EXAM NUMBER_____

GROSS ANATOMY – ANAT 503
EXAMINATION 5

September 13, 2013

PART I. Answer in the space provided. (12 pts)

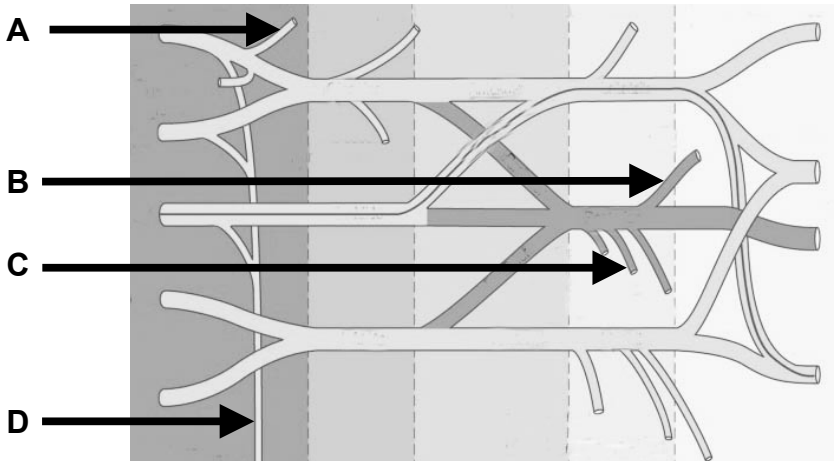
1. Identify the structures. (2 pts)

A. _____

B. _____

C. _____

D. _____



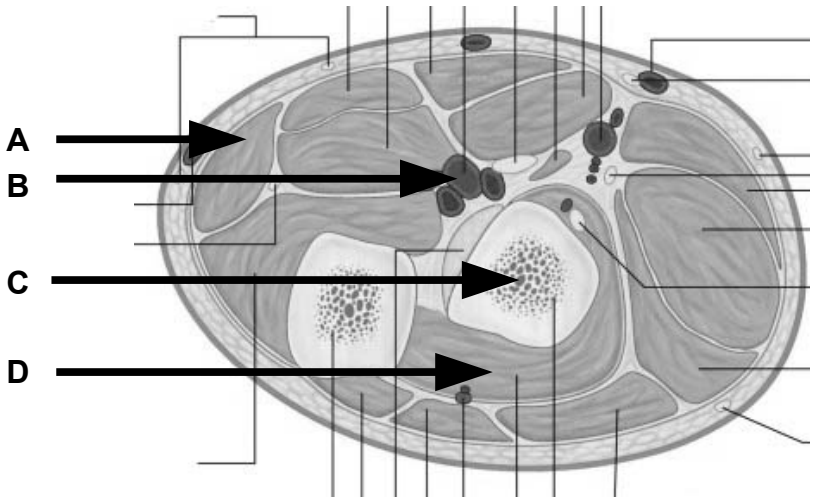
2. Identify the structures. (2 pts)

A. _____

B. _____

C. _____

D. _____



EXAM NUMBER_____

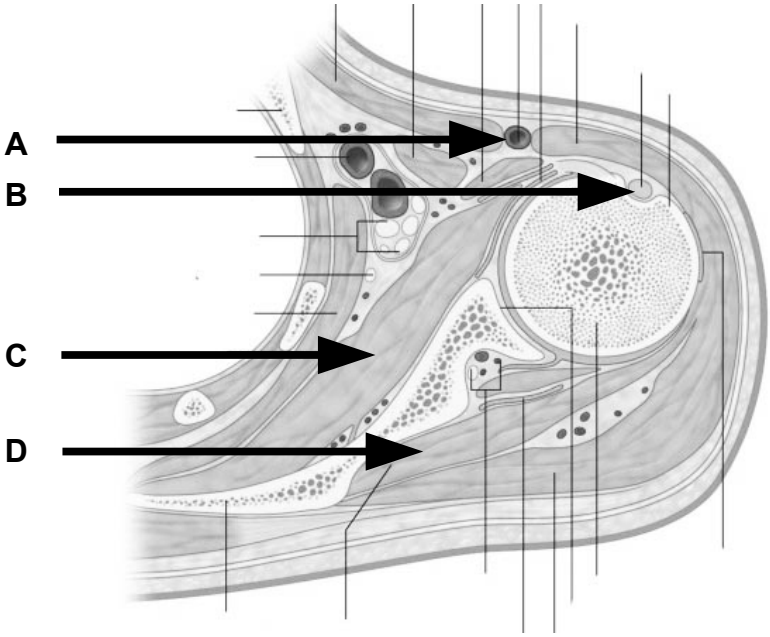
3. Identify the structures. (2 pts)

