Data collection and external examination

1

Gather supplies:

- Gloves
- Ruler or tape measure
- Scissors
- Forceps
- Bone cutter
- Scalpel blades
- 10% buffered formalin
- Microscopes slides
- Sterile syringe
- Culturette

2

Data collection:

- Record history - presumptive cause of death, location found, health status, exhibit/quarantine
- PIT tag number?
- Weight and length (sharks measure snout to caudal notch; rays measure discwidth)
- Male or female?

Note: The necropsy should be completed as soon as possible after death. If a necropsy cannot be performed do NOT freeze the specimen. Keep in a cooler or on ice.

3

External examination:

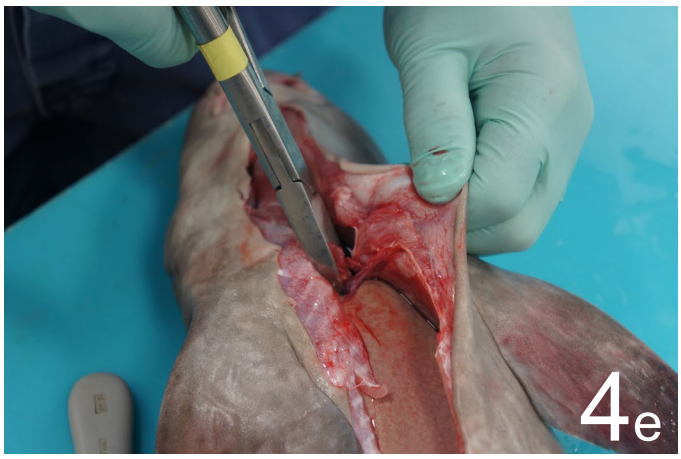
- Integument (**SKIN** including fins and tail) - note any lesions (type and location), unique markings.
- Examine **EYES** (3a) - note clarity (clear, cloudy), color, or possible trauma
- Examine **MOUTH** (3b/c) - note any discoloration or blockage (it may be difficult to pry open)
- Examine **GILLS** - note color (pink, red, blanched) and presence or absence of blood
- Examine **CLOACA** for any parasites or discharge - if so then collect a sample for cytology

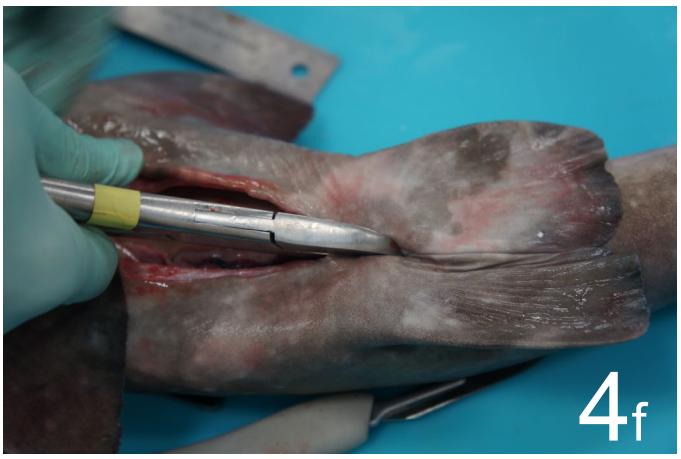
Incision

4

The approach to the internal organs is a ventral midline incision in small sharks. The approach in larger sharks is the same with the addition of two perpendicular incisions at both ends, making an "I" incision, and retracting or removing the flaps. The approach in stingrays is to cut along the pectoral and pelvic cartilaginous margins and make a circular window.

Shark skin is made up of tiny denticles, making it very difficult to cut through. To begin the incision, pinch the skin with forceps (or forefinger and thumb, but be careful not to cut yourself) and make a stab incision with a scalpel or sharp knife (4a). Continue the incision cranially and caudally with either the scalpel, knife or scissors (4b). The normal liver in elasmobrachs is ventral and large so be careful not to cut the liver while making the initial incicsion (4c). The incision should span the entire length of the shark from mouth to cloaca (4d). Do not touch the internal cavity. Cultures and fluid should be collected before touching any internal orgrans. The pectoral (4e) and pelvic (4f) cartilaginous girdles may need to be cut to access organs cranial and caudal to them, respectively.



