A/B Designation
(Circle your designation)

Name:_____

Lab Class Room SCL 421 Virtual Lab Class room: SCL 423

Your Lab Section number:_____

Your Class id for Mastering:_____

Your GTAs email:_____

Virtual Office Hours of your GTA's:_____

_____

Lab Web Page: https://fp.auburn.edu/cosam/cat/index.html
Use your Auburn credentials when asked for username and password

Mastering A&P Website: http://www.masteringaandp.com/

Lab Coordinator Email: pastole@auburn.edu

Things to Remember:
Do not wait to the last minute to do your assignments—you may need some help with them, and need time to ask for that help and get a response.

Watch the lab schedule: assignments in Mastering open on your lab day and close the night before your lab day of the week listed on the schedule.

Bring your lab notebook and manual to lab every week to know what you are doing in lab. Also bring your laptop (or get one from the library) to your "virtual labs"

All the answers to the questions in the assignments are found in your lab handouts or in items referred to in the handouts. If it is not something you are required to know it will not be an answer in your assignments. Complete names must be used and spelled correctly as they need to be on quizzes and tests as well.

DO NOT USE THE GIVE UP BUTTON FOR ANY REASON IN MASTERING

FAQ/ Problems:

Getting On To Mastering A&P for the First time:
Note: if you had access before you should still have access and will not need a new access code- You will just need to join the new class with your class code given in lab.

Step by step instructions can be found on the lab webpage. Follow the "Getting into and around Mastering A&P" link for the instructions- we will be going over this on the first day of lab. This should answer all Mastering questions go through this first whenever you have a question.

My class id from lab does not work:
There are two reasons why your class code to join the class will not work

1) Entered incorrectly. Action: Try and reenter the code you have. E-mail your TA for the class code. Make sure you tell them what section you are in. Do not get the code from a friend not in your lab period- they are different codes.

2) Used an incorrect access code when registering for Mastering. Where did you get the access code that you used to register for mastering? This is the most common mistake. The access codes are different and only allow access to certain parts of mastering. Your access code has to come from the student access kit that comes with the textbook. If you got your access code on line you need to select the proper book. How to buy access online is shown step by step in the "Buying Mastering A&P Access online" link on the lab webpage. If you got the incorrect code on line you need to contact mastering for a refund and get the correct book.

If you are still having trouble and these problems have been check please contact the lab coordinator at pastole@auburn.edu. Remember to include you class (ap1 or ap2) lab time, section (A/B) and exactly what the problem is and what you have done.

The question won't take my answer.

If you are having trouble with the questions go through these steps.

1. Re-read the question, are you answering what is being asked or just what you think is being asked. Open any hints with the question.
2. Have you spelled your answer correctly (the computer needs it exactly)
3. Are you using the complete names as written on the lab handout?
4. Check the answers you have written (do not repeat exactly what you have it won't be right the second time either) check for typo's
5. Is the answer you are trying to give actually something that you are required to know? You only need to know what is on the lab handout—if it is not something you need to know it will not be the correct answer. All answers are from the lab handouts (or items the handout tells you to know)

6. Still not helping then take a breath and re-think your answer, use your lab web page materials to figure out the answer. Remember everything is individual and not everything will look exactly alike, the questions will give you different views of what you are studying so you can start to get the concept of the items- not just learn one picture. Try to get a feel for what you are being asked about—it will only help you on quizzes and tests.
7. If you are still completely stumped email you GTA for help, remember to include your lab section including your A / B designation.
8. **Do not use the give up button.**

The slideshows on the web page are not working.

You need to view the slideshows with the firefox or **chrome** web browsers. Other browsers may work, but the slideshows will work with firefox and **chrome**. There are links on the home page of the Lab website to download the one of your choice if you do not already have it.

The Mastering content is not displaying correctly.

This website is not in our control. It is most likely that you need flash updated if you are having a problem. Otherwise all the requirements for working in mastering can be found at this link:
http://www.masteringaandp.com/site/support/system-requirements.html

Where to get help:

If you have problems getting in to mastering, content working, webpage problems contact the lab coordinator.

If you need to make up/move your lab time or Lab exam contact the lab coordinator

If you are having trouble with a question and need help understanding the answer contact your lead TA.

If your mastering score is incorrect, or you accidently forgot to submit your assignment, contact your TA.

If you want to move your lab time for a reason other than a university approved excuse contact your class professor first then when approved contact the lab coordinator to schedule a time.

Missing Lab or Lab Exams:

If you have a University approved excuse for missing lab you will need to attend an entire lab at another lab time that week. (If you do not have a University approved excuse- contact your class professor to ask approval—if given then contact the coordinator as directed below.)

The lab coordinator needs to be informed of preapproved absences (i.e. class/spots trips) **as soon as you know** you will be missing class—not after or the day before.

If you are sick, you need to contact the coordinator as soon as you know you will not make it to class and a doctors excuse is required to make up the lab.

To schedule a different lab contact the lab coordinator. Include in your email:

a. If you are in A&P I or II
b. Your lab time and A/B designation
c. The reason you will miss the lab (Attach excuse if you have it)
d. **ALL** other Labs/Exam times that you **are able** to make-up the lab.
   Labs are M: 12, 2, 4 & 6 T: 12:30, 2:30, & 4:30
   Exams are every hour on the hour M 12-7:00 pm, and on the half hour T 12:30-5:30 pm
e. The lab coordinator will then send you a confirmation and a time to make up you lab / exam. You are not scheduled until you receive that confirmation.

You may not go to another lab without scheduling a time with the lab coordinator

Take your University approved excuse to the TA giving the make-up lab/ exam unless otherwise directed by the lab coordinator. (if you do not have an excuse, the TA will not allow you to take the quiz or exam!!)

LAB 1: TERMINOLOGY, HISTOLOGY, INTEGUMENT SYSTEM

1) TERMINOLOGY. In the lab manual exercise 1 *The Language of Anatomy*:
A. Be familiar with the following:

1. anatomical position, and all bold words that go with the following figures
2. Fig 1.1: *Surface anatomy*
3. Fig 1.2 *Anatomical terminology describing body orientation and direction*
4. Fig 1.3: *Planes of the body with corresponding magnetic resonance imaging scans.*

2) HISTOLOGY. Exercise 6A in lab manual *Classification of Tissues*
A. Be familiar with the following tissues and their associated cells and structures listed in ( ) after the tissue. There is a review on the lab web page- "*Lab 1 histology review*" to help you study.
B. There are more tissues / structures in your lab book and on PAL than you need to know. You are responsible for the **16** tissues listed below.
C. Know and use the **complete name** of each tissue as written here in RED
D. Learn at least one location and one function of each tissue- use the slide show on the lab web page to obtain these.

EPITHELIAL TISSUE

1. simple squamous epithelium
2. simple cuboidal epithelium
3. simple columnar epithelium
4. stratified squamous epithelium

CONNECTIVE TISSUE

Proper:

loose

5. areolar connective (elastic fibers, collagen fibers, fibroblasts)
6. adipose connective
7. reticular connective (mast cells, reticular fibers)

Dense

8. dense regular connective

Cartilage

9. hyaline cartilage (chondrocyte in lacunae)
10. elastic cartilage (elastic fibers, chondrocyte in lacuna)

Bone

11. bone (central/Haversian canal, lamellae, canaliculi, osteocyte in lacuna)

Blood

12. blood (erythrocyte/ red blood cell, leukocyte/ white blood cell)

MUSCLE TISSUE

13. striated skeletal muscle (nucleus, striations)
14. (striated)cardiac muscle (nucleus, striations, intercalated discs)
15. smooth muscle (nucleus)

NERVOUS TISSUE

16. nervous (neuron, nucleus, cell processes or dendrites, cell body)

3) INTEGUMENT SYSTEM. Exercise 7 *The integumentary system*

A. Locate the following skin structures on Figures *Skin Structure* (7.1) and *The main structural features in epidermis of thin skin* (7.2)

1. epidermal layers
    a. stratum corneum
    b. stratum granulosum
    c. stratum spinosum
    d. stratum basale
2. dermal layers (Dermis)
    a. papillary layer
    b. reticular layer
3. hypodermis
4. dermal papillae
5. adipose tissue
6. root hair plexus – (Hair follicle receptor)
7. pacinian corpuscle
8. sensory nerve fiber
9. hair root
10. hair follicle
11. arrector pili muscle
12. sebaceous (oil) gland
13. hair shaft
14. eccrine sweat gland
15. pore

4) Homwork:

A. Before next week

Look over the Histology Review on the lab webpage
Get registered into mastering if you have not done so in class
Go to the Mastering A and P website assignments area and complete all the activities in the "**Lab 1 homework**" Folder.

B. There is a 5 point quiz on this material at the beginning of your next lab, be prepared.

Lab 2 Virtual Skeleton Lab

1) LECTURE: On the lab web page, in the lab 2 & 3 section, go through the Axial Skeleton presentation while completing the following

2) OVERVIEW OF THE SKELETON. In the lab manual Exercise 9 *Overview of the Skeleton:* Read the introductory pages up to activity 1 and know the following

1. From **fig. 9.1** *The human skeleton*, know which bones are part of the axial skeleton and which are in the appendicular skeleton
2. Be familiar with the terms in **Table 9.1** Bone Markings
3. From **fig. 9.3** *The structure of a long bone*: know the following structural parts of a long bone and **locate** them on the **cross-sectioned femur**:
   - proximal epiphysis
   - diaphysis
   - distal epiphysis
   - spongy bone
   - compact bone
   - medullary cavity

(Can also be seen in PAL while in the lower leg section picture 10)

3) AXIAL SKELETON:

1. Find and be able to identify the following Bones, Specific bones, Structures and Sutures
2. Use PAL on the Mastering website, your lab manual and the axial skeleton lecture on the lab webpage to get the best understanding.

A) SKULL. In lab manual Exercise 10 *The axial skeleton*,

Figures *10.1, 10.2, 10.3, 10.6, and 10.7, 10.8, 10.10*

In PAL pictures 1-12, 27-29, 34-35 *take the time to rotate the bones where possible* (picture numbers subject to change without notice look for what you need to know.

