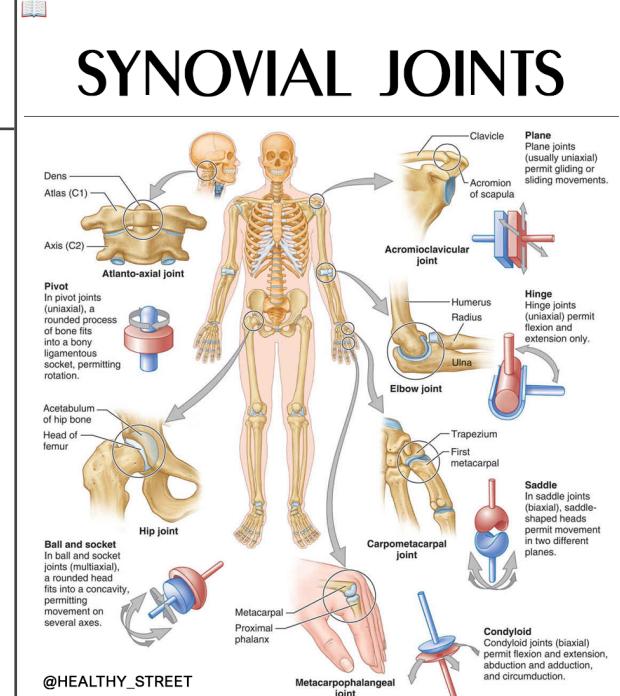
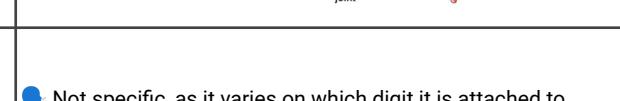
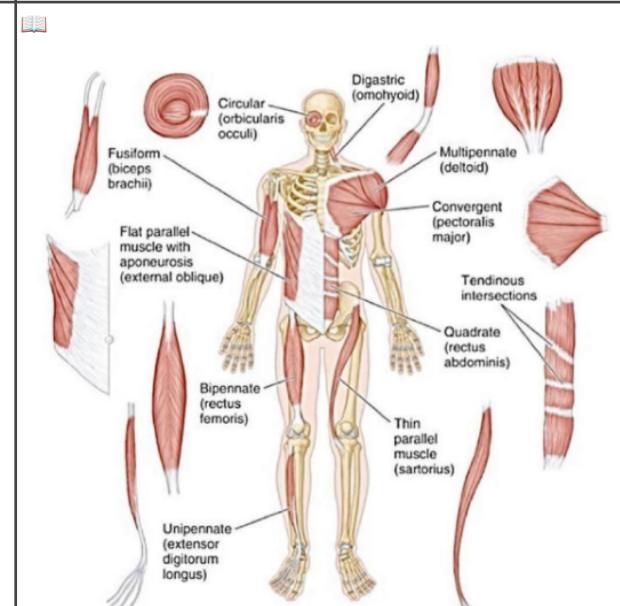


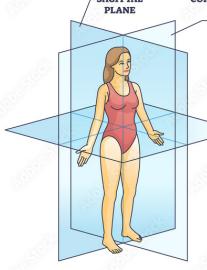
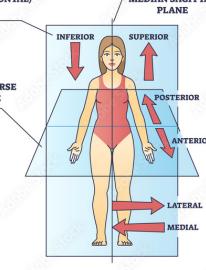
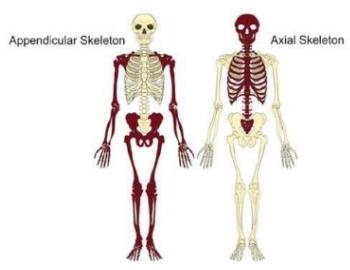
LEGEND

Ratio from 2025 Sushi

Explanation from Book / Trans

Explanation from Prof

QUESTION	ANSWER	RATIO
1. In the anatomical position, the forearm are in a. Adduction b. Flexion c. Pronation d. Supination	d. Supination	Anatomical position: - Standing upright - Head, gaze, & toes are directed anteriorly - Arms to the sides with palms facing anteriorly - Lower limbs close together with feet parallel to one another
2. What kind of joint is the metacarpophalangeal joint? a. Condyloid b. Hinge c. Plane d. Ball and Socket	a. Condyloid	
3. Which of the following joints is BI-AXIAL in its range of motion? a. Glenohumeral joint b. Radioulnar joint c. Metacarpophalangeal joint d. Sternoclavicular joint	d. Sternoclavicular Joint	
4. The LUMBRICAL MUSCLES are what type of muscle shape? a. Bipennate b. Flat c. Fusiform d. Unipennate	BONUS/ERRATA	
5. Which of the following muscles best describe a multipennate muscle? a. Triceps brachii b. Pectoralis major c. Deltoid	b. Deltoid	