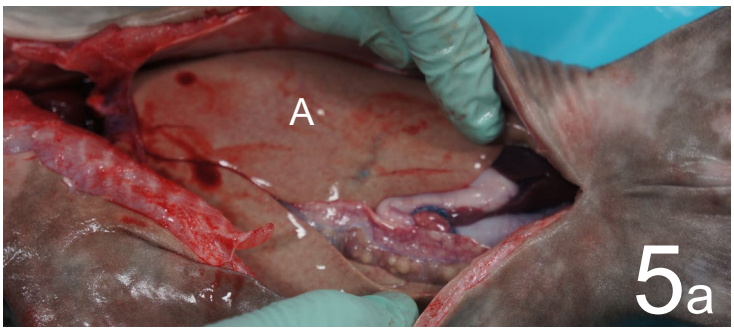


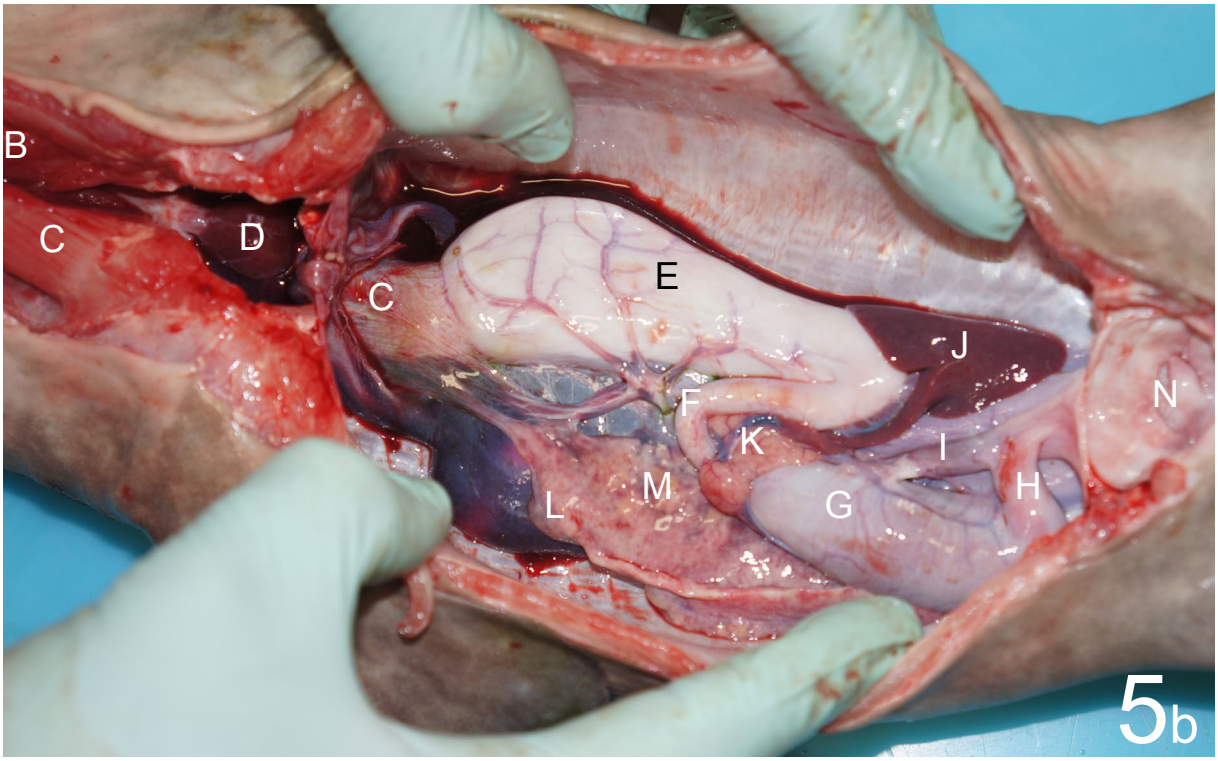
5

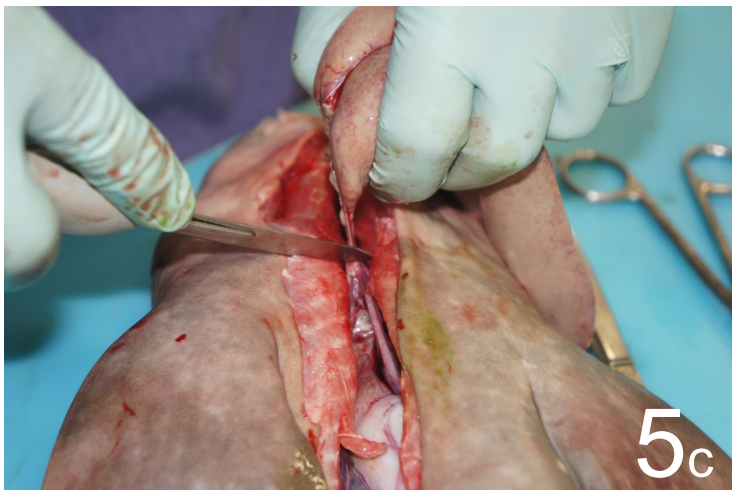
As mentioned, the liver in elasmobranchs is typically located along the ventral coelom and is quite large. Many times it will be the only organ seen upon initial view of the opened coelomic cavity (5a). Once the liver is removed (5c), most of the other internal orgrans can be seen (5b). The liver