All skull bones only need to know articulated

1. Frontal
   a. Supraorbital foramen
2. Parietal
3. Occipital
   a. Foramen magnum
4. Temporal
   a. Z ygomatic process
   b. Styloid process
   c. Mastoid process
   d. External acoustic meatus
   e Internal acoustic meatus

5. Zygomatic
6. Sphenoid
    a. optic canal
    b. orbital fissure
    c. foramen rotundum
    d. foramen ovale
    e. foramen spinosum
    f. foramen lacerum
    g. sella turcica
7. Ethmoid
    a. cribriform plate
    b. crista galli
    c. olfactory foramina
8. Lacrimal
9. Maxilla
    a. Infraorbital foramen
10. Nasal
11. Mandible
    a. Mandibular notch
    b. Mandibular condyle
    c. Coronoid process
    d. Alveolar margins
    e. Mental foramen
12. Vomer
13. Palatine
14. Hyoid
15. Sutures:
    - Coronal suture (not frontal)
    - Sagittal suture
    - Lambdoid suture
    - Squamous suture

B) VERTEBRAE.

1. Spinal Column: Be able to determine the **type and number** of any vertebrae articulated in the spinal column, and know the following structures (***Fig 10.11)***
    Cervical 1 – 7
    Thoracic 1 – 12
    Lumbar 1 – 5
    a. Intervertebral disc (Structure between vertebrae)
    b. Intervetebral foramen (Structure between vertebrae)
2. Know the specific names of the first two cervical vertebrae and be able to identify them disarticulated. (***Fig. 10.14)***
3. Know the following bones and structures on the articulated **and** disarticulated bones.
4. Identify the different types of vertebra disarticulated

In lab manual refer to Table 10.1, and Figures, 10.13, 10.14, 10.15 and 10.16 In PAL pictures 1-24 take the time to rotate the bones where possible

1. Cervical Vertebrae
    - Atlas (C1)
        a. Transverse process
        b. Transverse foramen
        c. Articular facet
        d. Vertebral foramen
    - Axis (C2)
        a. Spinous process
        b. Transverse process
        c. Transverse foramen
        d. Articular facet
        e. Vertebral foramen
        f. Body
        g. Dens (only on axis)
    - All other Cervical
        a. Spinous process
        b. Transverse process
        c. Transverse foramen
        d. Articular process
        e. Articular facet
        f. Vertebral foramen
        g. Body

2. Thoracic Vertebrae
        a. Spinous process
        b. Transverse process
        c. Articular process
        d. Articular facet
        e. Vertebral foramen
        f. Body
3. Lumbar Vertebrae
        a. Spinous process
        b. Transverse process
        c. Articular process
        d. Articular facet
        e. Vertebral foramen
        f. Body
4. Sacrum
        a. Sacral canal
5. Coccyx

C) RIB CAGE. Find and be able to identify the following Bones, specific bones and Structures

Figures 10.17 AND 10.18; In PAL pictures 1-5

1. Sternum (One bone made of 3 specific bones fused together)
    a. manubrium
    b. body
    c. xiphoid process
2. Costal cartilage
3. Ribs
    a. head
    b. neck
    c. shaft

Know the types of rib

a, "True Ribs"; b. "False Ribs"; c "Floating Ribs"

4) Mastering: Go to the mastering web page and click on assignments. Complete all the activities in the "**Lab 2 skeleton 1**" folder.

5) LECTURE: On the lab web page, in the lab 2 & 3 section, go through the Appendicular Skeleton presentation while completing the following

6) THE APPENDICULAR SKELETON Exercise 11 in lab manual

1. Find and be able to identify the following Bones and Structures
2. Use PAL, the lab webpage, and your lab manual to get the best understanding. *take the time to rotate the bones where possible*

A) Pectoral Girdle:

1. Clavicle
2. Scapula (Be able to identify a left scapula from a right)
    a. acromion
    b. coracoid process
    c. glenoid cavity
    d. subscapular fossa
    e. supraspinous fossa
    f. infraspinous fossa
    g. spine

B) Upper Limb (Arm):

1. Humerus (Be able to identify a left humerus from a right)
    a. greater tubercle
    b. lesser tubercle
    c. head of humerus
    d. radial fossa
    e. coronoid fossa
    f. capitulum
    g. trochlea

h. medial epicondyle
i. lateral epicondyle
j. olecranon fossa

2. Radius
   a. head of radius
   b. neck of radius
   c. styloid process of radius
3. Ulna
   a. olecranon process
   b. trochlear notch
   c. coronoid process
   d. head of ulna
   e. styloid process of ulna
4. Carpals
5. Metacarpals
6. Phalanges

C) Pelvic Girdle:

1. Coxal bone (Three specific bones fused into one bone)
   Be able to identify a left Coxal bone from a right, and be able distinguish a male and female pelvic girdle- table 11.1 in lab manual
   a. ilium
   b. ischium
   c. pubis
   a. iliac crest
   b. acetabulum
   c. pubic symphysis
   d. greater sciatic notch
   e. lesser sciatic notch
   f. auricular surface
   g. obturator foramen

D) Lower Limb (Leg):

1. Patella
2. Femur (Be able to identify a left Femur from a right)
   a. head of femur
   b. neck of femur
   c. greater trochanter
   d. lesser trochanter
   e. linea aspera
   f. medial condyle
   g. lateral condyle
   h. lateral epicondyle
   i. medial epicondyle
   j. intercondylar notch

3. Tibia (Be able to identify a left tibia from a right)
    a. medial condyle
    b. lateral condyle
    c. intercondylar eminence
    d. medial malleolus
    e. tibial tuberosity
4. Fibula
    a. head of fibula
    b. lateral malleolus
5. Tarsals
6. Metatarsals
7. Phalanges

7) Exercise 13 *ARTICULATIONS AND BODY MOVEMENTS* in lab manual FIGURE 13.1 AND FIGURE 13.3
Know the following table and examples from the **appendicular skeleton presentation on the lab website:**

ARTICULATION	**FUNCTIONAL CLASSIFICATION**	**STRUCTURAL CLASSIFICATION**
Sutures	Generally Synarthrotic	Fibrous
Syndesmoses	Generally Amphiarthrotic	Fibrous
Synchondroses	Generally Synarthrotic	Cartilaginous
Symphyses	Generally Amphiarthrotic	Cartilaginous
Plane	Diarthrotic	Synovial
Hinge	Diarthrotic	Synovial
Pivot	Diarthrotic	Synovial
Condyloid	Diarthrotic	Synovial
Saddle	Diarthrotic	Synovial
Ball and Socket	Diarthrotic	Synovial

Note: There are self quizzes and practicals, in PAL for both the axial and appendicular bones to help you study and quiz yourself, you are not required to complete these, but it is recommended to try them while studying. You can also turn off the labels in the self-review pictures and quiz yourself as well.

8) Mastering Assignment: Now go back to the mastering web page and click on assignments. Complete all the activities in the "**Lab 2 Skeleton 2**" folder.

NEXT TIME:
Be ready to spend the class relating what you have learned to the real bones-on which you will be tested. You will be having an exit quiz on the axial skeleton.

Lab 3: Wet Skeleton Lab

In Lab:

Be able to identify all of the Bones, Specific bones, Structures and Sutures found in Lab 2 Skeleton on the real bones.

Relate **all** the information from Lab 2 to the real bones; this is how you will be asked on the practical.

This is your last time in lab before your practical. Make sure you go over everything.

Lab 4 Virtual introduction to axial cat dissection

1) LECTURE: In the Lab 4 & 5 section of the lab webpage, watch the axial muscle introduction

2) AXIAL MUSCLES:

Take the list of muscles below and watch the dissection videos

Learn how to dissect out each section and start to locate the listed muscles

Pictures of the muscles can also be found in the **Dissection exercise 1** chapter of your lab manual.

Note: There are a few muscles that transverse sections—and thus are listed in two sections on the cat—these are indicated by separated color for each of those muscles, make sure you recognize it in all sections listed.

SUPERFICIAL BACK MUSCLES (Dissection video 1)

Latissimus dorsi	Spinodeltoid
Spinotrapezius	Acromiodeltoid
Acromiotrapezius	Clavodeltoid
Clavotrapezius	Levator scapulae ventralis

DEEP BACK MUSCLES (Dissection video 2)

Rhomboid capitis	Teres major
Rhomboid minor	Supraspinatus
Rhomboid major	Infraspinatus
Splenius	Spinalis dorsi
Longissimus dorsi	Serratus dorsalis
Multifidous spinae	Serratus ventralis

SUPERFICIAL CHEST MUSCLES (Dissection video 3)

Pectoantebrachialis	Pectoralis minor
Pectoralis major	Xiphihumeralis

DEEP CHEST MUSCLES. (Dissection video 4)

Scalenes	Serratus ventralis
Transversus costarum	Subscapularis
Rectus abdominis	

ABDOMINAL MUSCLES. (Dissection video 5)

External oblique	Transverse (transversus) abdominis
Internal oblique	Rectus abdominis
External intercostals	Internal intercostals

3) On the lab web page, in the Lab 4 & 5 section watch "axial muscle review"

4) Origin / Insertion / Action: Know this table word for word. You need to be as specific as stated in the table. So for example, "thoracic vertebrae" is not enough for the origin of the splenius. You need to know that it is the spine of the thoracic vertebrae.

MUSCLE	**Origin**	**Insertion**	**Action**
Spinotrapezius	spines of thoracic vertebrae	spine of scapula	pulls scapula back and caudal
Rhomboid minor	spines of thoracic vertebrae	vertebral border of scapula	pulls scapula back and medial
Splenius	spines of thoracic vertebrae	lambdoidal ridge	turns or raises head
Pectoantebrachialis	manubrium	proximal end of forearm	adducts arm
Rectus abdominis	pubic bone	costal cartilage of ribs	compresses abdomen
Serratus ventralis	first ten ribs	medial surface of scapula	pulls scapula forward
Triceps brachii – all three heads	lateral border of scapula	olecrenon process of ulna	extends forearm
Biceps brachii	tuberosity near glenoid fossa and coracoid process of scapula	radial tuberosity	flexes and supinates forearm
Sartorius	Ilium	patella	adducts and rotates femur; extends tibia
Adductor longus	Pubis	linea aspera of femur	Adducts thigh
Gluteus maximus	Transverse process of last sacral and 1st caudal vertebrae	greater trochanter of femur	Abducts thigh
Gastrocnemius	Knee fascia and distal end of femur	Calcaneus by the calcaneal tendon	Extends foot

Note: The muscles in red are appendicular muscles you will learn next section, but you need to know this whole table for this week.