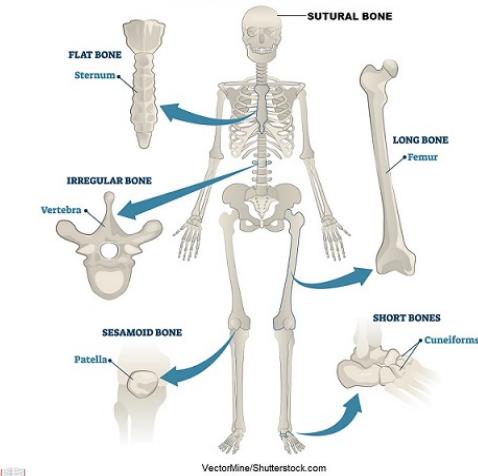
		 SUMMARY OF JOINT CLASSIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Structural Class</th><th>Characteristics</th><th>Types</th><th>Mobility</th></tr> </thead> <tbody> <tr> <td>Fibrous</td><td>Bones united by collagen fibers</td><td>1. Suture 2. Syndesmosis 3. Gomphosis</td><td>1. Immobile (synarthrosis) 2. Slightly moveable (amphiarthrosis) 3. Immobile</td></tr> <tr> <td>Cartilaginous</td><td>Bone ends united by cartilage</td><td>1. Synchondrosis (hyaline) 2. Symphysis (fibrocartilage)</td><td>1. Immobile 2. Slightly moveable</td></tr> <tr> <td>Synovial</td><td>Bone ends covered with articular cartilage and enclosed within a capsule lined with a synovial membrane</td><td>1. Plane 2. Hinge 3. Pivot 4. Condyloid 5. Saddle 6. Ball and socket</td><td>Freely moveable (diarthrosis) which depends on joint design</td></tr> </tbody> </table>	Structural Class	Characteristics	Types	Mobility	Fibrous	Bones united by collagen fibers	1. Suture 2. Syndesmosis 3. Gomphosis	1. Immobile (synarthrosis) 2. Slightly moveable (amphiarthrosis) 3. Immobile	Cartilaginous	Bone ends united by cartilage	1. Synchondrosis (hyaline) 2. Symphysis (fibrocartilage)	1. Immobile 2. Slightly moveable	Synovial	Bone ends covered with articular cartilage and enclosed within a capsule lined with a synovial membrane	1. Plane 2. Hinge 3. Pivot 4. Condyloid 5. Saddle 6. Ball and socket	Freely moveable (diarthrosis) which depends on joint design
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6. What type of joint can be seen in gomphosis joints (teeth)? a. Synovial b. Fibrocartilage c. Fibrous	c. Fibrous																	
7. What is the primary action performed when the arm is raised vertically laterally above the head? a. flexion b. extension c. abduction d. adduction	c. abduction		See item # 9															
8. What type of joint is the interosseous membrane? a. Synarthrosis b. Gomphosis c. Syndesmosis	d. Syndesmosis		See item # 6															
9. Transverse plane that divides the body from caudal to cranial and anterior to posterior. a. Frontal b. Coronal c. Sagittal d. Transverse	C. Sagittal	 ANATOMICAL PLANES AND SECTIONS <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>BODY PLANES</p>  <p>SAGITTAL PLANE</p> <p>CORONAL (FRONTAL) PLANE</p> <p>TRANVERSE PLANE</p> </div> <div style="text-align: center;"> <p>PLANES AND SECTIONS</p>  <p>MEDIAN SAGITTAL PLANE</p> <p>INFERIOR</p> <p>SUPERIOR</p> <p>POSTERIOR</p> <p>ANTERIOR</p> <p>LATERAL</p> <p>MEDIAL</p> </div> </div> <p>Adobe Stock #490345159</p>																
10. Part of the humerus that is often fractured a. Head b. Anatomical neck c. Surgical neck d. Body	c. Surgical neck		 Surgical neck - more fragile  Anatomical neck - stronger															
11. Which of the following bones belongs to the appendicular skeleton? a. Skull b. Rib c. Scapula d. Vertebra	c. Scapula	  <p>Appendicular Skeleton</p> <p>Axial Skeleton</p>																

12. 16. The VERTEBRA is best classified as what type of bone according to SHAPE?

