyster anatomy is to correctly orient your oyster specimen. The oyster should be positioned cup down and the hinge to the right. The hinge part of the oyster is the anterior and the opposite end is the posterior, while the upper shell is the dorsal surface and the bottom shell is the ventral surface.

The Mantle

The mantle is composed of an edge, a thickened dark tissue that surrounds the interior of the body mass, and a thin sheet that covers the entire body. The mantle membrane often tears and shrinks when the oyster is shucked. The thickened edge of the mantle forms a seal along the margin of the shellfish that helps to control the flow of water inside the oyster. The mantle edge is primarily responsible for growing the shell. The mantle membrane also produces the mother of pearl that covers the inside of the shell.

The Digestive system

The **mouth** is located at the anterior end to which two leaf-like **labial palps** are attached. It then connects to the stomach via a short esophagus. The labial palps assist in the sorting of particles, choosing higher quality food items and rejecting unwanted particulates. The **stomach** is often completely surrounded by the **digestive gland** and is visible in the photograph. Cutting into the digestive gland reveals a darkened mass of tubules where microalgae is digested, and often assumes the color of the food that is eaten. Inside the stomach is the **crystalline style**, a clear colored, worm-like structure that is, in fact, often misidentified as a worm. The crystalline style contributes enzymes to digest food and when not actively digesting is small and difficult to see. Connected to the digestive gland is a tubular intestine, which is coiled through the visceral mass. The intestine absorbs digested nutrients and expels waste out the anus.

The adductor muscle

The adductor muscle, located at dorsal/central position, is composed of two tissue types, the smooth and striated muscles. The striated muscle is dark colored and located beneath the arrow head in the photograph while the smooth muscle is pale white. The striated muscle closes the shell to any point of closure determined by the oyster while the white muscle, also termed the catch muscle, holds the oyster shells tightly together.

The Heart

When shucking the oyster, carefully cut the adductor muscle close to the flat upper shell. Remove the membrane mantle and move the tissue away from the ventral side of the adductor muscle. You should be able to see the tubular shaped heart that changes length with beating. Oysters have microscopic blood cells, termed hemocytes, which circulate through the body.

Gonad

The gonad is a completely white tissue mass, unlike the digestive gland, and is located at an anterior/dorsal position. It is most prominent during the summer months, after it has been warm

enough for gametes, eggs and sperm, to develop. The sex of an oyster can only be determined by microscopic examination of maturing gametes.

For further information on the functional anatomy of the Pacific oyster refer to, “Applied Biology of the Pacific Oyster *Crassostrea gigas* in Alaska: Classification and Functional Anatomy”.

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