is the organ used in elasmobranchs for storing fat therefore its gross appearance should be large and tan-colored (5d).

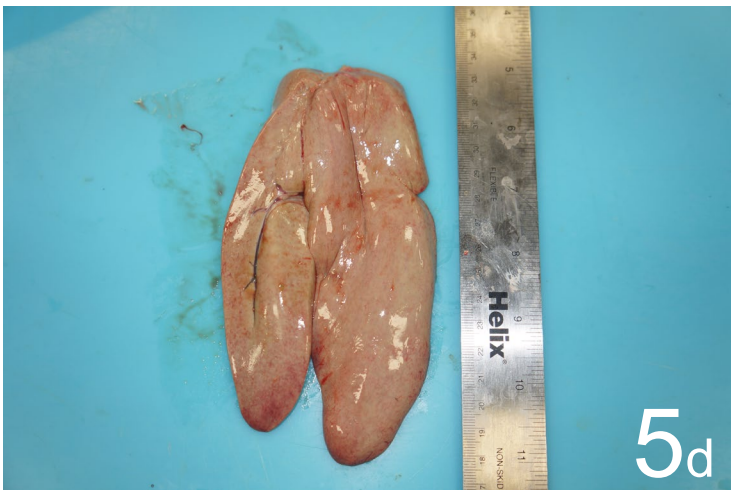
Key for Images 5a/5b:

A. Liver
B. Thyroid
C. Esophagus
D. Heart
E. Stomach
F. Proximal intestine
G Spiral intestine
H. Rectocolon
I. Rectal gland
J. Spleen
K. Pancreas
L. Epigonal organ
M. Ovary
N. Cloaca
Not pictured: Reproductive tract, kidney, brain