- a. Sesamoid
- b. Short
- c. Irregular
- d. Long

c. Irregular

TYPES OF BONES



13. The cephalic vein pierces through what structure prior to draining into the axillary vein?

- a. Costocoracoid membrane
- b. Pectoralis fascia
- c. Brachial fascia
- d. Suspensory ligament of the axilla

a. Costocoracoid membrane

The structures that pierce the costocoracoid membrane include the: Thorocacromial artery. Lateral Pectoral Nerve, and the Cephalic vein

14. The lumbrical muscles are located in which of the following compartments of the hand?

- a. Interosseous
- b. Central
- c. Adductor
- d. Hypotenar

b. Central

Dorsal and palmar interossei are found in the interosseous compartment
 Lumbricals are found in the central compartment
 Adductor compartment contains the adductor pollicis muscle
 Hypotenar compartment: found opposite to thumb

15. Anterior dislocation of the shoulder. Blood supply is affected in which artery?

- a. Axillary
- b. Posterior Circumflex Humeral Artery
- c. Brachial
- d. Circumflex Scapular

b. Posterior Circumflex Humeral Artery

Anterior humeral circumflex artery avulsion with brachial plexus injury following an isolated traumatic anterior shoulder dislocation.

16. Which muscle pronates the forearm and assists in flexion of the elbow joint

- a. Flexor carpi ulnaris
- b. Flexor carpi radialis
- c. Pronator quadratus
- d. Pronator teres

d. Pronator Teres

Pronator teres pronates the forearm and assists in flexion of the elbow joint. It acts synergistically with the pronator quadratus

17. Which of the following muscles rotates the arm medially?

- a. Infraspinatus
- b. Subscapularis
- c. Supraspinatus
- d. Teres minor

b. Subscapularis

- Infraspinatus - laterally rotates the arm and acts with rotator cuff muscles
- Subscapularis - medially rotates and adducts the arm
- Supraspinatus - initiates and assists deltoid in abducting the arm (<15 degrees)
- Teres minor - laterally rotates the arm and weakly adducts the arm at the shoulder



18. The tendon of which of the following muscles is transmitted through the carpal tunnel?

- a. Abductor Pollicis Longus
- b. Flexor Carpi Radialis
- c. Flexor Pollicis Longus
- d. Palmaris Longus

c. Flexor Pollicis Longus

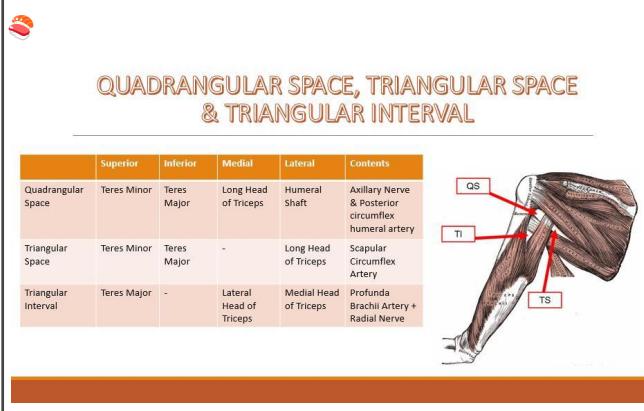
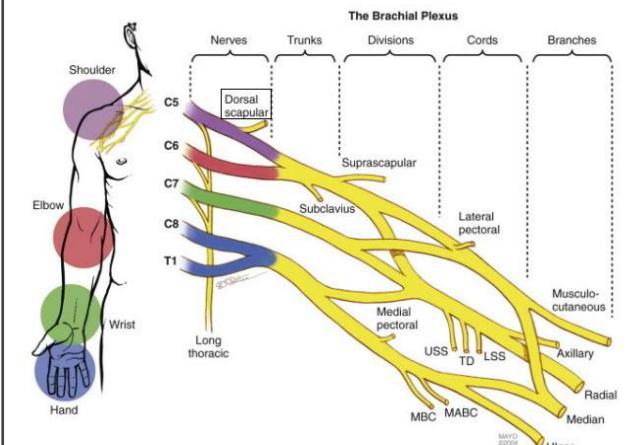
Carpal tunnel contents:
- Median nerve
- Flexor digitorum superficialis tendon
- Flexor digitorum profundus tendon
- Flexor pollicis longus tendon

19. Elbow pain is experienced when one extends his 5th digit. To which attachment can be localized?

- a. Cubital Fossa
- b. Medial Epicondyle of the Humerus
- c. Lateral Epicondyle of the Humerus
- d. Olecranon

c. Lateral Epicondyle of the Humerus

• **Cubital Fossa** - an area of transition between the anatomical arm and the forearm. It is located in a depression on the anterior surface of the elbow joint.
• **Medial Epicondyle of the Humerus** - common flexor origin
• **Lateral Epicondyle of the Humerus** - common extensor origin
• **Olecranon** - part of the ulna that projects proximally and serves as a short lever for extension of the elbow

