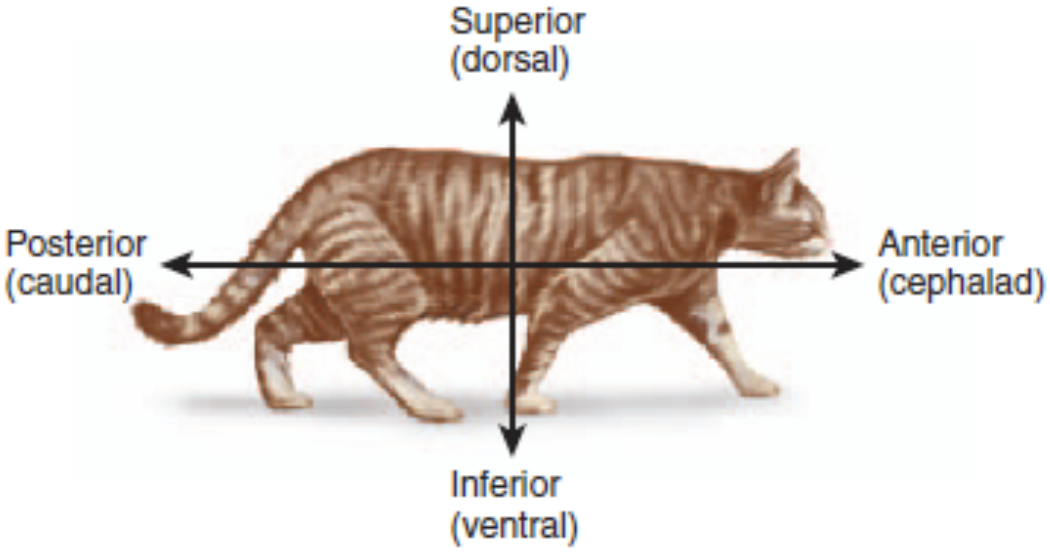
Day 1 Terminology & External/Internal Anatomy:

Planes of Section & Directional Terms

Position your cat on its back or side in the dissection tray. Use the following figures to locate important anatomical directions on the cat. These will be used throughout the lab in the directions for dissection

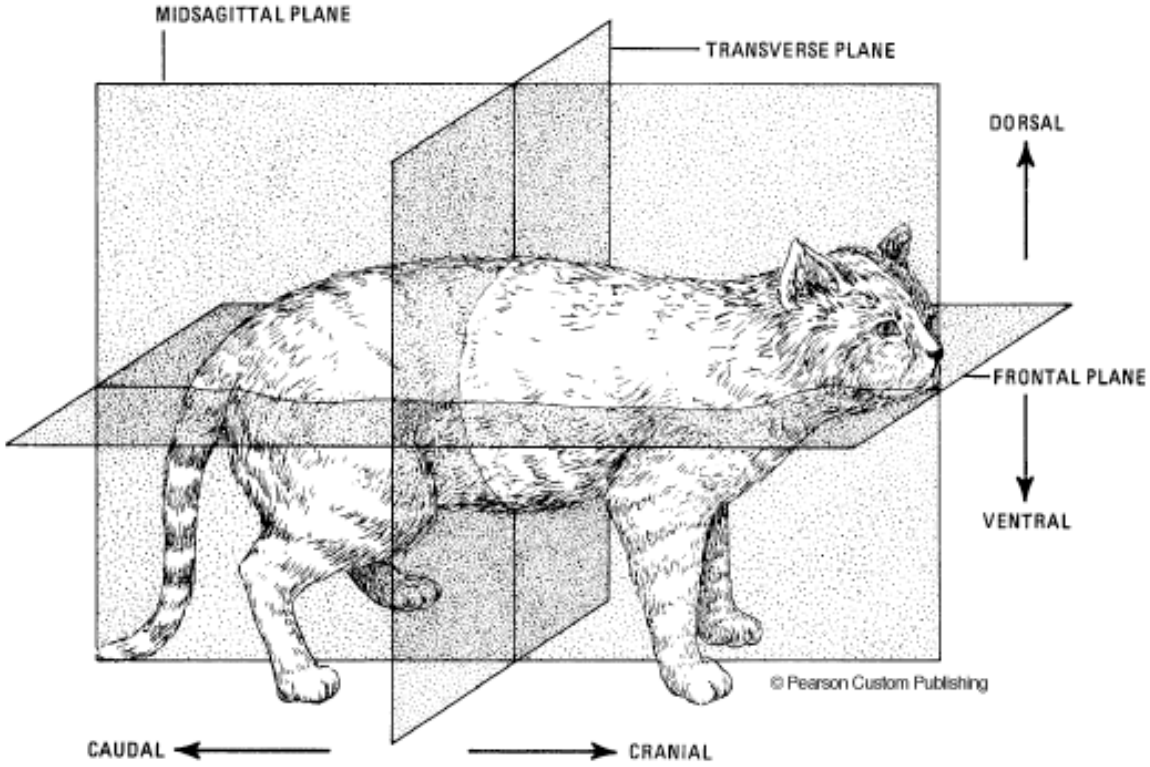
Many terms for direction are the same in comparative and human anatomy, but there are certain differences occasioned by our upright posture. A structure toward the head end of a quadruped is described as **cranial** (or cephalad); one toward the tail, as **caudal**. A structure toward the back of a quadruped is **dorsal**, one toward the belly is **ventral**.