A. _____

B. _____

C. _____

D. _____



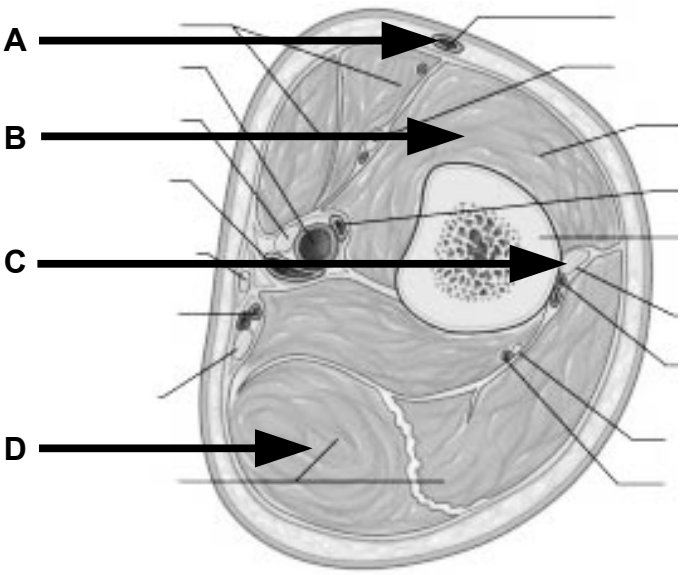
4. Identify the structures. (2 pts)

A. _____

B. _____

C. _____

D. _____



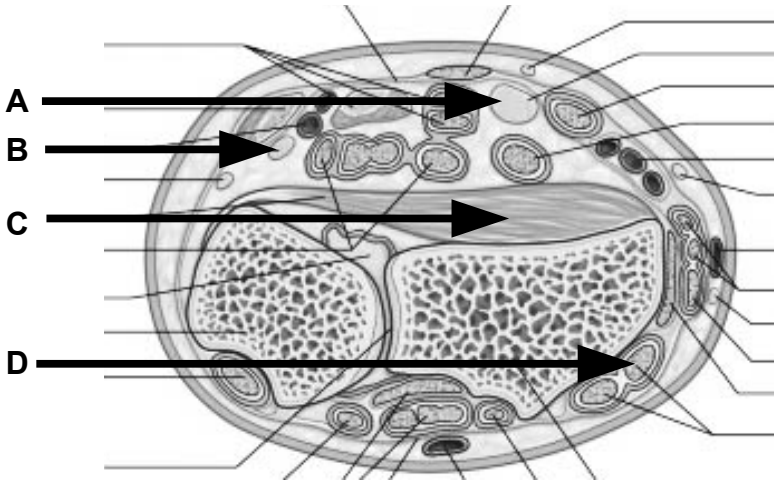
5. Identify the structures. (2 pts)

A. _____

B. _____

C. _____

D. _____



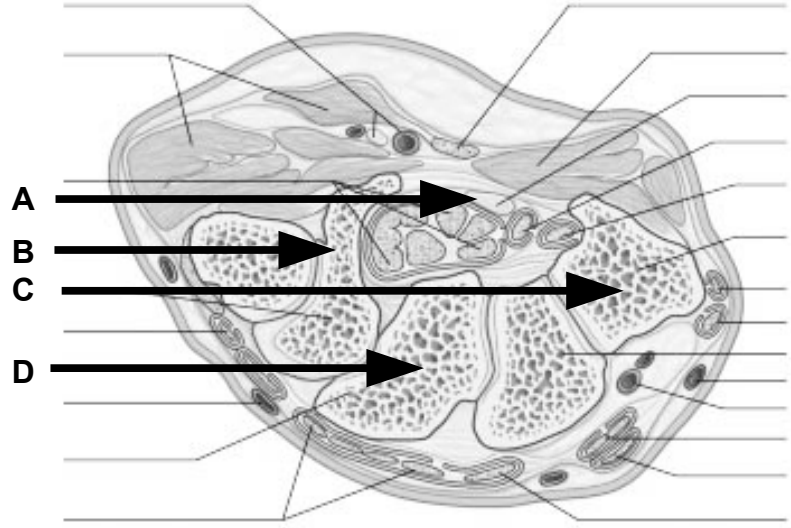
6. Identify the structures. (2 pts)