20. Which structure borders the quadrangular space medially?	a. Long head of Triceps brachii	<p>Quadrangular space</p> <table border="1"> <tr> <td>Superior border</td><td>Teres minor</td></tr> <tr> <td>Inferior Border</td><td>Teres major</td></tr> <tr> <td>Lateral border</td><td>Surgical neck of the humerus</td></tr> <tr> <td>Medial Border</td><td>Triceps brachii long head</td></tr> <tr> <td>Contents</td><td>Axillary nerve & Posterior circumflex humeral artery</td></tr> </table>	Superior border	Teres minor	Inferior Border	Teres major	Lateral border	Surgical neck of the humerus	Medial Border	Triceps brachii long head	Contents	Axillary nerve & Posterior circumflex humeral artery														
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21. Which is the distal attachment of the Latissimus Dorsi?	a. Floor	<p>PLDT (Orientation: Lateral to Medial Lip)</p> <ul style="list-style-type: none"> - <u>Lateral lip</u>: Pectoralis major - <u>Floor</u>: Latissimus Dorsi - <u>Medial lip</u>: Teres minor 																								
22. Which muscle forms the superficial layer of the anterior forearm?	a. Pronator Teres	<p>Muscles that form the superficial layer of anterior Forearm: PT, FCR, Palmaris Longus and FCU.</p>																								
23. 19.A 24 year old male suffered a stab wound to the right proximal posterior arm, on the lower triangular space. Which artery may be injured?	b. Profunda brachii	 <p>QUADRANGULAR SPACE, TRIANGULAR SPACE & TRIANGULAR INTERVAL</p> <table border="1"> <thead> <tr> <th></th> <th>Superior</th> <th>Inferior</th> <th>Medial</th> <th>Lateral</th> <th>Contents</th> </tr> </thead> <tbody> <tr> <td>Quadrangular Space</td> <td>Teres Minor</td> <td>Teres Major</td> <td>Long Head of Triceps</td> <td>Humeral Shaft</td> <td>Axillary Nerve & Posterior circumflex humeral artery</td> </tr> <tr> <td>Triangular Space</td> <td>Teres Minor</td> <td>Teres Major</td> <td>-</td> <td>Long Head of Triceps</td> <td>Scapular Circumflex Artery</td> </tr> <tr> <td>Triangular Interval</td> <td>Teres Major</td> <td>-</td> <td>Lateral Head of Triceps</td> <td>Medial Head of Triceps</td> <td>Profunda Brachii Artery + Radial Nerve</td> </tr> </tbody> </table>		Superior	Inferior	Medial	Lateral	Contents	Quadrangular Space	Teres Minor	Teres Major	Long Head of Triceps	Humeral Shaft	Axillary Nerve & Posterior circumflex humeral artery	Triangular Space	Teres Minor	Teres Major	-	Long Head of Triceps	Scapular Circumflex Artery	Triangular Interval	Teres Major	-	Lateral Head of Triceps	Medial Head of Triceps	Profunda Brachii Artery + Radial Nerve
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24. Adduction of the fingers is primarily done by which of these muscles	a. Palmar Interossei	<p>PAD - Palmar interossei = <u>Adduction</u> DAB - Dorsal interossei = <u>Abduction</u></p>																								
25. Which among the following nerves is innervated by C5 ONLY?	a. Dorsal Scapular Nerve	 <p>The diagram illustrates the Brachial Plexus, showing the roots, trunks, divisions, cords, and branches. The Dorsal scapular nerve (C5) originates from the posterior division of the fifth cervical nerve root. It descends posterior to the subclavian artery, passes deep to the supraspinatus muscle, and then divides into medial and lateral rami. The medial ram supplies the infraspinatus muscle, while the lateral ram supplies the teres minor muscle.</p>																								
26. Which nerve innervates the latissimus dorsi?	c. Middle subscapular nerve	<p>The middle subscapular nerve (C6-C8), also known as the thoracodorsal nerve, innervates the latissimus dorsi muscle and travels with the thoracodorsal artery.</p>																								