Other terms for direction are used in the same way in all animals. **Lateral** refers to the side of the body; **medial** to a position toward the midline. **Median** is used for a structure in the midline. **Distal** refers to a part of some organ, such as appendage, that is farthest removed from the point of reference, such as the appendage's point of attachment; **proximal** is the point nearest to the point of reference. A **superficial** structure lies upon another one and closer to the body surface, a **deep** one lies beneath others and farther from the body surface. **Left** and **right** are self-evident, but it should be emphasized that in anatomical directions, they always pertain to the specimen's left or right, regardless of the way the specimen is viewed by the observer.

The body of a specimen is frequently cut in various planes to obtain views of internal organs. A longitudinal, vertical section from dorsal to ventral that passes through the median longitudinal axis of the body is a **sagittal** section. Such a section lies in the sagittal plane.

A section cut across the body from dorsal to ventral, and at right angles to the longitudinal axis, is a **transverse** section, and it lies in the transverse plane. A **frontal** (coronal) section or plane is one lying in the longitudinal axis, and passing horizontally from side to side.



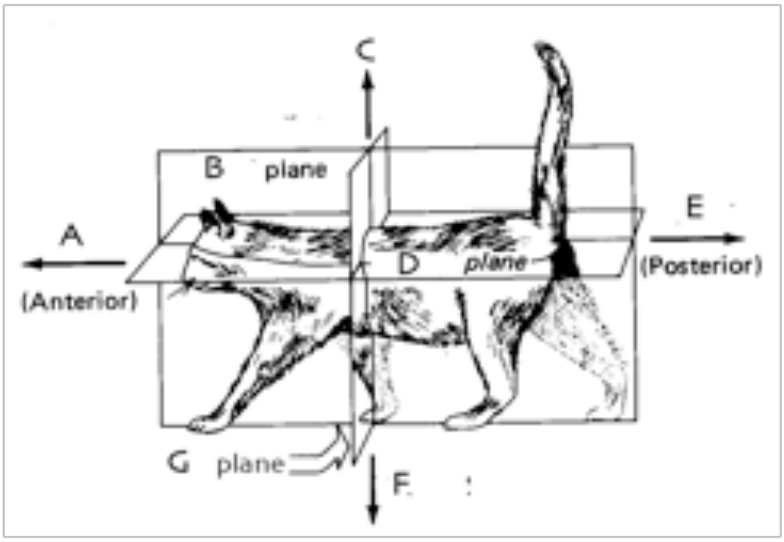
CAT, ANATOMICAL PLANES
AND DIRECTIONAL TERMS

Analysis Questions-Planes & Directional Terms

Log into QUIA using your Team's *Username* and *Password* provided by your instructor. As your group works on the DAY 1 assignment of the cat dissection, enter your responses to the Analysis Questions into QUIA-Day1. Your team may save your work from class and return to finish the assignment until the due date (see assignment sheet). When the section is complete, select "submit" to send your Analysis Question responses to your instructor. The reference diagrams in this eBook are also available online so that you can zoom in and out.