5) Go to the assignment section on the mastering page and complete the Items in the " **Lab 4 Axial Muscles"** folder

Also In Mastering: Complete the "**LAB 4 Origin / Insertion / Action"** folder

These Short animations describe the origin, insertion, and actions of the human counterparts to the muscles you are required to know in the cat. The cat muscles may be slightly different from what is stated in the animations, as cats are a different shape than humans, but it is good to know the relationship of the cat muscles to the human muscles. You will not be tested on the human muscles in lab; all questions outside this folder refer to the table of cat muscles.

Lab 5 axial cat muscle dissection

BEGINNING THE CAT DISSECTION

Remove the cat from the bag as shown by your TA's.
Put the bag to the side, and place the cat in the center of the dissecting tray
Carefully remove as much fat and fascia from the surface of the muscles using your fingers or a blunt probe, as was seen in the video
Follow the dissection instructions found on the next 3 pages
Pictures of the muscles can also be found in the Dissection exercise 1 chapter of your lab manual.

Dissect and be able to identify the following Muscles on the cat specimens

SUPERFICIAL BACK MUSCLES

Latissimus dorsi	Spinodeltoid
Spinotrapezius	Acromiodeltoid
Acromiotrapezius	Clavodeltoid
Clavotrapezius	Levator scapulae ventralis

DEEP BACK MUSCLES

Rhomboid capitis	Teres major
Rhomboid minor	Supraspinatus
Rhomboid major	Infraspinatus
Splenius	Spinalis dorsi
Longissimus dorsi	Serratus dorsalis
Multifidous spinae	Serratus ventralis

SUPERFICIAL CHEST MUSCLES

Pectoantebrachialis	Pectoralis minor
Pectoralis major	Xiphihumeralis

DEEP CHEST MUSCLES.

Scalenes	Serratus ventralis
Transversus costarum	Subscapularis
Rectus abdominis	

ABDOMINAL MUSCLES.

External oblique	Transverse (transversus) abdominis
Internal oblique	Rectus abdominis
External intercostals	Internal intercostals

CLEAN UP

Place cat parts in bucket labeled "**Cat Parts Only**"
Place all other garbage in the regular trash can
Spray cats with **BIOSHIELD**
Place cats in bags; fold the top of the bag over and secure tightly with a rubber band. Label cat so you can find it next week
Wash the table dissecting tray and tools with bleach and water and replace dry tray to table as found when you arrive to lab.

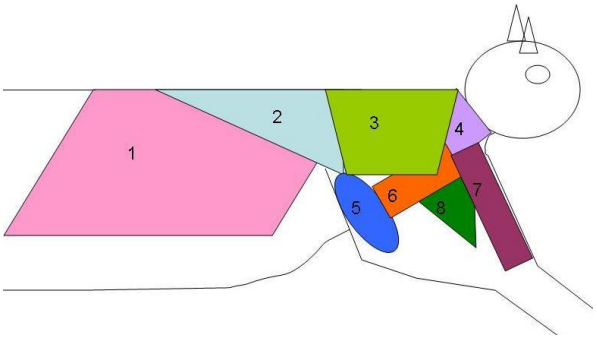
Axial Muscles Dissection Instructions:

SUPERFICIAL BACK CAT MUSCLES

Start on the dorsal side of the cat. Note the large triangle on the back, this is made of fascia or muscle connective tissue, and is a good reference marker for you to use. For the first set of muscles you want to concentrate on removing the fat on one side of the cat, starting at your triangle reference and working towards the head. Don't be too delicate with the fat, I find it best to use the hemostats to grab and remove it. You should start to be able to see the muscle fibers and the boarders that separate the muscles. Use your hemostats to pick along these boarders to release the muscles, as you get a hole, you can start to go along its borders with the probe, pulling the muscle up with your fingers

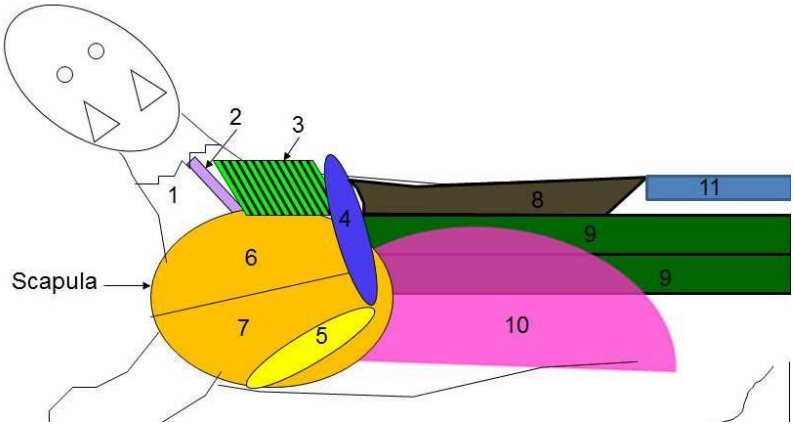
SUPERFICIAL BACK CAT MUSCLES

This first large muscle that you see is the ***latissimus dorsi (1),*** Use your probe and the hemostats to move along the borders and really pull it free, it is a large sheet muscle. Sitting on top of l*atissimus dorsi(1)* is a smaller triangular muscle, ***spinotrapezius (2).*** Go along the border of the muscle with your hemostats and pull up with your hand. Next, we have **acromiotrapezius (3),** this sits right on the shoulder of the cat, pull along the edges of this muscle and to pull it free from the others this one is a little harder to separate, be careful of the muscles under it. Finally there is a big sheet muscle next to *acromiotrapezius* (3), and superficially covering the neck, the ***clavotrapezius(4).*** You do not need to dissect this muscle out, just know its borders.



Move down along the shoulder to the deltoid muscles, Here you can see an oval shaped muscle right in the armpit of the cat the ***Spinodeltoid(5)***. Making a T with this muscle you find a little strip muscle-- the ***Levator scapulae ventralis(6),*** Coming down from the *clavotrapezius(4)* along the arm you have this strip muscle ***Clavodeltoid(7)***, and between them all, a triangular muscle ***Acromiodeltoid(8)***.

DEEP BACK MUSCLES



On the other side of the cat (so you leave your nicely dissected superficial muscles in tack) Carefully remove acromiotrapizius, clavotrapezius and spinotrapezius be careful not to cut the muscles underneath. To do this pull the muscles up around the borders with your fingers and carefully use the scissors to remove them.

Pull the top of the scapula about an inch away from the body and clean up the fat / connective tissue till you can see the muscles underneath. Starting from the neck of the cat and connecting to the scapula you see this ribbon

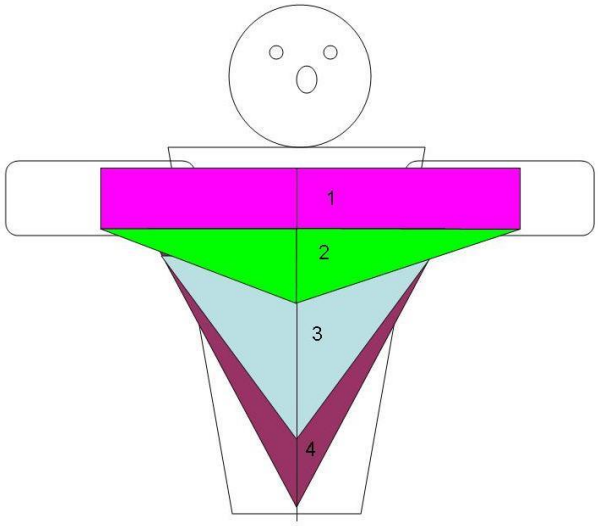
like muscle. ***Rhomboid capitis (2)***, underneath rhomboid capitis(2) and right along the neck of the cats you will find ***splenius(1).*** The ruff looking muscle coming from the spine of the cat and connecting to the top of the scapular is ***Rhomboid minor(3)***, starting at the end of minor but now wrapping along the edge of the scapular is ***Rhomboid major(4)***. Meeting Rhomboid major at the edge of the scapular is another oval shaped muscle, ***teres major(5).***

There are two other muscles on the scapular and divided by the spine of the scapular, which you can feel with your finger, find ***Supraspinatus(6)*** superior to the spine, and ***infraspinatus(7)*** inferior to the spine. Underneath rhomboid minor you can see a muscle crossing from the body of the cat and connecting to the back of the scapular-- this is ***Serratus ventralis.*** You will see this again later as well.

Move caudally down the back (you may need to remove some of *Latissimus dorsi* depending on your cat) to reveal more of the back muscles. You can see along the spine a muscle band this is ***spinalis dorsi(8)***, this muscles ends sweeping into the spine, right where that triangle of fascia started on the back. Anterior to *spinalis dorsi(8)* you can see some fascia / connective tissue. Carefully pull at this connective tissue with the hemostats to make a hole, cut though only this plastically looking fascia to reveal the muscle underneath. Pull the thin sheet muscle away from the body-- This is very difficult to do, this muscle holds on to the ribs below very tightly and will easily tear when being dissected out. This is ***serratus dorsalis(10)***, it is not a small muscle it goes all along the back here covering the rib cage, but it is a thin muscle. Pulling back the *serratus dorsalis(10)* reveals two more bands of muscles along the body of the cat. These next two bands are both part of ***longissimus dorsi(9)***.
Move even more caudally down the cat and cut a window through the triangular fascia on the back. Be careful to cut only the fascia and not the muscles underneath. If you have a little nick that is fine just cut your window big enough to see the muscles on the spine and below. Right on the spine is ***Multifidus spinae(11)***, you should be able to feel the spine under the muscle with your probe. The two bands inferior to *Multifidus spinae(11)* are still ***longissimus dorsi(9)***

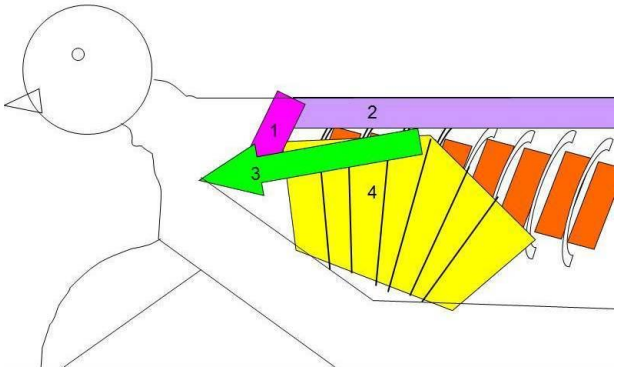
SUPERFICIAL CHEST MUSCLES

Turn Cat over so the Ventral Side is up and start to remove fat again, for now, you just need to worry about the chest and abdomen area of the cat
After the fat is removed look closely at the muscles fibers and look for the muscles. These muscles are not as easy to dissect out, so just make sure **you** can see the boarders of the muscles.
The top rectangular shaped muscle is the ***Pectoantebrachialis(1)*** this goes from forearm to forearms. The next triangular shaped muscle is the ***Pectoralis major(2)***, the next muscle is the ***Pectoralis minor (3)***, and lastly we see ***Xiphihumeralis(4).*** You can make a light cut at the borders of the muscles to help see them but have your TA with you when you do to make sure you are cutting in the right place. Make sure not to cut too deep-- these are sheet muscles.



