LAB 11
REPTILES
BIRDS
CHAPTER 20: MAMMALS
EXERCISES 20.1 – 20.2

I. OBJECTIVES AND PREPARING FOR LAB

1. Preparing for Lab:
   a. Carefully read the text associated with the three lab exercises listed above. Be sure to read the introductory pages at the beginning of the chapter as well as the specific experimental procedures.
   b. Familiarize yourself with the terms printed in **bold** print in the introductory pages and in each specific exercise.

2. Objectives: At the end of this lab, you should be able to do the following:
   a. Describe the distinguishing characteristics of the classes Reptilia, Aves and Mammalia.
   b. Discuss the significance of feathers in the evolution of homeothermic vertebrates.
   c. Discuss the significance of hair, mammary glands, a complete secondary palate, and large cerebral cortex in the evolution of mammals as homeotherms.
   d. Locate and identify the major skeletal features of the pigeon and compare them to homologous bones in other vertebrates.
   e. Understand the basic structure of feathers.
   f. Locate and identify the principal divisions of the mammalian skeleton and the major bones of those regions.
   g. Locate, identify, and give the function of the major anatomical features and internal organs of the fetal pig and compare them to homologous structures in other vertebrates.
   h. Describe the evolutionary position of birds and mammals on the phylogeny of chordates.

WHILE DOING THE LAB EXERCISES, ANSWER ALL QUESTIONS AS YOU ENCOUNTER THEM IN THE LAB MANUAL, RECORDING YOUR ANSWERS IN THE SPACE PROVIDED.

II. EXPERIMENTAL PROCEDURES

Working individually, examine the specimens on display in the lab. We will NOT be dissecting the pigeon, but you should examine the pigeon and cat skeletons on display, following the instructions on pp. 436-438 and the attached figure of the bird skeleton to help you locate and identify the skeletal features. You should also examine the feathers on display and refer to the attached text and figures and your textbook (p. 380 and Figure 19.4) to help you understand the basic structure of feathers.

Working in pairs, complete Ex. 20-2, examining the internal and external anatomy of the fetal pig. With careful dissection, you should easily be able to locate and identify the specified structures with the assistance of the figures in the lab manual. However, you can also refer to the models and specimens on display to help you locate internal structures. Make certain to examine the internal anatomy of fetal pigs of both sexes.

III. ASSESSMENT (15 points)

1. **Pre-Lab Quiz (5 Points):** There will be a quiz on this lab at the beginning of the lab. To prepare for the quiz, you should carefully read the material specified above in Section I-2 and I-3.

2. **Oral Quiz (10 points):** When you have completed your dissection, bring your dissection to the instructor’s desk at the front of the room. Your instructor will quiz you and your lab partner on the parts of the fetal pig, asking you to locate, identify and give the function of the structures shown in Figure 20.4 and Figures 20.7 – 20.19 and listed in Tables 20.3 – 20.5. You should also be able to locate, identify and/or give the function of those muscles specified by your lab instructor.

IV. KEY TERMS:

In addition to the bold terms scattered throughout the chapters you should be able to describe the taxonomic organization of classes Aves and Mammalia (i.e., distinguishing characteristics of each Class) and locate, identify and give the function of the structures shown in Figure 20.4 and Figures 20.7 – 20.19 and listed in Tables 20.3 – 20.5. You should also be able to locate, identify and/or give the function of those muscles specified by your lab instructor.
A Closer Look at Feathers

Birds possess several different types of feathers, including contour feathers used for flight, soft down feathers found beneath the contour feathers for insulation, and filoplume feathers with a thin shaft and small tuft on the end that play a sensory role. Feathers begin their development in much the same manner as a reptile's scales, as a small protrusion of the epidermis, but rather than flattening out into a scale, they roll into a cylindrical bud that becomes enclosed in a protective sheath that will split open as the feather nears the end of its growth. Mature feathers actually are dead tissue, much like a human hair, and are molted periodically as new feathers grow to replace them.

 Procedure

1. Obtain a contour feather and examine its basic structure.

This type of feather is composed of a long shaft, or rachis, that contains parallel barbs forming two vanes, one on each side of the shaft (Fig. 19.7). The side of the feather with the shorter barbs represents the leading edge of the feather and is designed to produce lift as the feather is swept through the air. The feather is anchored to its follicle in the skin by the hollow calamus, or quill, as it often is called.

2. Examine the feather using a dissecting microscope.

Under low magnification you should be able to see that each barb bears numerous hooklets and barbules that overlap to interlock the barbs in much the same way that Velcro® works. With the wear and tear of a bird's daily activities, these hooklets and barbules frequently are pulled apart, compromising the feather's aerodynamic properties. When a bird runs its feathers through its beak while preening, it is re-zipping the hooklets and barbules of its feathers together to restore its feathers to their proper condition.

3. If any other types of feathers are available for study, such as down or filoplume feathers, examine them under the dissecting microscope and compare them to the contour feather.

Figure 19.7
Anatomy of a feather