Biology 322 - Human Anatomy

**GROSS ANATOMY OF THE MUSCULAR SYSTEM**

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References:

Kenneth Saladin, *Human Anatomy* (4th edition), Chapters 10, 11, 12

Eric Wise, *Human Anatomy Laboratory Manual,* Exercises 11, 12, 13, 14

**INTRODUCTION**

 We will use three lab periods to learn the names of the muscles which comprise the human muscular system. There will not be step-by-step instructions: instead, it will be an independent study exercise in which you can proceed at your own pace, using your textbook and lab manual as references. Study the appropriate figures in your lab manual and textbook, the models of the arm and leg muscles, and the cadaver to learn the names of the muscles listed below. These are only a fraction of the muscles found in the human body, but they are the largest and most important for our purposes.

 Pay attention to the names of the muscles - these often tell you their functions (e.g. the *extensor digitorum* extends the digits) or their origins and insertions (e.g. the *sternocleidomastoid* originates from the sternum and clavicle and inserts onto the mastoid process of the temporal bone). Many muscles have similar names, so be careful with spelling.

 Muscles are grouped according to location and/or function, and you should also pay attention to these groupings. They are not random - they will often help you learn the muscle names (e.g. many of the muscles in the *anterior compartment* of the forearm start with the name *flexor,* and none in this group will ever begin with the name *extensor*), and muscles in the same group often share origins or insertions. Some muscles form functional groups within a larger group: for example the semitendinosus, semimembranosus and biceps femoris form the *hamstrings* on the posterior thigh. You need to know both the individual muscles and the group as listed on the following pages.

 Be sure to look at the *whole* muscle when identifying it or when relating its structure and position to its function. For example: What size is it? (smaller muscles typically provide more fine movement than do larger ones). What shape is it? (a broad, flat muscle can pull on a wider area than a narrow one). What direction do its fibers run? (this tells you the direction of pull). Where do its tendons lead? (if they lead to the fingers, then the muscle probably moves the fingers).

 Many muscles can also be felt through the skin. On yourself and/or another person, locate each of the living muscles as you cause them to contract. For example, you can feel the contraction of your biceps brachii muscle when you flex your elbow against resistance, or contraction of your sternocleidomastoid muscle when you flex your neck against resistance. Many of these will require the removal of clothing and should, obviously, not be done in the lab. Do not attempt to identify muscles through clothing. You will need to use your textbook to identify the specific function of each muscle in order to contract it. For example, different joints in the fingers are flexed by the flexor digitorum profundus and flexor digitorum superficialis.

 On the lab exam, you will be asked to name muscles from the diagrams in your lab manual (all muscles in this exercise), the arm and leg models (muscles marked with an asterisk), or the cadaver (listed on the last page). You will also be asked to choose one muscle from certain groups and to identify the origin, insertion, and function of that muscle at the same level of detail given in the lab manual or textbook.

**MUSCLES OF FACIAL EXPRESSION:** These muscles typically (although not always) originate from the bones of the face, and they insert into the skin of the scalp or face or they blend into other muscles. Thus, they move skin, not bones, when they contract. Many of them are small, but because they have a very extensive nerve supply through the seventh cranial (facial) nerve, you have fine control of their contraction.

Identify the following muscles of facial expression using your lab manual or textbook.

 Frontalis

 Occipitalis

 Orbicularis oculi

 Orbicularis oris

 Depressor anguli oris

 Depressor labii inferioris

Select one muscle from the list above and be ready to discuss its origin, insertion, and function.

You should be able to find all of these muscles on the living person.

**MUSCLES OF MASTICATION:** These muscles, as their name implies, move your mandible when you chew. They are bilateral (found on each side of the face).

Identify the following muscles using your lab manual or textbook.

 Masseter

 Temporalis

 Buccinator

Select one of these muscles and be prepared to discuss its origin, insertion, and function.

You should be able to find both of these muscles on the living person.

**MUSCLES OF THE ANTEROLATERAL NECK:** These muscles are only grouped together because of their location on the front of the neck, not because of their function. Take careful note of their names since they often give clues as to their location/points of attachment. Example: Sternothyroid muscle attaches to the sternum on one end and the thyroid cartilage on the other.

Identify the following muscles using your lab manual or textbook.

 Sternocleidomastoid (also called the sternomastoid)

 Digastric

 Mylohyoid

 Sternohyoid

 Sternothyroid

 Thyrohyoid

 Omohyoid

Select one muscle from this list above and be ready to discuss its origin, insertion, and function.

You should be able to find all of these muscles on the living person.

**MUSCLES OF THE THORAX AND SHOULDER:** The intercostal muscles move the ribs relative to each other; the other muscles on this list are involved with movement of the upper limb (including the scapula). Many of them also function to anchor the scapula in position to provide a stable platform for movement of the humerus.

Identify the following muscles using your lab manual or textbook.

Identify the muscles marked with an asterisk (\*) on the model of the upper limb:

 Pectoralis major

 Pectoralis minor

 Deltoid\*

 Trapezius

 Latissimus dorsi

 Supraspinatus

 Infraspinatus

 Teres major

 Teres minor

 Rhomboid major

 Rhomboid minor

 Levator scapulae

Select one muscle from the list above and be ready to discuss its origin, insertion, and function.

You should be able to find the pectoralis major, deltoid, trapezius, latissimus dorsi, and teres major on the living person; the others will be deep to other muscles and not individually identifiable.