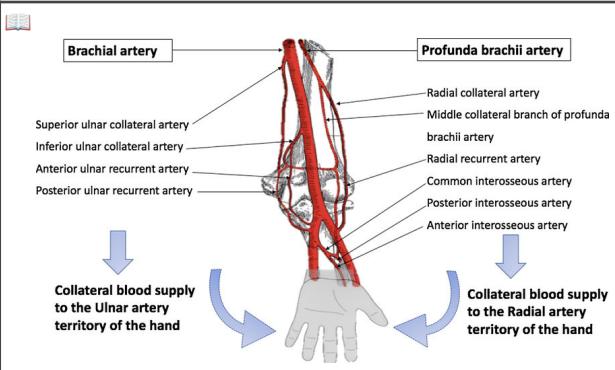
27. Which part of the brachial plexus comes from C5-T1?	a. Posterior cord	See item # 25
28. A fracture at the surgical neck of the humerus would MOST likely injure the ff nerve?	a. axillary	structures that surround the surgical neck of the humerus: - Axillary nerve - Anterior circumflex humeral artery - Posterior circumflex humeral artery
29. What is the primary abductor of the arm?	c. Deltoid	The deltoid is the primary muscle responsible for abduction of the arm especially beyond the 1st 15 degrees. From 0 to 15 degrees, the supraspinatus is the strongest initiator of abduction.
30. A patient is experiencing weakness in the forearm, which nerve is affected?	d. Musculocutaneous	
31. Which of the following nerves innervates the abductor pollicis?	D. Ulnar Nerve	See item # 30
32. A patient arrives at consult with his left arm hanging at the side, extended left elbow, and pronated left forearm. Injury to which part of the brachial plexus is mosy likely suspected?	D. upper trunk (key) or B. lower trunk (to be reviewed)	See item #'s 25 & 30
33. Which terminal branch contribution from both medial and lateral cord ?	a. median nerve	See item # 25
34. Which nerve traverses through the spiral groove?	b. Radial nerve	A - through carpal tunnel B - through spiral groove C - N/A D - through Guyon's tunnel
35. Which is partially innervated by the ulnar nerve?	b. Flexor Digitorum Profundus	See item # 30
36. The medial aspect of the 3rd digit is innervated by which nerve?	a. Median nerve	

37. Pain in the palmar tip of the index finger mediated by?	a. Median nerve	The median nerve provides sensation to the palmar side of the thumbs and fingers except for the 5th digit										
38. Common digital arteries are direct branches of?	b. Superficial Palmar Arch	Palmar and Dorsal Carpal Branches - Participates in the periarticular arterial anastomosis										
39. Which of the following statements describe the cephalic vein?	c. It lies medial to the deltoid	A - supplies the lateral aspect of the forearm B - Basilic + Brachial veins = Axillary vein C - Medial to the deltoid D - Traverses the deltopectoral groove										
40. Which of the following arteries DIRECTLY supplies the triceps brachii muscle?	b. Profunda brachii	Profunda brachii supplies: - Anconeus - Deltoid - Triceps brachii										
41. The lymph from the mammary gland drains INITIALLY into which group of axillary lymph nodes?	c. Anterior	<table border="1"> <tr> <td> Anterior (Pectoral)</td><td>Anterolateral part of thoracic wall Mammary gland</td></tr> <tr> <td>Posterior (Subscapular)</td><td>Posterior thoracic wall Shoulder region Lower part of back & neck</td></tr> <tr> <td>Lateral (Humeral)</td><td>Nearly ALL of the lymph from the upper limbs</td></tr> <tr> <td>Central</td><td>Receives drainage from anterior, posterior, and lateral lymph nodes</td></tr> <tr> <td>Apical</td><td>ALL other axillary nodes</td></tr> </table>	Anterior (Pectoral)	Anterolateral part of thoracic wall Mammary gland	Posterior (Subscapular)	Posterior thoracic wall Shoulder region Lower part of back & neck	Lateral (Humeral)	Nearly ALL of the lymph from the upper limbs	Central	Receives drainage from anterior, posterior, and lateral lymph nodes	Apical	ALL other axillary nodes
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Apical	ALL other axillary nodes											
42. The radial artery is superficial to which carpal bone?	d. Trapezium	See item # 46										
43. The axillary artery begins at which anatomical landmark?	c. Lateral border of the 1st rib	 Division Borders: <ul style="list-style-type: none"> - 1st - lateral border of the first rib - 2nd - pectoralis minor - 3rd - teres major <p>Axilla: Axillary Artery 3 segments, defined by the pectoralis minor m.</p> <ul style="list-style-type: none"> • 1st segment = 1 branch: - superior thoracic a. (supplies 1st 2 intercostal spaces) • 2nd segment = 2 branches: - thoracoacromial a. - lateral thoracic a. • 3rd segment = 3 branches: - subscapular a. - circumflex scapular a. - thoracodorsal a. - post. humeral circumflex a. - ant. humeral circumflex a. 										
44. A fracture to the midshaft of the humerus would MOST LIKELY injure which of the following arteries?	d. Profunda brachii	Profunda brachii is located at the lower triangular space and deep within the posterior of the arm.										

45. Which recurrent artery ascends to the medial humeral epicondyle to anastomose with the inferior ulnar collateral branch?