Question 1

Identify the letters below. ***Hint***: B, D & G are planes, whereas A&E, and C& F are directional terms.



Question 2

Use each of the following directional terms in an "anatomically correct sentence" about the cat. The sentence must show that you understand the meaning of the word. Ex: The ***spinal cord*** is dorsal to the ***sternum*** of the cat. (notice the example referred to 2 body structures!)

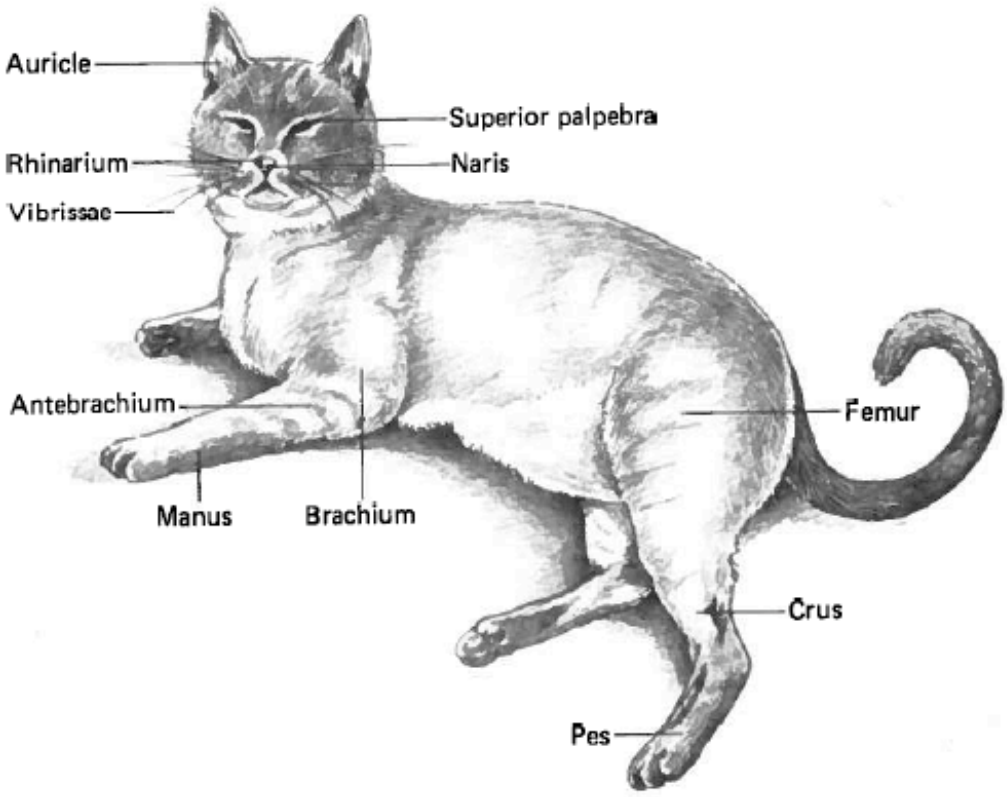
a. ventral

b. caudal

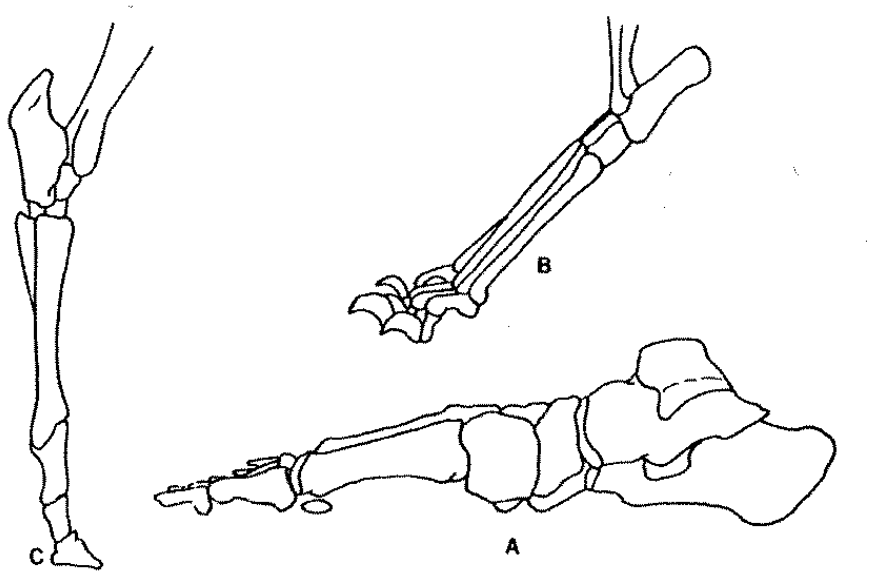
c. proximal

Surface Anatomy & Skeleton

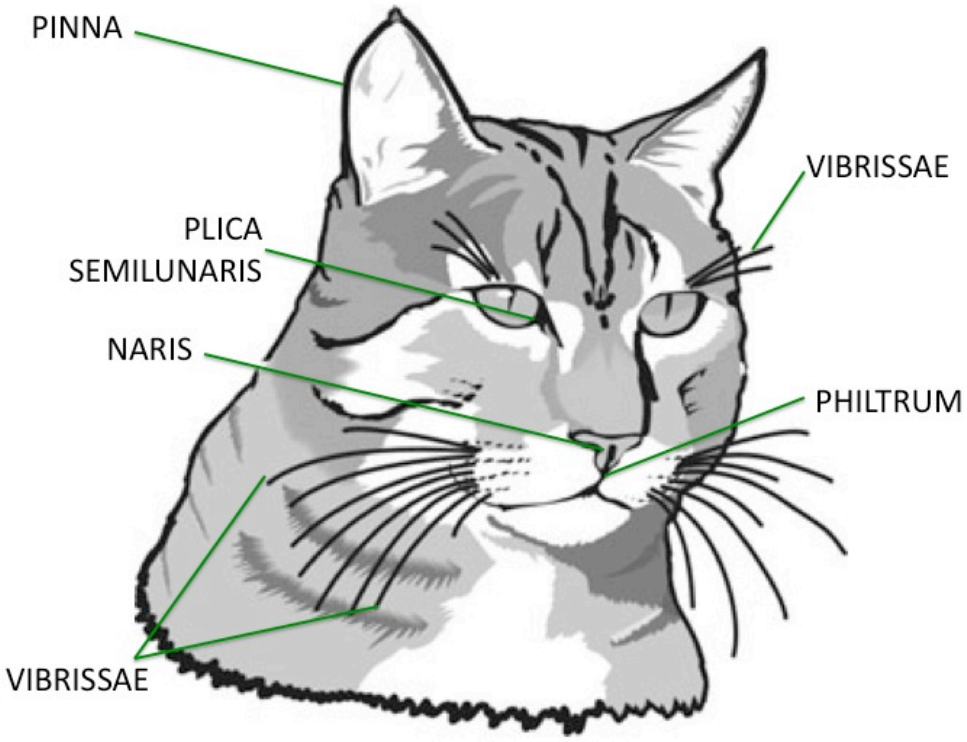
Examine a cat. The diagnostic hair of mammals is at once evident. The **head** (*caput*) is large and separated from the **trunk** (*corpus*) by a distinct and movable **neck** (*collum*). The trunk itself can be divided into the **back** (*dorsum*), **thorax**, which is encased by the ribs, **abdomen**, and **pelvis**. A **tail** (*cauda*) is typically present in mammals, but except in the whales and their allies is greatly reduced in size in comparison with that of an ancestral tetrapod. In other mammals it may be used as a balancing and grasping organ (monkeys), to brush flies off the back (horses), to express emotions (the wagging tail of a dog), or as a warning signal (white-tailed deer). The tail has been lost as an externally visible structure in human beings, although several tail vertebrae remain within the body.