**MUSCLES OF THE ABDOMINAL WALL:** These broad, flat muscles provide shape to, and movement of, the walls of the abdomen. Three muscles form the lateral abdominal wall, arranged on top of each other, and they share anterior insertions where the fourth one lies.

Identify the following muscles using your lab manual or textbook.

 External oblique

 Internal oblique

 Transversus abdominus

 Rectus abdominus

You do not need to identify the origin, insertion, or function of these muscles.

You should be able to identify the external oblique and rectus abdominus on the living person.

**MUSCLES OF THE ARM:** Anatomically, the *arm* extends only from the shoulder to the elbow. Muscles located here move (or stabilize) the arm if they cross the shoulder joint, and move (or stabilize) the forearm if they cross the elbow joint. They have relatively long tendons where they cross joints.

Identify the following muscles using your lab manual or textbook.

Identify the muscles marked with an asterisk (\*) on the model of the upper limb:

 Triceps brachii\*

 Biceps brachii\*

 Brachialis\*

 Coracobrachialis\*

Select one muscle from this list and be prepared to discuss its origin, insertion, and function.

You should be able to find the triceps brachii and biceps brachii on the living person.

**MUSCLES OF THE FOREARM:** Anatomically, your *forearm* extends from the elbow to the wrist. Muscles located here participate in movement or stabilization of the forearm, but most of them function primarily to move the hand or the fingers. They tend to be long and spindle-shaped with long tendons reaching toward their insertions. For reasons of both location and function, we divide them into two groups located in the *anterior (flexor)* and *posterior (extensor)* compartments of the forearm. Within both compartments, some muscles lie deep to others and can only be seen by moving the superficial ones out of the way.

a) Identify the following muscles using your lab manual or textbook. Identify the muscles marked with an asterisk (\*) on the model of the upper limb.

 Palmaris longus\*

 Flexor carpi radialis\*

 Flexor carpi ulnaris\*

 Flexor digitorum superficialis\*

 Flexor digitorum profundus\*

 Pronator teres

 Pronator quadratus

 Brachioradialis\*

b) Identify the following muscles using your lab manual or textbook. Identify the muscles marked with an asterisk (\*) on the model of the upper limb.

 Extensor carpi ulnaris\*

 Extensor digitorum\*

 Extensor pollicis longus\*

 Supinator

Select one muscle listed from *each* of the two compartments of the forearm and be prepared to discuss

 its origin, insertion, and function.

You should be able to find all of the muscles in these two regions on the living person except the

 pronator teres, pronator quadratus, and supinator.

**MUSCLES OF THE THIGH:** These muscles move both your thigh and (lower) leg, but they are also very important in holding you upright and in balance when you stand or walk. They tend to be very large and very strong. Similar to the arrangement in the arm, we divide these muscles into compartments based on both their location and similar functions.

a) Identify the following muscles using your lab manual or textbook. Identify the muscles marked with an asterisk (\*) on the model of the lower limb:

 Iliacus

 Psoas major

 Sartorius\*

 (Quadriceps Femoris):

 Rectus femoris\*

 Vastus lateralis\*

 Vastus medialis\*

 Vastus intermedius

b) Identify the following muscles using your lab manual or textbook. Identify them on the model of the lower limb:

 Pectineus\*

 Adductor magnus\*

 Adductor longus\*

 Gracilis\*

c) Identify the following muscles using your lab manual or textbook. Identify each of them on the model of the lower limb:

 Gluteus maximus\*

 Gluteus medius\*

 (Hamstrings):

 Biceps femoris\*

 Semitendinosus\*

 Semimembranosus\*

Select one muscle listed for *each* of the three compartments of the thigh and be prepared to discuss its

 origin, insertion, and function.

You should be able to find all of the muscles in these three regions on the living person except the

 vastus intermedius and gluteus medius, which are deep to other muscles.

**MUSCLES OF THE LEG:** Anatomically, your *leg* lies between you knee and your ankle. These long, spindle-shaped muscles help move and/or stabilize the leg, but they also have long tendons of insertion to reach the foot or toes. As in the forearm and thigh, they are divided into compartments based both on location and on similar functions.

a) Identify the following muscles using your lab manual or textbook. Identify the muscles marked with an asterisk (\*) on the model of the lower limb.

 Popliteus

 Gastrocnemius\*

 Soleus\*

 Flexor digitorum longus

 Flexor hallucis longus

b) Identify the following muscles using your lab manual or textbook. Identify all of them on the model of the lower limb.

 Fibularis (peroneus) longus\*

 Tibialis anterior\*

 Extensor digitorum longus\*

Select one muscle listed for *each* compartment of the leg and be prepared to discuss its origin, insertion,

 and function.

You should be able to find all of the muscles in these two regions on the living person except the soleus.

**MUSCLES ON THE CADAVERS**:

After studying the muscles using diagrams and models, identify the following muscles on the cadaver in the supine (face up) position:

 Pectoralis major

 Pectoralis minor

 Deltoid

 Sternohyoid

 Sternothyroid

 Sternocleidomastoid

 Biceps brachii

 Triceps brachii

 Soleus

 Gastrocnemius

Flexor carpi ulnaris

Flexor carpi radialis

Flexor digitorum superficialis

Extensor carpi ulnaris

Extensor digitorum of upper limb

Rectus femoris

Vastus lateralis

Vastus medialis

Sartorius

Gracilis

Adductor longus