DEEP CHEST MUSCLES

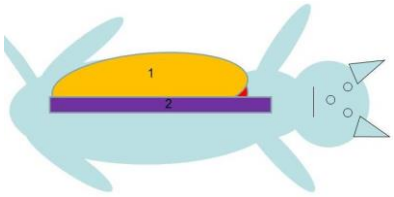
To get to the deep chest muscles cut through one side of the chest. You want to start in the middle of one side of the chest. Place your probe under the superficial muscles and then cut along the probe so that you cut into the cavity of the chest. Once in the cavity trim the superficial muscles out of the way. Clear out any fat and connective tissue so that you can see the muscles within.

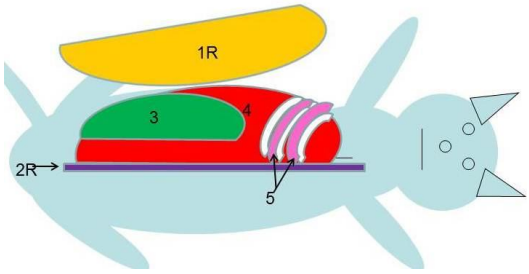


The small band going across the top of the chest is ***transversus costarum(1),*** Starting just caudally to *transversus costarum(1)* is the strip muscle ***rectus abdominis(2)*** which starts here and runs all the way down the abdomen. Posterior to *rectus abdominis(2)* and *transverus costarum(1)* you will find a long muscle running cranially into the chest and meeting up with two other muscles to form an arrow head, together these are the three heads of the ***scalenes(3).*** Posterior to the *scalenes(3)* you see a large muscle that has the appearance of a fan. You can see how it comes from the body across to the scapula – this is ***Serratus ventralis(4)*** the muscles you saw in the deep back under the Rhomboids. On the back of the scapular you find ***subscapularis.***

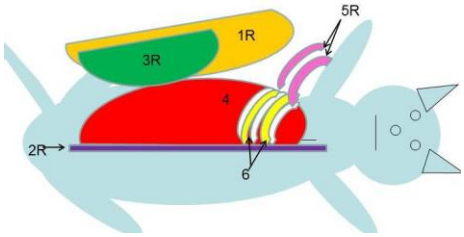
ABDOMINAL MUSCLES

Follow the ***rectus abdominis(2)*** down the center of the abdomen. There is a white line of connective tissue where the ***external oblique(1)***, a sheet muscle covering the abdomen of the cat, meets the *rectus abdominis(2)*. Pick at this with the hemostats to make a hole just in the connective tissue. Use a blunt probe in the hole to cut through this connective tissue—carefully pull along the border, while pulling up the *external oblique(1),* and leaving the two deeper sheet muscles in place. Reflect the external oblique to see in the lower end of the abdomen and ending about an inch before the rectus abdominis the ***Internal oblique(3)-*** another sheet muscle sitting on top of the sheet muscle ***transverse abdominis(4)*** which is a sheet muscle covering the inter abdomen. You can reflect the *internal oblique(3)* by pulling at the connective tissue at the edge, and then slowly pulling up to pull it away from the *transverse abdominis(4)*. This can be very difficult to do so as long as you can see the edges of the muscle and understand where it starts and ends you should be ok. The *transverse abdominis(4)* is the deepest muscle.





Keeping the external oblique reflected, move back towards the chest area. Here you will find the rib cage. In between the ribs are muscles-- these are the ***external intercostal(5).*** Basically if you see the ribs (not just slits in the muscle) then you are seeing the intercostal. The ones you see are the *external intercostals(5)*, deep to these are the ***internal intercostals*****(6),** You can cut through the muscles and peal them apart the top layer is the *external intercostals(5)* and the deeper layer is the *internal intercostals(6)*.



Lab 6 Virtual appendicular cat dissection and Muscle physiology

1) Muscle Physiology:

- Go to mastering. In the assignments area of mastering, open the "**Lab 6 Muscle Physiology"** folder
- Complete the interactive lectures and experiments (First items in the folder) answer the questions below and take notes for yourself
- Answer the associated questions in each mastering item.
- Use the information learned in the lectures and experiments to complete the rest of the question in the folder.
- The information in the lectures/ experiments and questions, is the information you need for Muscle physiology ask your TA if you are confused at all.

Follow along in lecture and make sure you understand the following questions:

Contraction of motor units (Lecture 1)

A motor neuron and all the muscle cells it innervates is called a: _____

_____

Stimulation of additional motor units will increase the strength of contraction.

This process is called: _____

Where is the interneuron located? _____

Where is the motor neuron located? _____

The synapse between a motor neuron and the muscle it innervates is called a:

_____

Variables affecting the strength and degree of muscle movement are:

The _____ of _____ firing. and

The number of muscle cells per _____ _____

Precise movements are created by _____ motor units.

Gross movements are created by _____motor units.

Random, asynchronous motor unit contractions provide a low-level tension and resistance to stretch called muscle _____.

What will happen to a muscle if the motor neuron is cut? _____

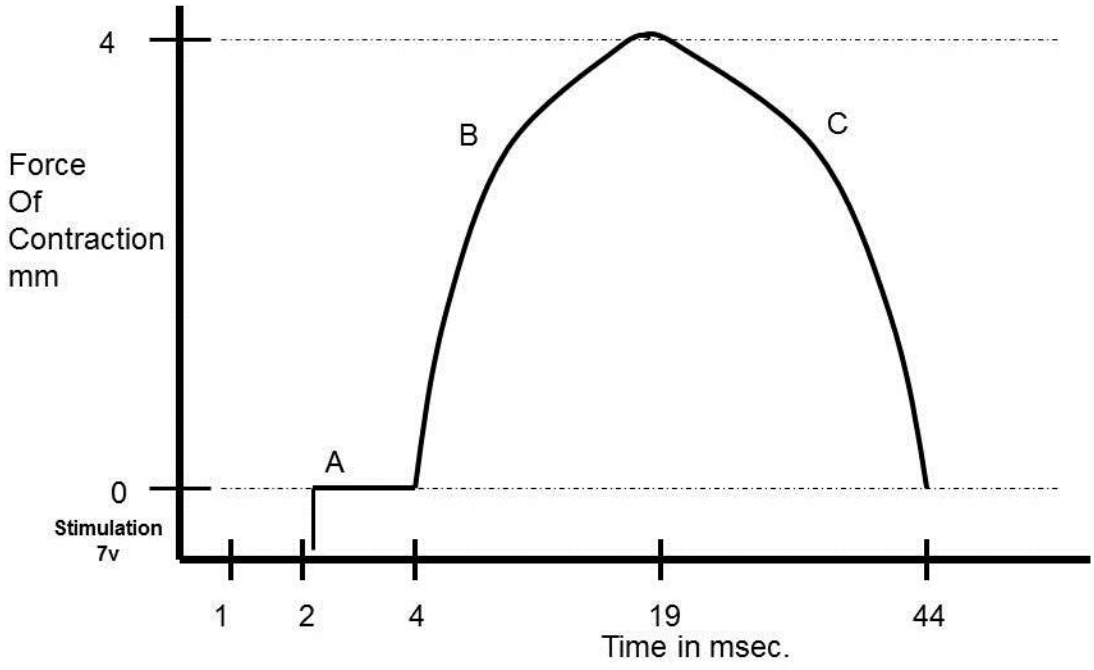
Contraction of whole muscles (Lecture 2)

A muscle contraction in response to a single stimulus of adequate strength is called a _____ _____

What are the phases of a single muscle twitch? _____

_____

The graph represents a _____ _____ _____



On the Graph above :

A represents the _____ Period. During which_____

_____

_____

_____

B represents the _____ Period. During which_____

_____

_____

_____

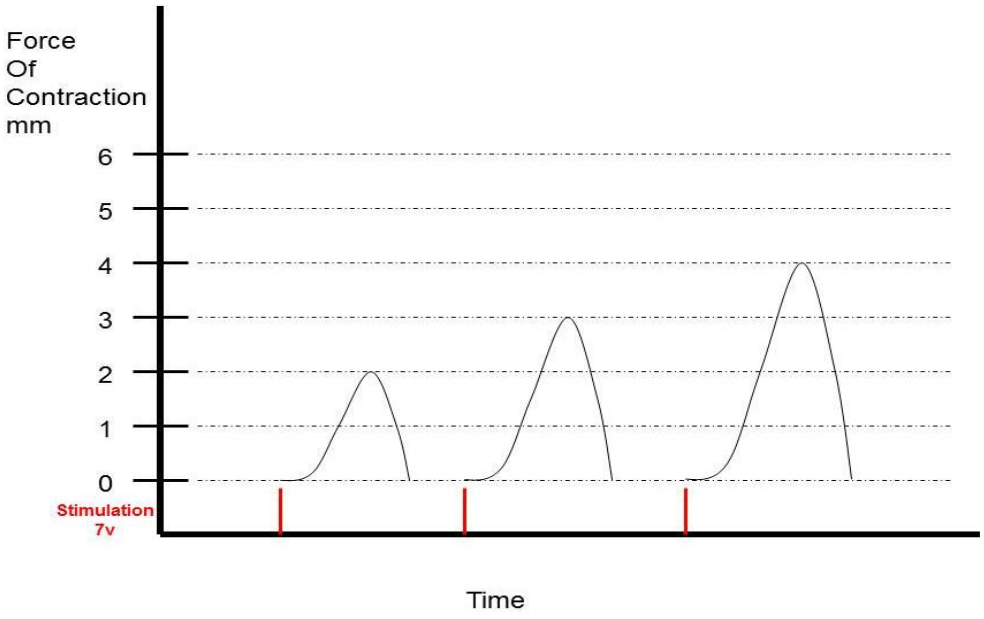
C represents the _____ Period. During which_____

