Supportive Layers of the Body

Purpose:
- To observe the locations of each supportive layer relative to associated body structures.
- To describe the structure and function of each supportive layer.
- To describe any ancillary structures (such as blood vessels and nerves) found within each supportive layer.

Covering and lining epithelium with supportive connective tissue for protective layers at many levels in the human body. **Skin** and **mucous membranes** line body surfaces controlling moisture, temperature, protecting from infection and ultraviolet (UV) radiation (skin only). **Serous membranes** line body organs providing moisture and protecting from frictional injuries and infection. In certain locations serous membranes such as the **peritoneum** (lining the abdominal cavity) extend to form supportive ligaments holding organs such as the liver, ovaries, and uterus in place. Both **superficial and deep fascia** protect and separate muscles and provide an outer substrate for passage of nerves and blood vessels to and from the muscle.

**Superficial fascia (hypodermis)** is found in the **subcutaneous layer** in most regions of the body, blending with the **reticular layer of the dermis**. It is absent on the face, over the upper portion of the sternocleiomastoid, at the nape of the neck, and overlying the sternum. It is comprised mainly of loose **areolar connective tissue** and **adipose** and is the layer that primarily determines the shape of a body. In addition to its subcutaneous presence, this type of fascia surrounds organs and glands, neurovascular bundles, and is found at many other locations where it fills otherwise unoccupied space. It serves as a storage medium of fat and water; as a passageway for lymph, nerve and blood vessels; and as a protective padding to cushion and insulate.

**Deep fascia** is the **dense fibrous connective tissue** that interpenetrates and surrounds the muscles, bones, nerves and blood vessels of the body. It provides connection and communication in the form of **aponeuroses**, **ligaments**, **tendons**, **retinacula**, **joint capsules**, and **septa**. The deep fasciae envelop all bone (**periosteum and endosteum**); cartilage (**perichondrium**), and blood vessels (**tunica externa**) and become specialized in muscles (**epimysium**, **perimysium**, and **endomysium**) and nerves (**epineurium**, **perineurium**, and **endoneurium**). The high density of **collagen** fibers is what gives the deep fascia its strength and integrity. The amount of **elastin** fibers determines how much extensibility and resiliency it will have.

**PROCEDURE**

Each student will spend time observing these supportive layers and take notes on tissues observed, ancillary structures found such as blood vessels,
lymphatic structures, and nerves, the relative locations of designated layers, surface features (skin), and any other unique observations.

1. Skin (best observed on an unprosected cadaver if available)

Scan the epidermis and dermis from the body surface. Look at the finger and toe prints. Can you see cleavage lines on the body surface? Look for signs of scarring, bruising, wrinkles, stretch marks or any other skin lesions? Do you see evidence of surgery? Discoloring of the skin? These findings may be pre- or postmortem. What do you think? Describe all of your findings below:

Use the following check list as a guide:

- moles or birthmarks
- age spots
- skin discoloration
- bruising
- scars
- lumps
- rash or other raised skin lesions
- cuts or open wounds
- tattoos
- other interesting observations
An example of medical examiner notes is provided below:
2. Hypodermis (Superficial Fascia)

If the cadaver is skinned properly, the dermis is separated from the hypodermis exposing superficial veins that would normally be seen from the body surface with the skin intact. Scan the hypodermis as you carefully remove the skin from the cadaver or on a prosected cadaver. Keep notes on the arrangement of blood vessels observed. Do you also see fine nerve fibers? As you and your classmates expose the hypodermis in different body areas observe the differences in thickness. Where is the hypodermis the thickest? Where does the hypodermis support the longest vein of the body? Do you see any arteries in the hypodermis? Explain. Write all of your findings below:

3. Mucous Membranes

You will observe small portions of each body tract based on the areas that have been opened on the available cadavers. Each mucous membrane will show evidence of either increased surface area, particle mobility (such as cilia) or both. Observe the exposed portions of the digestive tract, respiratory tract, urinary tract and reproductive tract. Does the exposed region provide any clues related to increased surface area? What are these clues? Do you see rugae? What do the presence of rugae indicate? Is the lining thick (to withstand mechanical abrasion) or thin (a short absorptive barrier)? Write your findings below:
4. Deep Fascia

Observe the fascial planes between muscles. Note blood vessels and nerves that perforate the deep fascia. Describe the attachment of tendons across the shoulder, elbow, wrist, phalanges, hips, knees, ankles and feet. Find the retinacula and describe their purpose. Follow the path of several nerves. Nerve fibers are very tough and can be pulled carefully without breaking. What type of tissue allows for this strength? Compare the surface of several arteries and veins. Which has a thicker tunica externa? Write down your observations below:

5. Serous Membranes

A. Describe the parietal and visceral portions of the pericardium and pleura in the thoracic cavity. What tissues comprise the visceral pericardium? Visceral Pleura? What are the specific locations of these visceral membranes? Where does the pericardium attach? Pleura?
Serous Membranes B. Peritoneum

Follow the peritoneum and describe the following: Which organs are within the peritoneal cavity? Which are retroperitoneal? Describe the relationship of the urinary bladder to the peritoneum. Where is the greater omentum attached? Lesser omentum? Describe the structure of both omenta. Follow the intestinal mesentery and describe the branches of blood vessels and nerves supported by this structure. Do the same with the mesocolon.

6. Internal Ligaments

The internal ligaments support viscera by attaching them to each other and/or to the body wall. Locate the ligamentum teres and the falciform ligament. Which organ do these structures support? Describe their relative position and attachment to this organ. Which ligaments support the urinary bladder? Describe their relative position and attachment to the urinary bladder.