- a. Anterior ulna
- b. Interosseous
- c. Posterior ulna
- d. Radial

a. Anterior Ulna

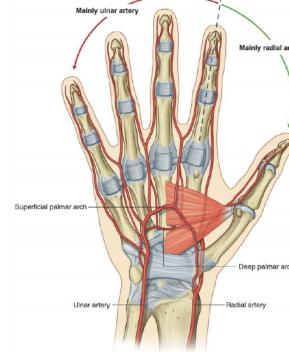


46. Which of the following arterial structures gives off a direct pathway to supply the lateral aspect of the 2nd digit?

- a. Deep palmar arch
- b. Radial artery
- c. Superficial palmar arch
- d. Ulnar artery

e. Radial artery

*thumb is more lateral



47. A patient with a history of shoulder injury involving the quadrangular space would most likely affect the following arteries

- a. Anterior humeral circumflex artery
- b. Axillary artery
- c. Circumflex scapular artery
- d. Posterior humeral circumflex artery

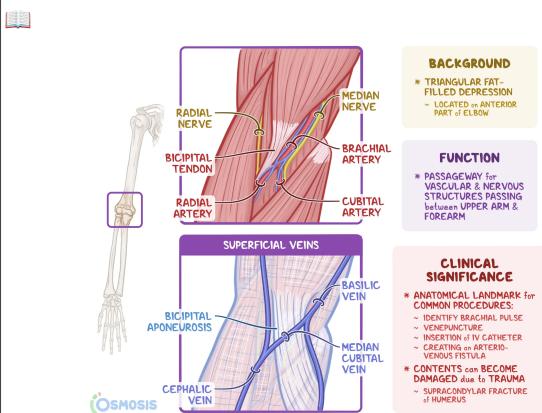
d. Posterior humeral circumflex artery

See item # 20

48. At the cubital fossa, the brachial artery is lateral to which of the following structures?

- a. Radial nerve
- b. Median nerve
- c. Musculocutaneous nerve
- d. Ulnar nerve

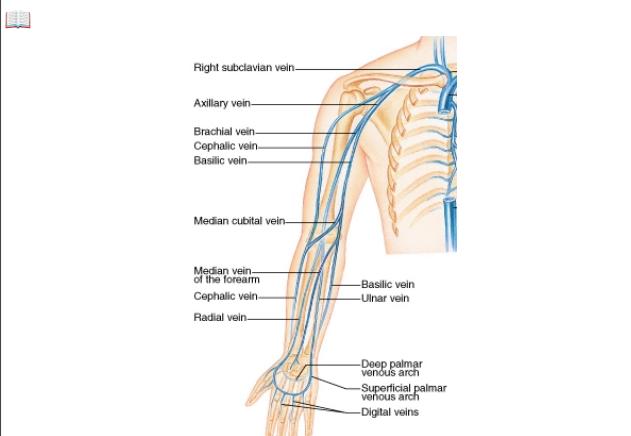
b. Median nerve



49. Which of the following veins connect to the axillary vein?

- a. Brach + ceph
- b. Brach + basilic
- c. Brachial + cubital fossa
- d. Cephalic + basilic

b. Brach + basilic



50. In cells that secrete steroid hormones, what organelle occupies the largest portion in the cytoplasm?

- a. Golgi Apparatus
- b. Lysosomes

c. Smooth ER

- Smooth ER - production of lipids, proteins and Ca²⁺
- Rough ER - production of proteins
- Ribosomes - production of cytoplasmic proteins
- Golgi apparatus - packaging and transport of cell products
- Lysosomes - aids in intracellular degradation