The paired appendages consist of an upper arm or **brachium**, forearm or **antebrachium** and a hand or **manus**, in the pectoral appendage; a **femur**, a shin or **crus**, and a hind foot or **pes**, in the pelvic appendage. Observe either on a mounted specimen or on a skeleton, that a cat walks on its toes with the wrist and heel raised off the ground. This method of locomotion is referred to as **digitigrade**, in contrast to **plantigrade** (human beings), in which the entire sole of the foot is flat on the ground, or **unguligrade** (horse) in which the animal walks on the tip of its toes. *A) plantigrade, B) digitigrade, C) unguligrade*



The cat's head consists of a rostral-ventral facial region and a caudo-dorso cranial portion. The lips around the mouth are well developed and the upper lip is cleft in the center by a groove called the **philtrium**.



The external **nares** are situated on a naked nose. The eyes have upper and lower lids and a greatly reduced nictitating membrane called the **plica semilunaris**. The ears possess a long, flexible external fold called the **pinna** which directs sound waves into the external auditory meatus.

The cat and many other mammals possess special long sensory hairs on the face called **vibrissae** or tactile pili. Most of these vibrissae are situated on mystacial pads on either side of the philtrium and are named according to their location; *supraorbitals* are above the eye, *infraorbitals* are below the eye, *zygomatic-buccals* are on the cheek, *labial-maxillary buccals* are on the upper lip, and *labial-mandibular buccals* are on the lower lip. The cat also has long hairs on the forefeet (*pili carpales*), but they do not appear to be sensory.

The trunk is divided into a **cranial thorax** and a **caudal abdomen** (the thorax and abdomen are separated by the same structure in humans and cats). Teats or nipples (the external openings of the mammary glands) are located on the ventral surface of the trunk. The number and location of the nipples varies in different mammals. There are usually eight in the cat, four on each side.

The epidermis on the bottom of the cat's foot is thickened into pads called **tori**. Five of the digits of the forefoot (*manus*) have pads, the *torus digitalis*, beneath each joint and between the distal and middle phalalnx.

Try and identify the gender of your cat. Males have a *scrotum* and a *prepuce*, a small mound anterior to the scrotum in which the penis is located. Females have a *urogenital aperture*, an opening

located anterior to the anus that is a common passageway for the urinary and reproductive systems. Four or five *teats* (nipples) are present on both male and female cats. Be able to identify both sexes externally.

"Dentition" refers to the arrangement and types of teeth of an organism. Examine the teeth of the cat and try to identify the four types of teeth: *incisors, canines, premolars, and molars*. In each side of the *upper jaw* there are normally three incisors in the incisive bone followed by one canine, three premolars, and one very small molar in the maxilllary bone. In the *lower jaw* there are three incisors, one canine, two premolars, and one large molar. In primative mammals, incisors are cutting teeth, the canines are "stabbing" teeth and the premolars and molars are usually flat grinding teeth. However in cats the premolars and molars are cutting teeth rather than grinders, since their food is primarily animal flesh rather than seeds and other plant material that requires grinding.

Click here to go online and Anatomy of the Cat Skull consists of a group "movies" that show the skull from different sides as well as bisected. To go to a new skull movie, click on the "Go To Links Button" and then click on the movie icon for the part of the skull you wish to view. More skull regions can be accessed in the same way from each skull movie.