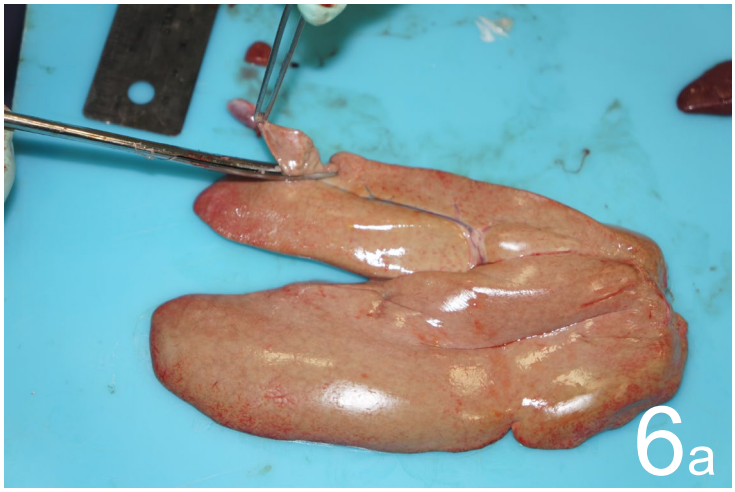


Sample Collection

6

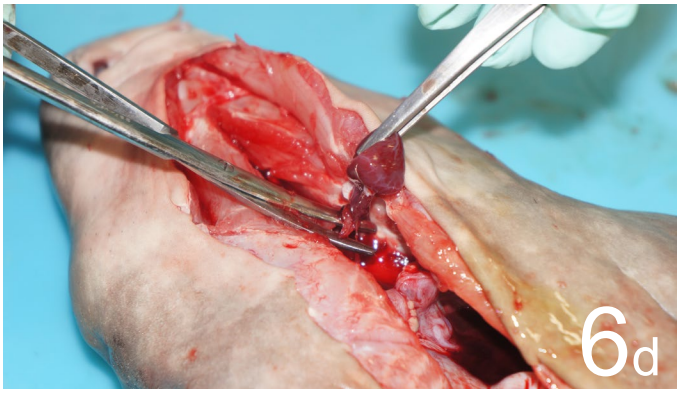
Each organ should be properly identified and assessed for any gross pathology or abnormalities (masses, discoloration, size discrepencies, trauma, parasites, odor, obstructions, torsions, or other lesions). If potential disease is present consider taking impressions (on a slide away from formalin) and culture samples. Samples for histopathology should be no larger than **1 cm by 1 cm** and placed in 10% buffered formalin (6a and 6b). In some cases, the entire organ may be placed in formalin. Multiple samples may be placed in the same formalin container. If an organ appears abnormal, take a sample of the abnormal section as well as a sample from the apparent normal section. Organs for sample collection should include:

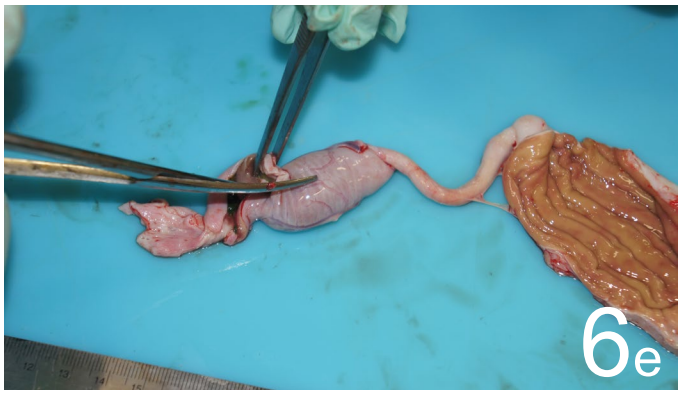
- **Liver** - large organ seen first when opening the coelom. It should be tan or beige and have sharp edges (6a).
- **Gall bladder** - attached to the liver, green and filled with bile.
- **Thyroid** - small, flattened gland caudal to the mouth (6c).
- **Heart** - just cranial to pectoral cartilaginous girdle (6d).
- **Esophagus** (and leydig organ) - extended from the distal oral cavity to the stomach. The leydig organ is usually located along the outer surface at the distal end (not in all species).
- **Stomach** - open stomach and inspect contents (6e).
- **Proximal spiral intestine** - connects stomach and body of spiral intestine (6f).
- **Spiral intestine** - open spiral intestine and inspect contents (6g).
- **Distal spiral intestine** (rectocolon)- connects body of spiral intestine to cloaca
- Gastrointestinal samples for histopathology (pictured left to right in 6h): esophagus, stomach, proximal spiral intestine, spiral intestine, distal spiral intestine (rectocolon).
- **Rectal gland** - small gland found near outer surface of distal spiral intestine (6i)
- **Pancreas** - small, tan organ located on the outer surface of the proximal spiral intestine (6j).
- **Spleen** - reddish organ located near pancreas (6k).
- **Epigonal organ** - varies in size (dynamic organ) and may be closely associated with the gonad, may be reddish or tan and bilateral (6l).
- **Gonad** (ovary or testis) - may be uni- or bilateral depending on species and may be in close proximity to epigonal orgran
- **Reproductive tract** (oviduct, oviducal gland, uterus) - be sure to check for egg development and fetuses. This organ may also be uni- or bilateral depending on species (6m).
- **Kidney** - retroperitoneal, bilateral organ located near spinal column (6n).
- **Eye** - carefully remove one eye and place in formalin (6o).
- **Gill** - red organ found inside gill slits (6p).
- **Skin** (and ampuli of Lorenzini) - collect any portion, ampuli of Lorenzini is a special sensory organ on the ventral surface.
- **Muscle** - collect any 1 cm by 1 cm portion and place in formalin.
- **Brain** - shave skin and cartilage to access the brain, should be light yellow to white. Carefully remove and place entire brain in formalin if the animal is small as in this example. Larger brains may need to be sectioned (6q-6t).