c. Smooth ER d. Rough ER		
51. Cells involved in phagocytic activity like macrophages are rich in which organelles? a. Cytoskeleton b. Lysosome c. Mitochondria d. Smooth ER	b. Lysosome	Lysosomes are sites of intracellular digestion and turnover of cellular components. There are membrane-limited vesicles that contain different hydrolytic enzymes and are particularly abundant in cells with great phagocytic activity (ex. macrophages, neutrophils)
52. Which of the following structures contain T-tubules? a. Matrix b. Cell membrane c. Proteasome d. Cytoskeleton	d. Cytoskeleton	The phospholipid-rich t-tubule lipid bilayers are shaped and maintained by membrane scaffolding proteins and intracellular cytoskeleton , as well as surrounding extracellular matrix. T-tubule membrane contains microdomains that compartmentalize transmembrane ion handling proteins and signaling molecules.
53. Which of the following cellular components is the site of ribosomal RNA synthesis? a. Rough Endoplasmic Reticulum b. Nucleolus c. Centrosome d. Mitochondrion	b. Nucleolus	Molecules of rRNA are synthesized in a specialized region of the cell nucleus called the nucleolus , which appears as a dense area within the nucleus and contains the genes that encode rRNA.
54. Which cellular structure is composed of microtubules? a. Cellular Membrane b. Centriole c. Nuclear Envelope d. Polyribosomes	b. Centriole	Each centriole is composed of nine highly organized microtubule triplets. With their long axes at right angles, the paired centrioles organize nearby tubulin complexes and other proteins as a pericentriolar matrix found close to the nucleus of nondividing cells.
55. Which phase activates RNA and protein synthesis? a. G1 b. S c. G2 d. Prophase	a. G1	Stages of Interphase: <ul style="list-style-type: none">- G1 - RNA and protein synthesis- S - DNA synthesis- G2 - checking phase- G0 - resting/ storage phase *Prophase - first stage of mitosis
56. What phase happens immediately after the telophase of the first meiotic division? a. Anaphase I b. Metaphase II c. Prophase II d. S Phase	c. Prophase II	PMAT (meiosis undergoes the same process as mitosis twice, with meiosis 1 – specifically at prophase 1 – being the stage of synapsis or crossover of chromosomes) <ol style="list-style-type: none">1. Prophase2. Metaphase3. Anaphase4. Telophase
57. Which process of getting rid of defective cells does not cause inflammation? a. Apoptosis b. Endocytosis c. Exocytosis d. Phagocytosis	a. Apoptosis	In apoptosis, the cell does not rupture so it will not spill out its contents, thus there will be no triggering of an inflammatory response. (Junquiera's Basic Histology, p.67)
58. What is the main function of the plasma membrane? a. Absorption b. Filtration c. Protection d. Lubrication	c. Protection	The plasma membrane, or the cell membrane, provides protection for a cell . It also provides a fixed environment inside the cell. And that membrane has several different functions. One is to transport nutrients into the cell and also to transport toxic substances out of the cell.
59. Which statement is TRUE of the core of the cilia a. 9 microtubule doublets arranged around a pair of microtubules b. 9 microtubule doublets with no pair of microtubules in the center c. 9 microtubule triads arranged around a pair of microtubules d. 9 microtubule triads arranged around a triad of microtubules	a. 9 microtubule doublets arranged around a pair of microtubules	<p>THE CILIUM DISSECTED</p> <p>Cilia consist of a ring of microtubule scaffolding called the axoneme, covered by cell membrane. IFT raft</p> <p>Ciliary membrane</p> <p>IFT raft</p> <p>Molecules are transported via intraflagellar transport (IFT) using motor proteins that travel up or down the microtubules</p> <p>The axoneme is anchored in the cell by a basal body</p> <p>A cross-section of an axoneme reveals either a 9+0 or a 9+2 arrangement of microtubules</p> <p>Ciliary membrane</p> <p>Doublet microtubules</p> <p>Singlet microtubules</p> <p>Dynein arms</p> <p>Radial spokes</p> <p>(primary cilium)</p> <p>(motile cilium)</p> <p>In motile cilia, tubules work with the dynein arms and protein spines that link them to produce movement</p>
60. The epithelium with the main function is for absorption of nutrients has what type of apical surface modification? a. Cilia b. Flagella c. Microvilli	c. Microvilli	Cilia - main function is to propel; motile Flagella - main function is for motility Microvilli - main function is absorption; nonmotile

61. Simple cuboidal cells found on mucosal linings serve which function?

- a. Increase of surface area
- b. Absorption
- c. Diffusion through the membrane
- d. Resistance of friction

c. Diffusion through the membrane



TABLE 4-3 Common types of covering epithelia.

Major Feature	Cell Form	Examples of Distribution	Main Function
Simple (one layer of cells)	Squamous	Lining of vessels (endothelium); Serous lining of cavities: pericardium, pleura, peritoneum (mesothelium)	Facilitates the movement of the viscera (mesothelium), active transport by pinocytosis (mesothelium and endothelium), secretion of biologically active molecules (mesothelium)
Cuboidal	Covering the ovary, thyroid	Covering, secretion	
Columnar	Lining of intestine, gallbladder	Protection, lubrication, absorption, secretion	
Stratified (two or more layers of cells)	Squamous keratinized (dry)	Epidermis	Protection; prevents water loss
Squamous nonkeratinized (moist)	Mouth, esophagus, larynx, vagina, anal canal	Protection, secretion; prevents water loss	
Cuboidal	Sweat glands, developing ovarian follicles	Protection, secretion	
Transitional	Bladder, ureters, renal calyces	Protection, distensibility	
Columnar	Conjunctiva	Protection	
Pseudostratified (layers of cells with nuclei at different levels; not all cells reach surface but all adhere to basal lamina)	Lining of trachea, bronchi, nasal cavity	Protection, secretion; dilute-mediated transport of particles trapped in mucus out of the air passages	

62. Autoimmune reactions against desmoglein transmembrane proteins reduce cell-to-cell adhesion with which junctional complex?