Click here to view an interactive Cat Skeleton Tutorial from Kenyon College

Analysis Questions-Background, Surface Anatomy & Skeleton

Question 3

What two external characteristics distinguish mammals (cats, humans) from all other vertebrates? (Hint: this was covered in the PreLab)

Question 4

Locate the nares, pinnae and vibrissae on your cat. These are all sensory structures that give the cat information about the environment. Give the common name for each structure and describe how it is involved in the sensory system.

Question 5

A) Differentiate between the thorax and abdomen of the cat.

B) Which structure separates the two? _____

Question 6

Examine the cat's feet. A) How do they differ from human feet? B) What is the name of the thick pads here?

Question 7

Locate the anal opening just below the tail. Examine the cat's external reproductive structures, do you have a male or female cat? Explain, using anatomical terms, which sex your cat is and how you can tell.

Question 8

Use the figures in your online references to locate the bones on the axial & appendicular skeleton below indicated by letters A-R.

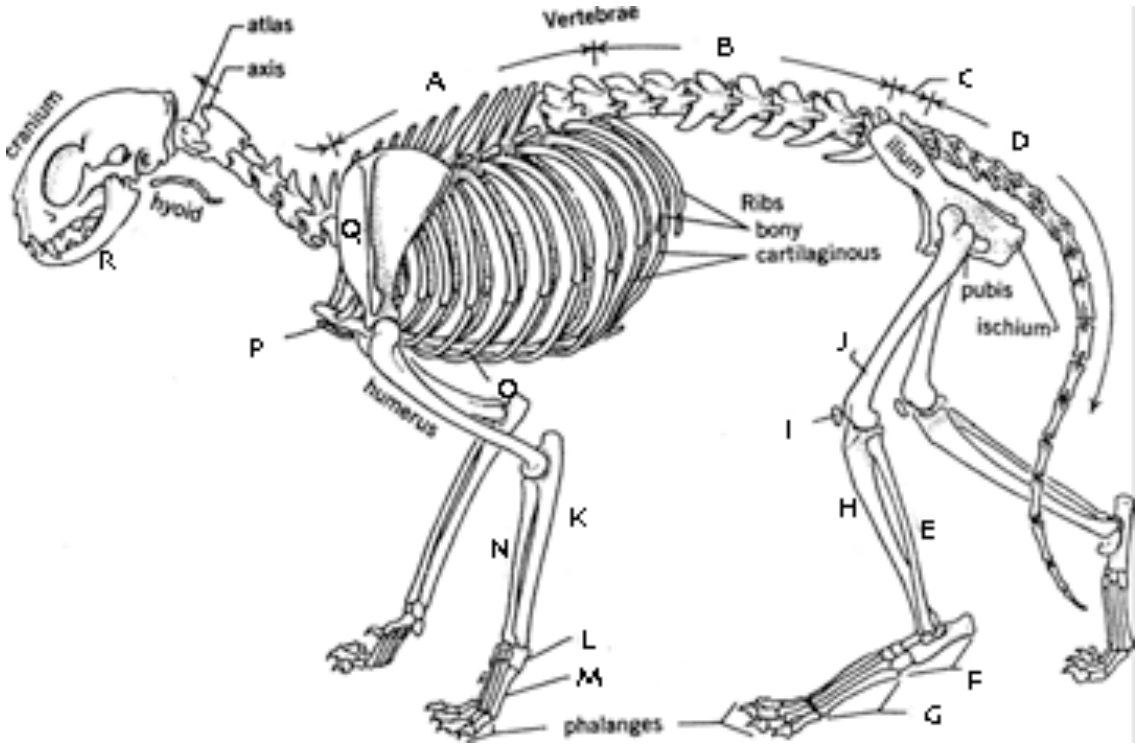
A. _____ B. _____ C. _____

D. _____ E. _____ F. _____

G. _____ H. _____ I. _____

J. _____ K. _____ L. _____

M. _____ N. _____ O. _____



Question 9 A& B. List two major differences between the cat skeleton and the human skeleton.

Question 10

A) What is one similarity between cat's teeth and our teeth?

B) One difference?