6a


6b

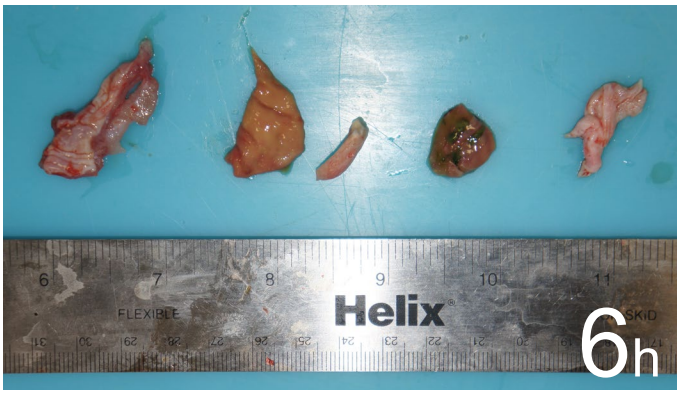

6c

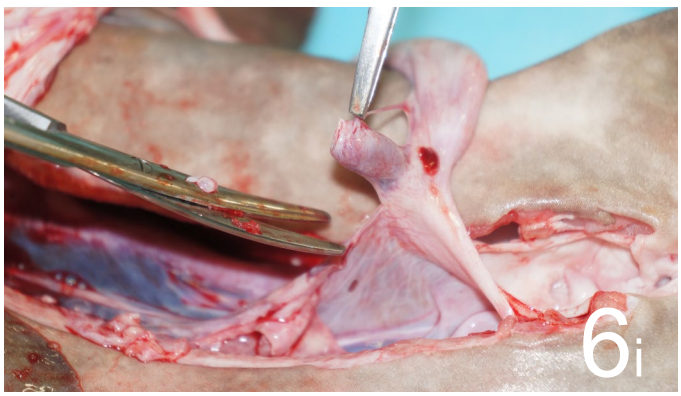

6d

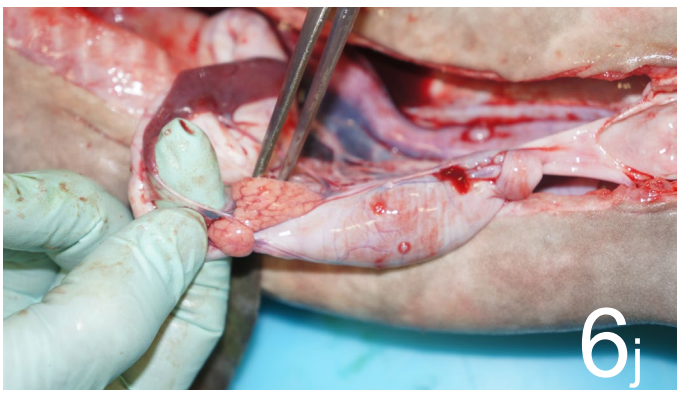

6e

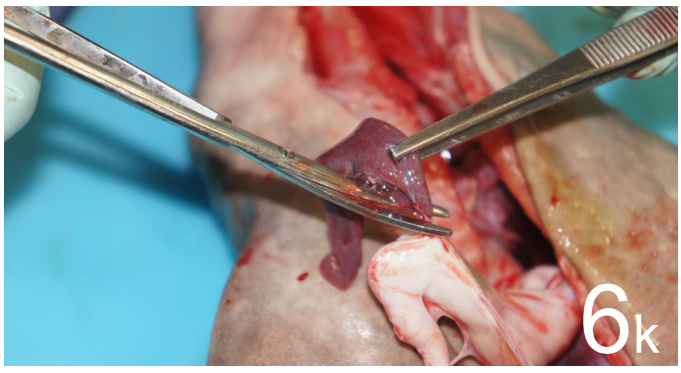

6f

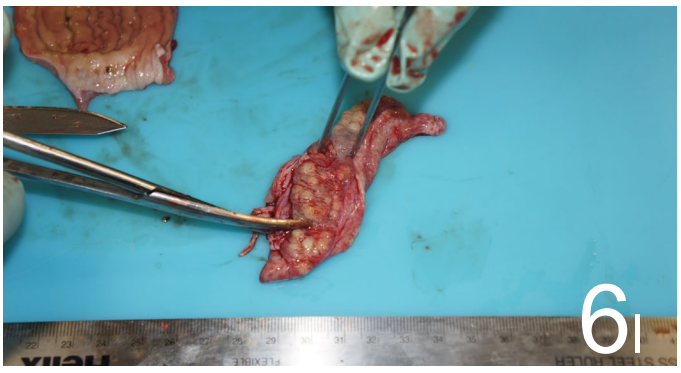

6g


Helix
6h


6i


6j


6k


6l

Sample Collection (continued)