_____

_____

_____

The graph below represents _____

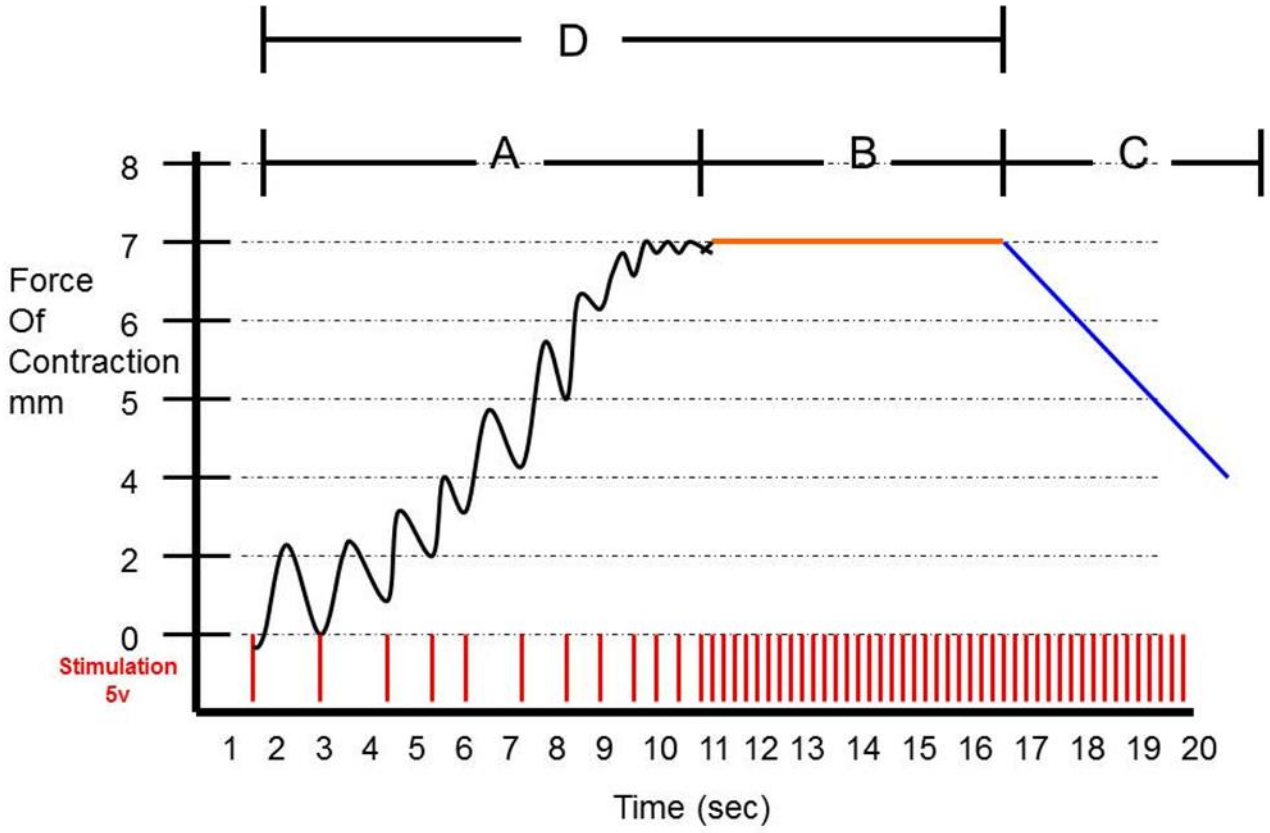


What are the two main conditions that must be met for Treppe to be demonstrated by a muscle stimulated multiple times?

_____

_____

_____



In the Graph above what phenomenon the letters represent:

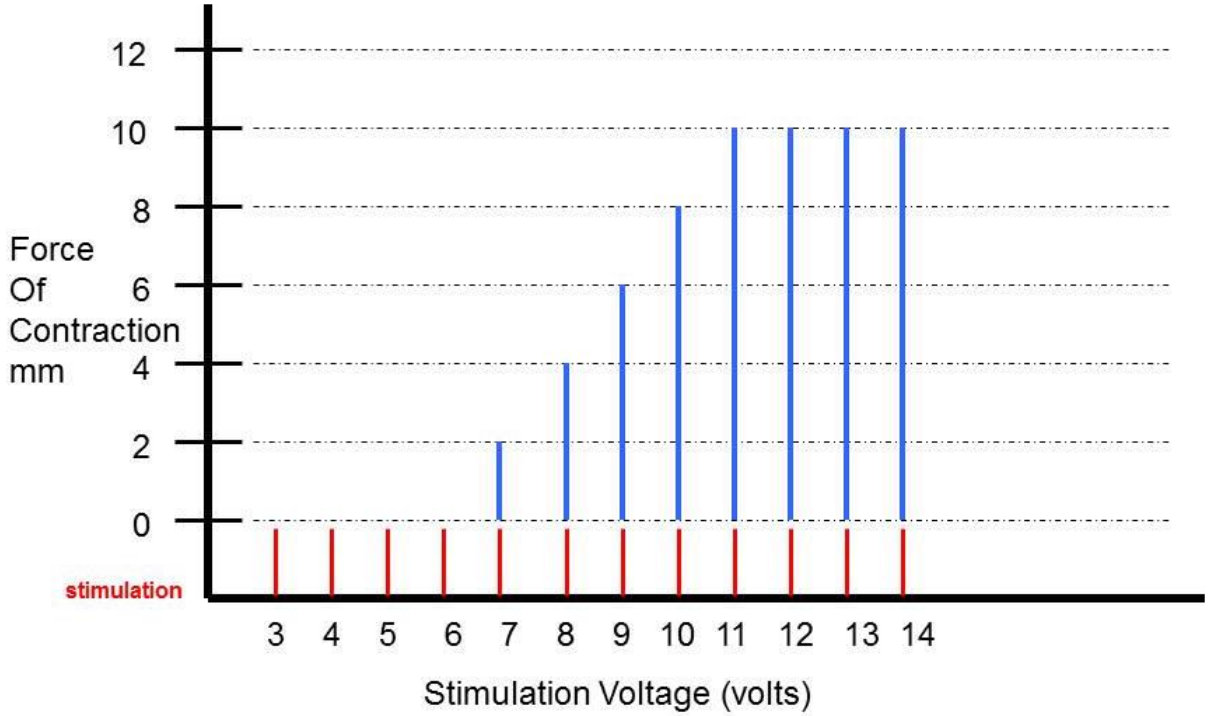
A:_____ B:_____

C:_____ D:_____

What is changing in the graph above that is causing the difference in muscle tension (Force of contraction)?

_____ of the _____

The Graph represents: _____ _____ _____ _____



On the Graph:
7V represents _____: which is:_____

_____

11V represents _____: which is:_____

_____

10mm represents _____: which is:_____

_____

An increase in the strength of the stimulus will cause an increase in the force

of the contraction caused by: _____

Make sure you make your own notes from the lectures as well, this is just a guide, but you are responsible for all the information in the lectures. Answer the questions in mastering associated with the lectures as well.

2) Virtual APPENDICULAR MUSCLES:

A) In the Lab 6 & 7 section on the lab webpage watch the "Lab 6 appendicular muscle intro" presentation.

B) Take the list of muscles below, and watch the dissection videos Learn how to dissect out each section and start to locate the listed muscles

Note: There are a few muscles that transverse sections—and thus are listed in two sections on the cat—these are indicated by a separate color for each of those muscles, make sure you recognize it in all sections listed. There is also a bone, and two structures that you need to know.

LATERAL SURFACE OF FORELIMB. (Dissection video 6)

- Triceps brachii lateral head
- Triceps brachii medial head
- Anconeus
- Triceps brachii long head
- Brachialis

MEDIAL SURFACE OF FORELIMB. (Dissection video 7)

- Biceps brachii
- Epitrochlearis

SUPERFICIAL MUSCLES OF MEDIAL THIGH. (Dissection video 8)

- Sartorius
- Gracilis

DEEPER MUSCLES OF THE MEDIAL THIGH. (Dissection video 8)

Anterior:

- Vastus medialis
- Rectus femoris
- Vastus lateralis
- Vastus intermedius

Posterior:

- Semitendinosus
- Semimembranosus
- Adductor femoris
- Adductor longus
- Pectineus
- Iliopsoas

LATERAL ASPECT OF THE LOWER LEG. (Dissection video 9)

- Gastrocnemius
- Soleus
- Peroneus
- Extensor digitorum longus
- Tibialis anterior
- Calcaneal tendon (structure)

MEDIAL ASPECT OF THE LOWER LEG. (Dissection video 10)

- Gastrocnemius
- Flexor digitorum longus
- Tibia (the bone)
- Tibialis anterior
- Calcaneal tendon

SUPERFICIAL MUSCLES OF THE LATERAL THIGH. (Dissection video 11)

Biceps femoris	Tensor fasciae latae
Caudofemoralis	Fascia lata (structure)
Gluteus maximus	Semitendinosus
Gluteus medius	

C) Watch "Lab 6 Appendicular Muscle Review" video on the lab web page in the Lab 6 & 7 section.

D) **Mastering**: Complete the "**Lab 6 appendicular muscles"** folder in the assignment section

5) NEXT TIME: Make sure you know the names of the muscles and where they are located as there will be an exit quiz for your wet lab.