A. _____

B. _____

C. _____

D. _____



Part II. Circle the correct answer. All, none, or some may apply. (22 pts)

1. **With regard to the back, suboccipital region, and scapular region:**
   a) The anterior longitudinal ligament resists flexion of the back.
   b) The vertebral artery lies on the superior surface of the transverse process of the axis in the groove for the vertebral artery.
   c) The inferior extent of the dural sac is inferior to the level of the 2nd lumbar vertebra.
   d) At the superior nuchal line the greater occipital nerve is medial to the occipital artery.
   e) The posterior external vertebral venous plexus is demonstrated during dissection of the suboccipital region.
   f) The circumflex scapular artery passes superior to the superior transverse scapular ligament.
   g) Ligation of the axillary artery proximal to the subscapular artery causes reversed blood flow (retrograde) in the circumflex scapular artery.
   h) The distribution of upper lateral cutaneous nerve of the arm can be used to test for injury to the axillary nerve.
2. **With regard to the axilla and brachial plexus:**
   a) A lesion of the axillary nerve compromises the strength of movements at the glenohumeral joint with the exception of abduction from 0 - 15 degrees.
   b) A lesion of the middle subscapular nerve reduces the strength of lateral rotation at the arm.
   c) The axillary artery becomes the brachial artery at the inferior edge of the teres minor.
   d) Pectoralis major inserts, in part, at the lateral lip of the intertubercular sulcus and, thus, contributes to on osseofibrous tunnel for the tendon of the long head of the biceps.
   e) The lower subscapular nerve innervates two muscles and each of these muscles laterally rotate the arm.
   f) A lesion of the middle subscapular nerve would weaken lateral rotation of the arm.
   g) Entrapment of the suprascapular nerve at the superior transverse scapular notch causes uncompensated loss of arm abduction from 0 - 15 degrees and compensated loss of medial rotation of the arm.
   h) A lesion of the dorsal scapular nerve proximal to the levator scapulae muscle results in uncompensated loss of retraction of the scapula.

3. With regard to the arm and cubital fossa:

a) The radial tuberosity faces anterior when the forearm is supinated.

b) A lesion of the musculocutaneous nerve in the axilla eliminates flexion at the elbow.

c) The posterior ulnar recurrent artery passes through the heads of origin of the flexor carpi ulnaris muscle.

d) The brachioradialis muscle, a flexor of the elbow, is innervated by the radial nerve and extends the wrist.

e) The medial (middle) collateral artery, but not the radial collateral artery, is in the cubital fossa.

f) The superior ulnar collateral artery passes anterior to the medial epicondyle of the humerus and enters the cubital fossa.

4. With regard to the forearm and the dorsum of the hand:

a) Flexion of the distal interphalangeal joints is by one muscle whereas intrinsic muscles and long extensors act together to extend the distal interphalangeal joints.

b) The supinator and the biceps brachii muscles supinate the forearm and are innervated by the musculocutaneous nerve.

c) The posterior interosseous nerve enters the posterior compartment of the forearm from the anterior compartment of the forearm by passing the superior free edge of the interosseous membrane.

d) The radial two heads of the flexor digitorum profundus muscle are innervated by the superficial branch of the radial nerve.

e) The interossei are posterior to the deep transverse metacarpal ligament and anterior to the axis of the metacarpophalangeal joints.

f) The flexor digitorum superficialis is dually innervated; the radial side by the median nerve and the ulnar side by the ulnar nerve.

5. With regard to the hand:

a) Guyon's canal (ulnar tunnel) is anterior and lateral to the transverse carpal ligament (flexor retinaculum).

b) The deep transverse metacarpal ligament stabilizes the heads of the metacarpal bones.

c) The palmaris brevis and the palmaris longus insert onto the palmar aponeurosis.

d) The hypothenar muscles are innervated by the median nerve with the exception of the lateral head of the flexor digiti mini brevis that is innervated by the ulnar nerve.

e) Typically, the ulnar artery dominates the superficial palmar arch and the radial artery dominates the deep palmar arch.

f) The interossei muscles and the lumbrical muscles prevent hyperextension at the MP joint.

g) The anterior interosseous nerve, after providing motor innervation to the pronator quadratus, continues onto the hand and supplies sensation to the joints of the wrist.

h) A graceful grasp depends on the intrinsic muscles of the hand whereas a strong grip is depends on extensor digitorum, extensor carpi radialis, and extensor carpi ulnaris.

