Anatomy and Physiology Laboratory Assignments

#1 Tissues, Integument & Bone – total 20 points

**Tissues lab:** Follow the directions in the Tissues handout. There will be drawings of each tissue subtype assigned. (This will be approximately 14 drawings). No structures need to be identified on these slides. Labels may be added later, so the better the drawings, the easier it will be later to just add labels. Many of these drawings will later be labeled for specific structures so the more effort you put into these drawings now will be beneficial later. Be sure to include total magnification, tissue subtype and the general function of that tissue subtype on each drawing.

**Skin:**
1. Draw (40X) thin (a.k.a. pigmented/nonpigmented) skin: epidermis, dermis and hypodermis. (see Histology book pp187 or 197 and 189) Also label collagen fibers, fibrocytes, keratinocytes, melanocytes* and dermal papilla. Know two other types of cells and two other types of fibers you can find in the dermis. Know the functions all structures labeled.

2. Re-draw or label the drawings from your tissues lab: a section of thick (“Plantar”) skin at 100X or 400X (p 195 in histology book). Label the 5 epidermal strata in the epidermis and the papillary and reticular layers of the dermis. Understand how the keratinocytes are changing in each strata.

3. Draw the scalp section at 40X or 100X. Label hair follicles, sebaceous glands, sweat glands, arrector pili muscles, and dermal papillae. Know the functions of these structures and their secretions. See p193 in histology book.

**Bone/Cartilage Histology:** Re-draw or label the tissues assignment drawing of the slide of dry compact bone and label your drawing for: lacunae, osteons, haversian (central) canals, lamellae and caniculi. Next to each label indicate the function of each structure. Draw at either 100X or 400X. See pp87-89 in histology book.

Draw several views of developing long bones at 400X in order to see each zone in the growing region. Label the drawings as to where each zone begins and ends and cite what is occurring in each of these zones. See pp 75-79 in histology.

Re-examine and label the drawings you made in the histology assignment for the hyaline and elastic cartilages for their lacunae, chondrocytes and primary fiber types found in their matrices. See exercise 6 in lab manual.

*you may need to look at the other section on this slide to see melanocytes. They will be located at the epidermal/dermal border and contain brown specks.
#2 Muscle –10pts

A. Muscle Histology: Label the cross section (cs) skeletal muscle slide for the following structures: muscle fascicle, perimysium and endomysium. See p 115 in histology.

Draw cardiac and smooth muscle at 100X and label nuclei, striations (if present). Be able to distinguish the three subtypes of muscle. See pp109 &117 in histology.

Motor end plate slide: draw a single motor end plate (40X or 100X) and label the nerve, one neuromuscular junction and muscle fibers. See p 113 in histo.

B. Muscle Handout: complete the handout in the lab practical study guide you will not be judged on what you write, but it must be complete.

#3 Nervous System –15 pts Know the functions of the labeled structures/cells

Peripheral nerve sections (Draw both the cross and longitudinal sections on this slide) See pp143&145 in Histology book for the cross section and label fascicles of axons, perineurium, extensions of epineurium and Schwann cell nuclei.

Medullated nerve: See p 143 and 147 in histology book and label myelin sheath, node of Ranvier and axons at 400X

Astrocyte: Draw one cell at 400X. Histology book figure on p139 is similar, but not exactly what these cells look like. It is labeled “fibrous astrocyte”

Microglia: Draw one cell at 400X. (also on p 139, but processes are longer on our slides) shows an example of this.

Spinal cord (giant motor neuron): Remember that motor neurons are going to be found in the ventral grey matter. Use plate in your lab manual (p487) or pp125-129 and p131 in histology book to search this slide for a similar looking neuron. Draw at 400X

Cerebrum: Look in the grey matter and draw the large pyrimidal cells in the cortex (400x). See figures on pp133&135 in histology and label pyramidal cell, nerve fibers and neuropia nuclei, dendrites, and axon at 400X.

Cerebellum: Look at border of grey matter for large bulbous Purkinje neurons (major output neuron of cerebellum) See p137 in histology.

Slide for Exercise 22: muscle spindle at 100X. Use the lab manual’s plate on p 489 and be able to identify the muscle spindle. You will have to search the slide for it. There are many motor end plates on this slide as well. Motor spindles are not round and are thin muscle fibers
Sensory: Slides for Exercise 24: Draw the retina at 400x. Use the lab manuals plate on p243&489 and label: fibers of the optic nerve, ganglion cell layer, nuclei of bipolar cells, nuclei of rods and cones, outer segments of rods and cones, choroid and sclera.

Brain Handout labeling: Complete handout adding functions where indicated by the blank line and be able to apply those labels to both human and sheep brains.

#4 Endocrine and Reproductive systems – 10 pts
NOTE:
-nice summary of pituitary on p328 in histology book
-know the hormones made, what stimulates their secretion and what their target tissues do when they respond to them.

Endocrine: Slides for Exercise 27:

Thyroid gland: Use pp341-3 Histology book and label “parafollicular cells, follicles with colloid and follicular cells” at 400x. Know the hormones made by these tissues and what they do.

Pancreas: Use pp 285-7 in the Histology book and label the islets of Langerhans. At 100x. Know the hormones made by these islets.

Adrenal gland: See pp347-49 and label structures: capsule, the 3 zonas and the medulla at 100x & know which hormone is made by each zona and the medulla.

Parathyroid gland: The small cells on this slide are chief cells that make PTH. See p 345 in histology text.

Pituitary Gland (also called hypophysis) see p331 and label the anterior versus posterior regions and know what tissues form them and what hormones they secrete.

Reproductive Systems: Slides for Exercise 43 & 44:
NOTE: Know the hormones made by each structure and a general effect these hormones have on their target tissues.

Testes: See pp355-361 in histology and label structures seminiferous tubules, spermatid, primary spermatocytes, interstitial and sustentacular cells at 400x. Note: you may have to make a drawing by synthesizing several views as we rarely see as nice a section as the histology book shows. Know the functions of these structures.

Vagina: See figure on p 403 in histology book and label stratified squamous epithelium.
Uterus: See p395 in histology and label the endometrium layers (functionalis and basale) and myometrium layers at 100X. Reminder: this uterus is mid-cycle, the lining changes dramatically with the hormonal changes in the reproductive cycle.

Ovary: use figures on pp 377-383 in histology text and label: "germinal epithelia, tunica albuginea, primordial follicles, follicular cells vs. oocyte, secondary follicle and corpus luteum. Also label the parts of the large mature follicle (16-20) (granulosa cells, oocyte, antrum and corona radiata) at 100X. Know the stages of development of a follicle, the hormones that are synthesized by the different structures and when in the life cycle of the individual each of these is made."