Lab 7 Appendicular Muscles

BEGINNING THE CAT DISSECTION

Retrieve cat from the your lab box and place on dissecting tray
Carefully remove as much fat and fascia from the surface of the muscles using your fingers or a blunt probe, as was seen in the video (DO NOT USE A SCAPEL AT ANY TIME DURING THE DISSECTION LABS!!)
Follow the dissection instructions found on the next 4 pages
Pictures of the muscles can also be found in the Dissection exercise 1 chapter of your lab manual.

Note: There are a few muscles that transverse sections—and thus are listed in two sections on the cat—these are indicated by a separate color for each of those muscles, make sure you recognize it in all sections listed. There is also a bone, and two structures that you need to know.

LATERAL SURFACE OF FORELIMB. (Dissection video 6)

- Triceps brachii lateral head
- Triceps brachii medial head
- Anconeus
- Triceps brachii long head
- Brachialis

MEDIAL SURFACE OF FORELIMB. (Dissection video 7)

- Biceps brachii
- Epitrochlearis

SUPERFICIAL MUSCLES OF MEDIAL THIGH. (Dissection video 8)

- Sartorius
- Gracilis

DEEPER MUSCLES OF THE MEDIAL THIGH. (Dissection video 8)

Anterior:

- Vastus medialis
- Rectus femoris
- Vastus lateralis
- Vastus intermedius

Posterior:

- Semitendinosus
- Semimembranosus
- Adductor femoris
- Adductor longus
- Pectineus
- Iliopsoas

LATERAL ASPECT OF THE LOWER LEG. (Dissection video 9)

- Gastrocnemius
- Soleus
- Peroneus
- Extensor digitorum longus
- Tibialis anterior
- Calcaneal tendon (structure)

MEDIAL ASPECT OF THE LOWER LEG. (Dissection video 10)

Gastrocnemius
Flexor digitorum longus
Tibia (the bone)
Tibialis anterior
Calcaneal tendon

SUPERFICIAL MUSCLES OF THE LATERAL THIGH. (Dissection video 11)

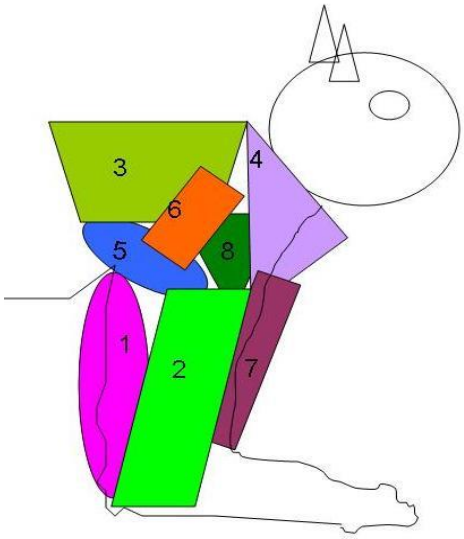
Biceps femoris
Caudofemoralis
Gluteus maximus
Gluteus medius
Tensor fasciae latae
Fascia lata (structure)
Semitendinosus

CLEAN UP

Place cat parts in bucket labeled "**Cat Parts Only**"
Place all other garbage in the regular trash can
Spray cats with **BIOSHIELD**
Place cats in bags; fold the top of the bag over and secure tightly with a rubber band. Label cat so you can find it next week
Wash the table dissecting tray and tools with bleach and water and replace dry tray to table as found when you arrive to lab.

Appendicular Cat Muscle Dissection

ΔStart on the **Dorsal** side of the cat: You will need to take fat etc. from the elbow to the shoulder of the cat to begin.

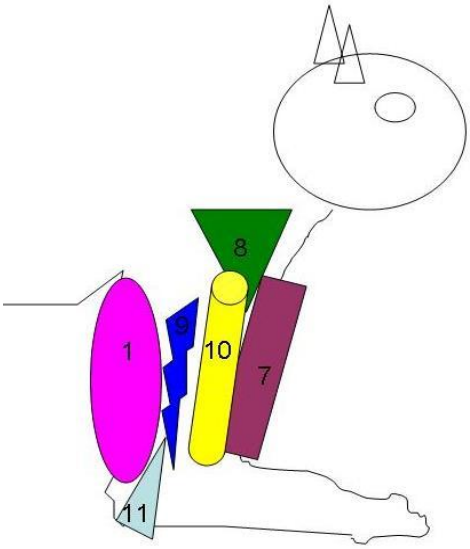


LATERAL SURFACE OF FORELIMB (ARM)

Triceps brachii lateral head **(2)**: At the end of the spinodeltoid a large muscle going across forlimb.

Triceps brachii long head **(1)** Along the outside of the arm and can be seen from both the dorsal and the ventral side of the cat.

Δ Place blunt probe under Triceps brachii lateral head, pull up and cut through to see the rest:



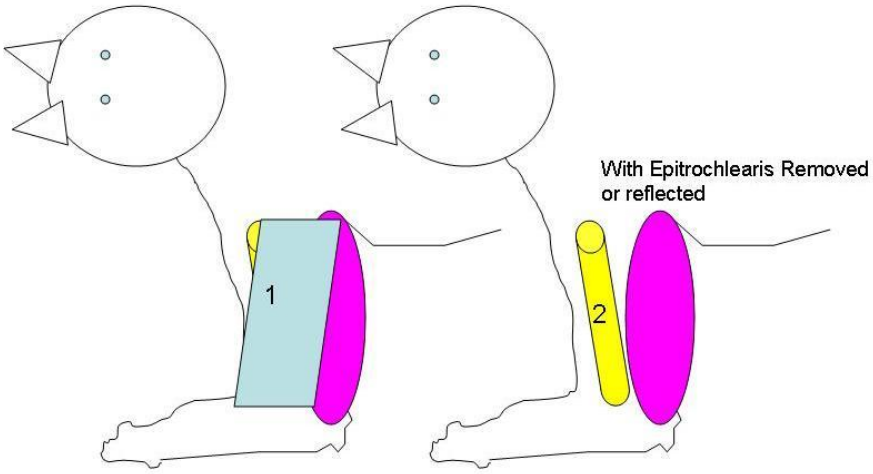
Triceps brachii medial head **(9)** in the middle, Under triceps brachii lateral head.

Anconeus **(11):** Follow TBMH all the way down to the elbow to find a small triangular muscle wrapped around elbow area.

Brachialis **(10):** is right along the arm bones next to Triceps brachii medial head, probe and should feel bone.

ΔTurn the cat over to the **ventral** side:

MEDIAL SURFACE OF FORELIMB



Epitrochlearis*:** Small sheet muscle covering bottom of arm. Pull this up with a probe and carefully cut through (this is not a thick muscle do not go too deep). Underneath you will find: ***Biceps brachii, next to Triceps brachii long head (from above), and on top of the vein

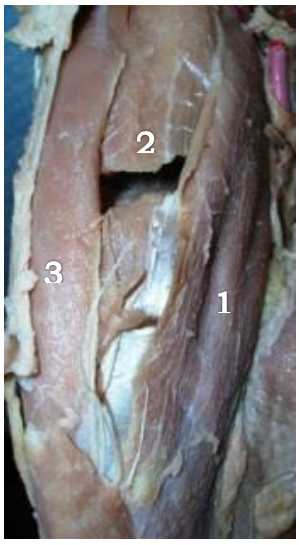
Δ Move down to the hind limb, leg (keep on ventral side) Remove fat from thigh

SUPERFICIAL MUSCLES OF MEDIAL THIGH

The thigh area is covered with two large muscles divided by the femoral artery, ***Sartorius*** on the top and ***Gracilis*** on the bottom.

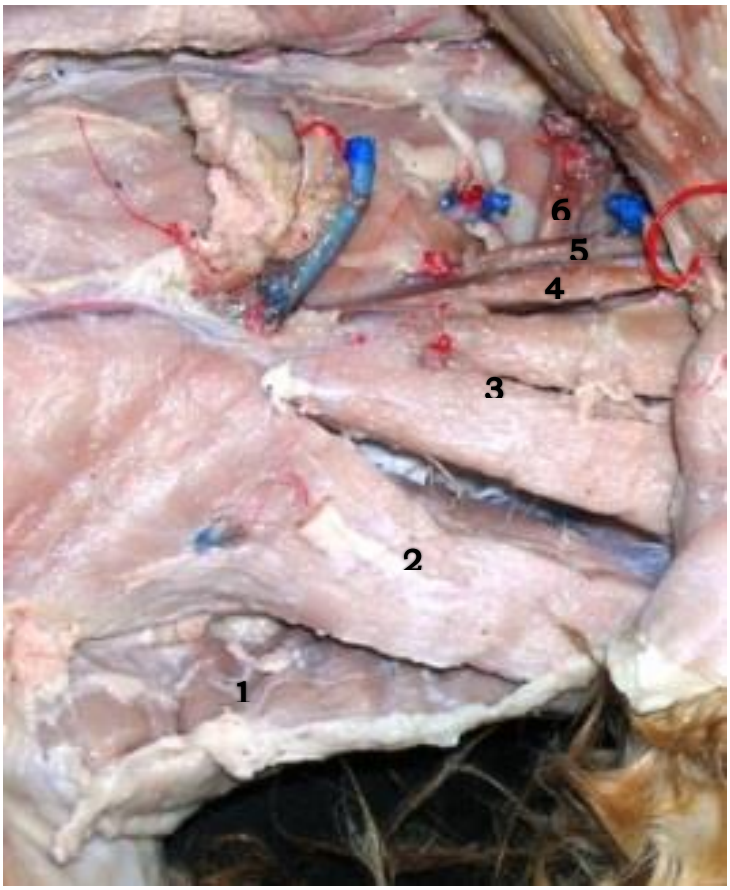
DEEPER MUSCLES OF THIGH

Δ Carefully cut through Sartorious and reflect to find muscles below—this is a sheet muscle so place probe underneath- lift up and then cut. Do not cut muscles below it. (NOTE—be careful to leave Femoral Artery and Vein intact on one leg.)



Quadriceps: Looks like a shiny hotdog with ***Vastus medialis*** **(1)** as the bun on the medial (inside) side of the cat, ***Rectus femoris*** (2) already reflected in picture) as the hotdog and ***Vastus lateralis*** (3) as the bun on the outside.