6. With regard to the joints of the upper limb:

a) Intervening between the distal ulna and the triquetrum is an articular disk that limits adduction at the wrist joint.

b) The rotator cuff muscles are 4 in number, 2 lateral rotators and 1 abductor inserting on the greater tubercle and one medial rotator inserting on the lesser tubercle.

c) Structures at risk during shoulder separation include the acromioclavicular, trapezoid, and conoid ligaments.

d) An articular disc divides the sternoclavicular joint into two synovial cavities.

e) The olecranon fossa of the humerus receives the olecranon of the ulna on maximum flexion.

f) The annular ligament stabilizes the head of the radius without attaching to the radius.

g) The glenohumeral joint capsule attaches to the margins of the anatomical neck of the humerus.

h) The central slip of the extensor hood extends distal to the lateral bands to insert on the base of the distal phalanx.

Part III. Questions for Clinical Correlations. Comment on your evaluation for each choice. (18 pts)

1. A 24 year old male is involved in a bar fight and sustains a knife wound to the right posterior forearm, transecting the deep branch of the radial nerve. **When the patient is examined in the emergency department, which of the following would best describe the deficits that this patient would demonstrate given this injury?**

a) Loss of sensation over the first and second digits with inability to flex the thumb and MCP joints of these fingers

b) Loss of sensation over the basal thumb joint and inability to flex the MCP, PIP and DIP joints of the thumb and index finger

c) Inability to extend the wrist and abduct the thumb

d) Inability to extend the thumb and MCP joints of the fingers

e) Inability to extend the PIP joints of the 3rd, 4th and 5th fingers

2. A 53 year old woman sustains a nerve injury at the scapular notch. **Which of the following tests of the rotator cuff should be intact in comparison to other limb?**

a) Internal (medial) rotation in the glenohumeral joint

b) "Empty can" test (internal rotation and extension of both arms against resistance)

c) Abduction of the arm from 0 to 90 degrees

d) External (lateral) rotation in the glenohumeral joint

e) Abduction of the arm from 0 to 15 degrees

3. A 15 year old male is struck on the wrist by a lacrosse ball. On examination in the emergency department there is swelling over the palmar aspect of the wrist. He is unable to abduct or flex the MCP joints of the fourth and fifth fingers. A plain x-ray is ordered. **Which of the follow structures is likely to show a fracture given these findings?**

a) Scaphoid

b) Capitate

c) Lunate

d) Hook of the hamate

e) Flexor retinaculum

Part IV. Short essay. Include the back of each page if required. (12 pts)

1. Fully abducting the upper limb requires the integrity of four nerves. **Review the muscles and nerves involved in fully abducting the upper limb from the hip to above the head. (6 pts)**

2. Laceration of the lateral proximal palm may sever the recurrent median nerve. **Review the anatomy of the recurrent median nerve. Discuss the functional deficits following damage to the recurrent median nerve. (6 pts)**

Part V. Long essay. Answer in the space provided. Include the back of each page if required. (36 pts)

1. Saddle anesthesia refers to numbness of the perineum and inner thighs and is often associated with cauda equina syndrome. The cause is often a herniated disc or spondylolisthesis at the L5/S1 vertebrae. Paralysis and incontinence may result. **Review the anatomy of the vertebral column and spinal canal. Include bones, articulations, ligaments, spaces, contents, muscles, movements and limitations of movement, vasculature and lymphatic drainage, innervation, and relationships. Include mention of the fascial layers penetrated during lumbar puncture and a brief account of saddle anesthesia. (12 pts)**

2. Compression injury to the proximal palm may fracture the hook of the hamate and crush the ulnar nerve. **Review the anatomy of the ulnar nerve at the hand. Discuss the deficits, compensations, and deformities that result from injury to the ulnar nerve at the wrist. (12 pts)**

3. Injury to the radial nerve at the spiral (radial) groove causes wrist drop. **Review the anatomy of the radial nerve. Discuss injury to the radial nerve at the mid-humeral level and include functional deficits. (12 pts)**