### Shark Dissection

Scientific Name: *Squalus acanthias* Common Name: Spiny Dogfish

## **(I.) Background Information**

• The Spiny Dogfish, or Squalus acanthias, or Pacific Dogfish, belongs to the subclass Elasmobranchii and is abundant from southern California to the Gulf of Alaska. Its habitat includes cool waters near the coast. Dogfish are usually active and pursue smaller fish or even squid and pelagic crustaceans to supplement their diet.

# **(I.) Background Information**

• However, they also sometimes scavenge refuse dumped into the sea, which obviously can't be too healthy for them. During World War I and II, dogfish were introduced to the commercial market, but that venture failed so one of their most widespread uses has become their dissection. Any given female dogfish gives birth to three or up to fourteen internally developed young, every two years

## **(I.) Background Information**

• The baby dogfish stay in the mother for almost two years and are born as miniature adults. The female Pacific Dogfish, found in the Pacific Ocean along the Northwestern U.S. coast, is estimated to mature at age 20 to 35; the lifespan of a dogfish shark varies even more, ranging from 25 to 100 years. Female sharks are slightly larger than males.

## (II.) External Anatomy

• **Procedure:** Run your hand along the shark's body, from head to tail and vice versa. Notice the difference in texture. The abrasiveness that you feel are the sharks' scales, called placoid skills (also called the dermal denticles). Using a scalpel to remove a piece of skin, examine under a microscope. Next, identify all the major external parts: snout, nostril, mouth, eye, spiracle, gill slits, first dorsal fin, pectoral fin, pelvic fin, second dorsal fin, claspers (male only), second dorsal fin, and caudal fin (tail). In nature, there is additionally one more part, called the Fin Spine, but it is slightly poisonous so fittingly it was removed prior to the arrival to our classroom.

#### External Anatomy of the Dogfish Shark

- Along the sides of the body is a light-colored horizontal stripe called the **lateral line**. The line is made up of a series of tiny pores that lead to receptors that are sensitive to the mechanical movement of water and sudden changes of pressure.
- The spiny dogfish has a double dorsal fin. The **anterior dorsal fin** is larger than the **posterior dorsal fin**. The spiny dogfish has the presence two spines, one immediately in front of each dorsal fin. The spines carry a poison secreted by glands at their base.





- The **caudal fin** is divided into two lobes: a larger dorsal lobe and a smaller ventral lobe.
- The eyes are prominent in sharks and are very similar to the eyes of man. A transparent cornea covers and protects the eye. A darkly pigmented iris can be seen below the cornea with the pupil at its center. Upper and lower eyelids protect the eye. Just inside the lower lid is a membrane that extends over the surface of the eye to cover the cornea.

# • Large **spiracle** openings are located posterior and dorsal to the eyes. A spiracular valve, permits the opening and closing of the external spiracular pore. The spiracle is an incurrent water passageway leading into the mouth for respiration.

• Most sharks have five external **gill slits** located on thire sides behind the mouth and in front of the pectoral fins. Water taken in by the mouth and spiracles is passed over the internal gills and forced out by way of the gill slits.







• The cloacal opening located on the ventral surface between the pelvic fins. It receives the products of the intestine, the urinary and the genital ducts. The name cloaca, meaning sewer, seems quite appropriate.

## Dogfish male clasper

Males have stout, grooved copulatory organs called claspers on the inner side of their pelvic fins. Fertilization in the dogfish shark is internal. During copulation, one of the claspers is inserted into the oviduct orifice of the female. The sperm proceed from the cloaca of the male along the groove on the dorsal surface of the clasper into the female.



## Dogfish female pelvic anatomy



## (III.) Internal Anatomy

• **Procedure**: Place the shark on its backside (ventral side up). See picture. Next on the left side of the shark, cut from the pelvic fin to the pectoral fin with a razor. Be careful not to cut too far into the shark, just through the skin. Then, cut across the shark from the pelvic fin and the pectoral fin. You will now have a "flap" of the shark's skin which you can pull up to expose the internal organs. Locate and identify the following organs: liver, stomach, spiral intestines, pancreas, spleen, vas deferens, and rectal gland.





#### Digestive Anatomy of the Dogfish Shark

- A smooth, shiny membrane called **peritoneum** can be seen lining the inside of the body wall. The visceral organs are suspended dorsally by a double membrane of peritoneum know as **mesentery**
- The **liver** is the largest organ Iying within the body cavity. Its two main lobes, the right and left lobes, extend from the pectoral girdle posteriorly most of the length of the cavity. A third lobe much shorter lobe is located medially and contains the green **gall bladder** along its right edge.

- The **esophagus** is the thick muscular tube extending from the top of the cavity connecting the oral cavity and pharynx with the stomach.
- The esophagus leads into the "J"-shaped **stomach**. The upper portion, the cardiac region, continues as the main body, and ends at the duodenal end.





## Dogfish brain and eye



#### Rectal Gland

There are not

Vas Deferens (hard to see, white)

Contraction, Vinter









## (IV.) Functions

#### External Parts and Functions

- Caudal Fin: Allows shark to change direction and aids in movement.
- Claspers: Found only on male sharks, they enable the transfer of sperm to the female during mating.
- Eye: Shark is able to see its surroundings.
- First Dorsal Fin: Allows shark to change direction and aids in movement.
- Gill Slits: Water passes throught the slits effectively allowing the shark to breathe.

## **External Parts and Functions**

- Lateral Line System: Actually, in the interior of the shark but visible from the outside, it helps the shark detect electromagnetic energy, aiding in pursuit of prey.
- Mouth: Food and water pass through to the body.
- Nostril: Allows shark to smell.
- Pectoral Fin: Allows shark to change direction and aids in movement

## **External Parts and Functions**

- Pelvic Fin: Allows shark to change direction and aids in movement.
- Second Dorsal Fin: Allows shark to change direction and aids in movement. Snout: Front of sharks' head.
- Spiracle(s): These are two openings behind the eyes. They allow water to pass through, allowing the shark to stop moving.

## **Internal Organs and Functions**

- Gall Bladder: used in urination process.
- Heart: pumps blood to other areas of body.
- Kidney: removes wastes from blood.
- Liver: Large organ which cleanse blood and stores bile.
- Pancreas: Produces digestive enzymes for transport to the spiral intestine.

## **Internal Organs and Functions**

- Rectal Gland: Stores solid wastes for excretion out of the body.
- Spiral Intestines: Absorbs food for the shark to utilize as energy.
- Spleen: Associated with the digestive system, the spleen is actually part of the circulatory system. Stomach: J-shaped organ which digests (breaks down) food.
- Vas Deferens: Duct which transports sperm from testes to claspers.







#### Parts of the fish brain