Δ Place probe under rectus femoris pull up and cut through, right underneath you will find a white covering ***Vastus intermedius***



Medial Thigh cont'

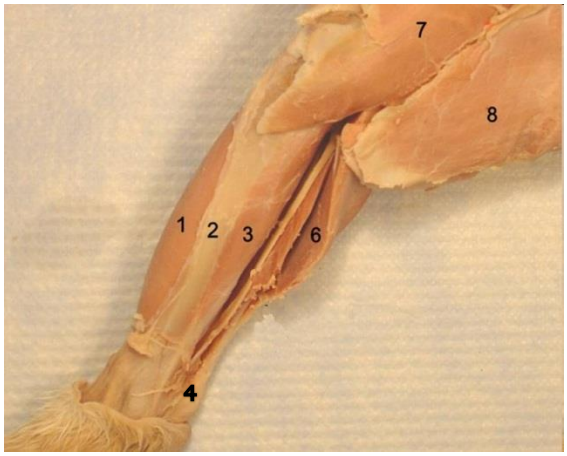
ΔCarefully cut through Gracilis (again a sheet muscle only cut the sheet) and reflect to find muscles below. Starting from the lower thigh you should be able to find the edges for 4 muscles moving your way towards the body of the cat- and then two more that should have your TA help you with.

Semitendinosus **(1)**
Semimembranosus **(2)**
Adductor femoris **(3)**
Adductor longus **(4)**
Pectineus **(5)**
Iliopsoas **(6)**

MEDIAL ASPECT OF LOWER LEG

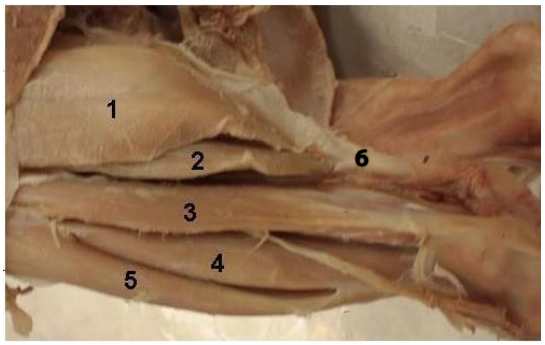
Δ Move to the lower part of the leg and you should be able to see the Tibia bone (If not, remove connective tissue until you can see it) You will see muscles on either side of the Tibia bone, and also be able to divide out a third muscles (The large calf muscle) along the back of the leg.

Starting from front of the leg (opposite the ankle)
Tibialis anterior (1)
Tibia (bone) (2)
Flexor digitorum longus (3)
Gastrocnemius (6)
You also need to know the **Calcaneal tendon** **(4)** found at the edge of Gastrocnemius on to the ankle, can be seen from both sides .



Δ Hold on to Gastrocnemius and **turn the cat over** again so you are on its **Dorsal** side, continue with the lower leg and starting with Gastrocnemius you should be able to divide out the 5 muscles below. Note you also saw Tibialis anterior from the other side

LATERAL ASPECT OF LOWER LEG---FIGURE D1.11



Gastrocnemius (1)
Soleus (2)
Peroneus (3)
Extensor digitorum longus (4)
Tibialis anterior (5)

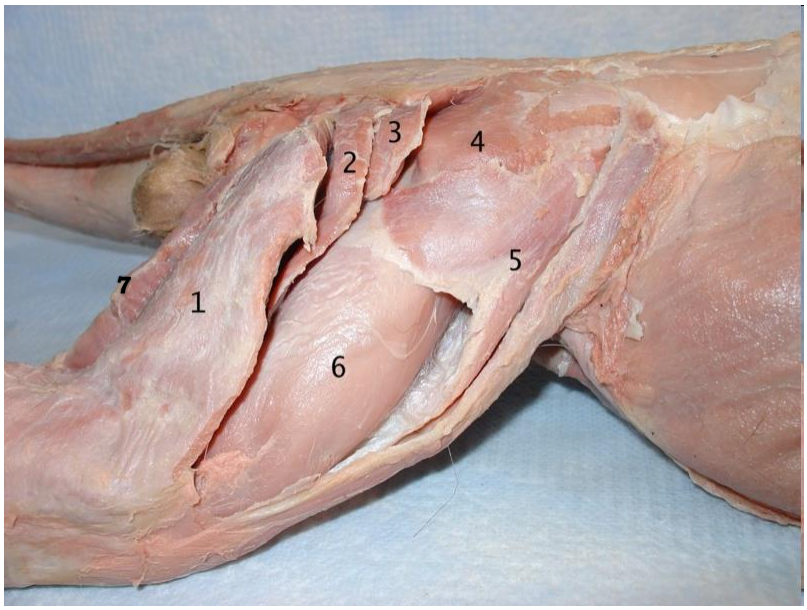
ΔAgain you also need to know the **Calcaneal tendon** (6) found at the edge of Gastrocnemius on to the ankle, can be seen from both sides

SUPERFICIAL MUSCLES OF THIGH

ΔMove back up to the thigh / bottom of your cat (keep on dorsal side) Covering the thigh you will find a large sheet muscle ***Biceps femoris*** (1)**.** ***Semitendinosus*** **(7)**—know this from the other side of the cat, find it hold on to it and see it from this side. It will be by the bottom part of Biceps femoris

Along the front side of the thigh you will see a white covering (seems plastic-y) **Fascia lata** (mostly cut off in this picture—look on your cat). Along the front and front side of thigh and under the fascia lata you will see ***Tensor fasciae latae*** (5)—note its' odd shape.

Δ Now Move to the top of the thigh, starting at the tail side along spine you will find three muscles in a row (and slightly covering each other: ***Caudofemoralis*** (2)- runs along the side and sometimes under *biceps fermoris*. ***Gluteus maximus*** (3) is a little strip muscle you should be able to get your probe under and really see the boundaries, ***Gluteus medius*** (4) larger muscle posterior *to tensor fasciae latae* and under / cranial to *gluteus maximus(3)*.



Note for Labs 8 & 9

For the last two labs A and B sections will be going in a different order.

A section will be doing NeuroAnatomy (wet) next lab and then Neurophysiology (Virtual)

B section will be doing Neurophysiology (virtual) next lab and then Nueroanatomy (wet)

Prepare accordingly.

Bring gloves and dissecting tools to the neuroanatomy lab, Bring your laptop to the Neurophysiology lab.

Section A only: Before your next lab you have some preparation to complete for the Neuroanatomy lab.

Preview Neuroanatomy for next week's wet lab.

A) Using the Neuroanatomy lab handout, Find the items on the handout using PAL; Cat /Nervous system/ self-review pictures 1-6, 10-14 and Anatomical models / nervous system / central nervous system/ self-review/ pictures 4-9) **And** the neuroanatomy reviews in the neuroanatomy section of the lab web page.

B) Go to the assignments area in Mastering and complete the **"Neuroanatomy prep"** folder. Here you will find pictures and questions to start preparing you for lab. Go through this material and have a feel for the name and where they are located. Check the due date for this on mastering

NEUROANATOMY
Lab 8 for Section A and Lab 9 for Section B

1) HUMAN BRAIN MODEL.
Lab manual: Exercise 19
Be able to identify the items listed below on the plastic brain models:

Cerebral hemispheres
4 lobes of the brain:
Frontal, Parietal, Temporal, Occipital
Gyrus (plural – gyri)
Sulcus (plural –sulci)
Fissure
Olfactory bulbs
Olfactory tracts
Optic nerves
Optic chiasma
Optic Tract
Pituitary gland
Infundibulum
Brain stem—made up by the structures below
a. Midbrain
b. Pons
c. Medulla oblongata
Midbrain made up by the structures below
a. Corpora quadrigemina
b. Cerebral aqueduct
Corpora quadrigemina- made up by the structures below
a. Superior colliculi
b. Inferior colliculi
Cerebellum
Arbor vitae
Corpus callosum
Fornix
Septum pellucidum
Thalamus
Hypothalamus
Pineal body (Pineal gland)
Choroid plexus

2) CRANIAL NERVES.
Lab Manual: Exercise 19 Activity 3

a) Know the name, number, and **basic** function for all twelve cranial nerves

b) ***Locate the twelve cranial nerves on the human brain model***

3) MAMMAL BRAIN SPECIMEN
Lab Manual: Exercise 19 dissection
Be able to identify the following brain structures on the preserved specimen.

Cerebrum (Cerebral hemisphere)
Gyrus
Sulci
Olfactory Bulbs
Optic Nerves
Optic chiasma
Optic Tracts
Corpora quadrigemina
Superior colliculi
Inferior colliculi
Pons
Medulla oblongata
Cerebellum
Corpus callosum
Fornix
Septum pellucidum
Thalamus
Hypothalamus
Pineal gland (or Pineal body)
Arbor vitae

4) ANATOMY OF THE SPINAL CORD.
Lab Manual Exercise 21
Be able to identify the following structures on the spinal cord models

1. Gray matter
    a. Dorsal (or Posterior) horn
    b. lateral horn
    c. Ventral (or Anterior) horn
    d. gray commissure
2. Central canal
3. Dorsal root
4. Dorsal root ganglion
5. Ventral root
6. Spinal nerve
7. White matter
    a. Dorsal (or Posterior) funiculus
    b. Dorsal (or Posterior) median sulcus
    c. lateral funiculus
    d. Ventral (or Anterior) funiculus
    e. Ventral (or Anterior) median fissure

5) CAT SPINAL NERVES.
Lab Manual: Dissection Exercise 2
Be able to identify the following spinal nerves on the dissected specimen.

1. Brachial Plexus
    A. axillary nerve
    B. radial nerve
    C. ulnar nerve
    D. median nerve
    E. subscapular nerve

2. Sacral plexus
    A. sciatic nerve
    B. tibial nerve
    C. common fibular (OR peroneal) nerve

6) SPECIAL SENSES (Vision) Exercise 24 in Lab Manual. Complete the following activities and understand all information provided in the Lecture slides

A) Mammal Eye Dissection:
Figure 24.3 Internal anatomy of the eye. Be able to identify the following eye structures by dissecting the mammal eye

Cornea	Pupil	Aqueous Humor
Iris	Lens	Vitreous Humor
Retina	(Tapetum lucidum)	Choroids
Sclera	Optic Nerve	Optic Disk (Blind Spot)

B) Human Eye Model: Find and be able to identify the following eye structures on the eye model

Cornea	Pupil	Iris	Lens
Vitreous Humor	Retina	Choroids	Sclera
Optic Nerve	Fovea centralis	Ciliary body	
Superior Rectus	Inferior rectus		

Medial and Lateral Rectus (how to you tell the difference?)

C) Know **figure 24.2** Muscles of the eye and **24. 6** Visual Pathway to the brain from your lab Manual

D) Find your Blind Spot Exercise 24 Activity 5 in lab manual

Use the lab manual and class lecture to answer the following questions:
What are rods and cones? _____

_____

_____
What are the 3 types or cones?
_____

The eye is divided into two sections the _____ segment and _____ segment

Know which parts above belong to which segment.

Match the following structure of the cow eye with their function and/or description.

A. tapetum lucidum B. retina C. ciliary body
D. lens E. sclera F. iris
G. Pupil

_____ Contains the photoreceptors for vision.
_____ The colored portion of the eye.
_____ This structure changes shape to focus light on the retina.
_____ The opening in the iris through which light passes.
_____ The iridescent portion of the choroid layer found in "nocturnal" animals.
_____ Consists of muscles, which control and shape the lens.
_____ The white of the eye.

Trace the path of visual information to the brain:

Object → Cornea → _____ → Retina → _____ _____ → _____

_____ →_____ _____ →_____ → _____ Lobe of brain,

Where information is divided into 3 processing systems for _____

_____ and _____ → comes together as what we perceive.

(T/F) The information from the left eye is processed on the right side of the brain, and the information from the right eye is processed on the left side of the brain.

T/F) The information from the left field of vision is processed on the right side of the brain, and the information from the right field of vision is processed on the left side of the brain.

How are the two questions above different?

NEUROPHYSIOLOGY

Lab 9 for Section A and Lab 8 for Section B

1) LECTURE:

Go to mastering. In the assignments area of mastering, open the "**Neurophysiology"** folder, complete the lecture activity, take notes and answer the questions here and in the mastering item. You are responsible for everything in the lecture—the questions below are a guide to help you retrieve information, but are not everything you need to know.

The membranes of neurons at rest are very permeable to _____ but only slightly permeable to _____.

During depolarization, which gradient(s) move(s) Na^+ into the cell?
(Hint 1. Think about the charge inside the cell and the concentration of Na+ inside and outside the cell.)

_____

What is the value for the resting membrane potential for most neurons? _____

The concentrations of which ion is highest outside the axon? _____

What does the neuron use to move ions to compensate for Na^+ and K^+ leaks?

_____ _____

The Na^+ - K^+ pump is a membrane _____ that uses _____

_____ to move Na^+ and K^+ ions against their electrochemical gradients.

To maintain the -70 mV membrane potential the Na^+ - K^+ pump continually

moves _____ Na^+ ions out of the neuron and _____ K^+ ions into the neuron

The action potential is a transient change in the resting membrane potential from -70 mV to +30 mV, then back to -70 mV. This change is caused by the opening of first _____ then _____ voltage-gated channels.

What area(s) of the neuron generate local signals that open the voltage-gated channels in the first part of the axon, thus causing an action potential to

begin? _____ _____

As the axon hillock depolarizes, Voltage-gated Na^+ channels open and Na^+ moves (into or out of) _____ the cell causing further (depolarization or repolarization) _____.
If depolarization reaches -55 mV, an action potential will be generated. What is

this -55 mV trigger point called? _____

The action potential is said to be an _____ or _____ event

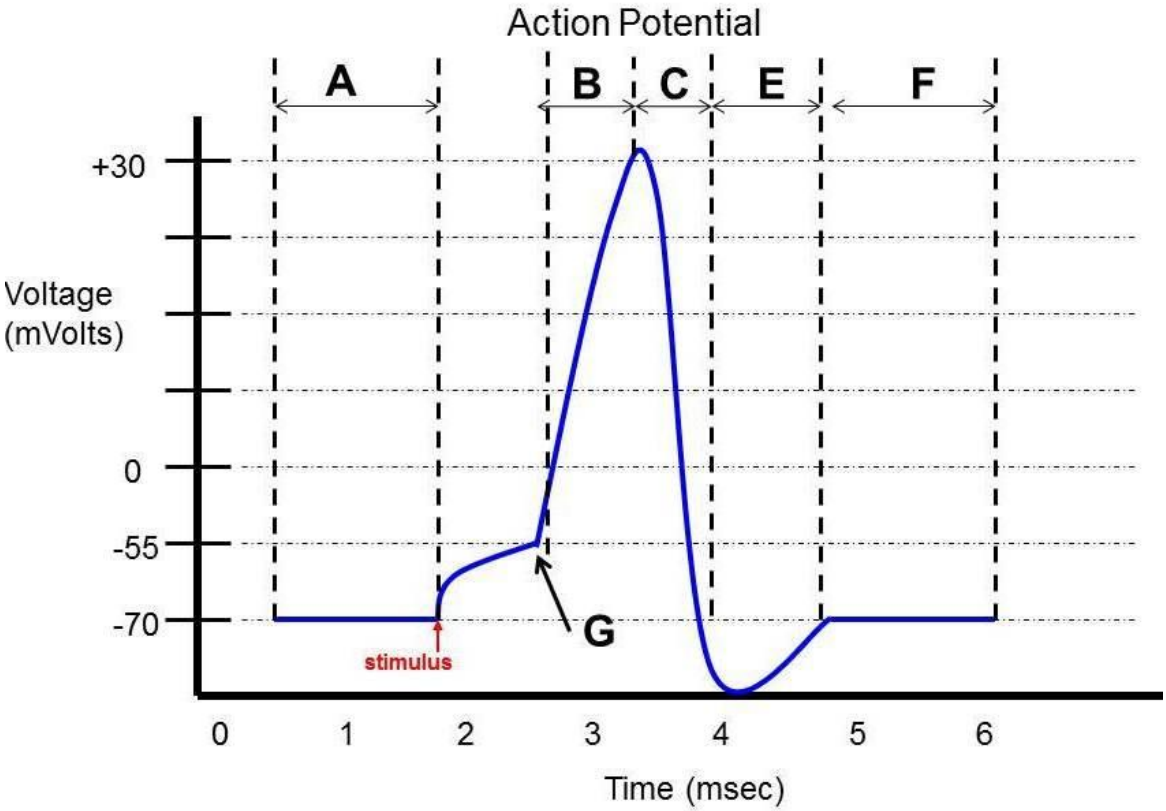
The voltage-gated Na+ channels in the neuron have a voltage sensitive gate and

a _____ sensitive gate.

At the end of the depolarization phase, voltage-gated _____channels open to help restore the resting membrane potential.

At what point in an action potential do the voltage gated K+ channels open?

_____ And when are the fully activated? _____



Fill in the names and the state of the ion channels for each phase of the action potential as seen in the graph above.

Phase	Na+ channels	K+ Channels
A:_____	_____	_____
B:_____	_____	_____
C:_____	_____	_____
E:_____	_____	_____
F:_____	_____	_____
G:_____	_____	_____

Depolarization is caused by the movement of what ion (sodium or potassium), in what direction (into or out of the cell)?

Repolarization is caused by the movement of what ion (sodium or potassium), in what direction (into or out of the cell)?

After a neuron has generated an action potential, it cannot generate another

one for a while. This period is called the: _____ _____ _____

Immediately after the absolute refractory period is the _____

_____ _____ when an action potential can be generated if depolarized to a point greater than threshold.

_____ _____ is the speed with which an action potential is propagated.

Conduction velocity depends on what two factors? _____

_____

The areas of bare axon on an otherwise myelinated axon are called the nodes of

_____

An action potential jumping between the nodes of Ranvier is called_____

_____

2) EXPERIMENT: Physio-Ex 8.0 18b Neurophysiology of Nerve Impulses.

You will need to **download the instructions from the lab web-site** before starting. Use the introduction to make sure you know the following terms, and questions in the detail described in this handout.

Excitability
Conductivity
Resting Membrane Potential
In neurons, what happens when the action potential/nerve impulse reaches the axon terminal?
What are the (4) ways that an action potential can be generated?
Conduction velocity
Myelin
In this experiment, are we working with one neuron or several neurons?

In the assignments area of mastering, continue with the

"**Neurophysiology"** folder by starting the next item: the physio-ex experiment.
Clicking on the link in the introduction will open up the physio-ex experiment in another tab or window.
Use your instruction handout for the directions to the experiment.
Start at the beginning, read and follow all directions and you should be able to complete with no problems.
While completing each activity answer the associated questions in the item. Make sure you submit the answer to each question.

3) Lab Manual:

A) Using chapter 22- ***Human Reflex Physiology*** in your lab manual know the following items in as much detail as is given in your lab manual.

autonomic reflexes
somatic reflexes
The five components of a reflex arc
superficial cord reflexes
stretch reflex
corneal reflex
pupillary reflex
contralateral response
ipsilateral response

B) Using Chapter 23 ***General Sensation*** in your lab manual know the following items in as much detail as is given in your lab manual.

sensory receptors
general senses
special senses
exteroreceptors
interoceptors/visceroceptors
proprioceptors
free/naked nerve endings
Merkel discs
hair follicle receptors
Meissner's corpuscles
Ruffini's corpuscles
Pacinian corpuscles

C) Continue with the "**Neurophysiology"** folder and complete the questions. These are a sample of questions that help to test your knowledge from the lecture, experiment and lab manual chapters. It is not a complete list of what you need to know, but a sampling on how this information will be tested.

Section B only:

4) Prep: Preview Neuroanatomy for next week's wet lab.

A) Using the Neuroanatomy lab handout, Find the items on the handout using PAL; Cat /Nervous system/ self-review pictures 1-6, 10-14 and Anatomical models / nervous system / central nervous system/ self-review/ pictures 4-9) **And** the neuroanatomy reviews in the neuroanatomy section of the lab web page.

B) Go to the assignments area in Mastering and complete the **"Neuroanatomy prep"** folder. Here you will find pictures and questions to start preparing you for lab. Go through this material and have a feel for the name and where they are located. Check the due date for this on mastering