- a. Macula adherens
- b. Nexus
- c. Zonula adherens
- d. Zonula occludens

a. Macula adherens

Macula Adherens or Desmosome – “spot-welds”

- “DesmoCoGleIn”: Involved desmocollin and desmoglein

Zonula (C)Adherens: Involved Cadherin and Catenin

Zonula “Occludin/Ocludin”: Involved claudin and occludin

63. On light microscopy, epithelium appears to have several layers, wherein the basal is cuboidal, middle is polyhedral and the surface is flattened. This is classified as

- a. Stratified columnar
- b. Stratified Cuboidal
- c. Stratified Squamous
- d. Transitional

c. Stratified Squamous

Multiple layers of cells, cuboidal cells at the base, polyhedral cells in the middle and flat cells with sparse or no keratin at the top

64. The epididymis is lined by absorptive cells with apical modification to increase the surface area. What is this lining?

- a. Simple cuboidal epithelium with cilia
- b. Pseudostratified columnar with stereocilia
- c. Pseudostratified columnar epithelium with cilia and goblet cells

b. Pseudostratified columnar with stereocilia

Microvilli & Stereocilia - functions for absorption and increase of surface area

Cilia - motile, for transport of surface debris and particles

Flagella - for cell motility (e.g. sperm cells)

65. Among the types of epithelium, which is characterized to have umbrella-like cells on the apical portion of the cell when relaxed and flattened cells when distended?

- a. Transitional Epithelium
- b. Stratified Squamous Epithelium
- c. Stratified Cuboidal Epithelium
- d. Simple Columnar Epithelium

d. Transitional Epithelium

Transitional Epithelium - characterized by balloon, umbrella, or dome shaped apical cells when in a relaxed state

Stratified Squamous Epithelium - 2 or more layers of flattened cells (or flat cells on apical portion)

Stratified Cuboidal Epithelium - 2 or more layers of cells that are as tall as they are wide

Simple Columnar Epithelium - Cells that are taller than they are wide. Nucleus is located near the basement membrane

66. Which type of duct is lined with simple columnar epithelium with infolds of plasma membrane at the basal layer of the cells.

- a. Intercalated
- b. Intralobular
- c. Main
- d. Striated

a. Interlobular

Interlobular ducts are lined by simple columnar epithelium

Intercalated are lined by simple cuboidal epithelium

67. What is the classification of a gland according to secretion that consists of cells with clear cytoplasm and flattened nuclei at the basal portions?

- a. Mixed Gland, Predominantly Mucous
- b. Mixed Gland, Predominantly Serous
- c. Purely Serous

a. Mixed Gland, Predominantly Mucous

Mixed gland, predominantly mucous, have a combination of pyramidal cells and clear cells with flattened basal nuclei, but the clear cells predominate.

Mixed gland, predominantly serous, have a combination of pyramidal cells (serous cells) and clear cells with flattened basal nuclei (mucous cells) but the pyramidal cells predominate.

Purely serous glands are composed of pyramidal cells with a broad base rounded nuclei and basophilic cytoplasm ONLY.

68. A gland that releases or involves the pinching of the apical portion together with the product?

- a. Apocrine
- b. Merocrine
- c. Holocrine

a. Apocrine

Apocrine - pinches a portion off

Merocrine - exocrine

Holocrine - undergoes cell death

69. What type of gland is sebaceous gland?

- a. Merocrine
- b. Apocrine

d. Holocrine

The sebaceous gland is holocrine, with the whole gland being part of what is excreted

- c. Eccrine
- d. Holocrine

70. A gland with both serous and mucous secreting cells is best classified as:

- a. Simple coiled tubular gland
- b. Simple acinar gland
- c. Compound tubuloacinar gland
- d. Compound acinar gland

c. Compound tubuloacinar gland



TABLE 4-4 Structural classes of exocrine glands, features of each class, and examples.

SIMPLE Glands (Ducts Do Not Branch)

Class	Simple Tubular	Branched Tubular	Coiled Tubular	Acinar (or Alveolar)	Branched Acinar
Features	Elongated secretory portion; duct usually short or absent	Several long secretory parts joining to drain into 1 duct	Secretory portion is very long and coiled	Rounded, saclike secretory portion	Multiple saclike secretory parts entering the same duct
Examples	Mucous glands of colon; intestinal glands or crypts (of Lieberkühn)	Glands in the uterus and stomach	Sweat glands	Small mucous glands along the urethra	Sebaceous glands of the skin

COMPOUND Glands (Ducts from Several Secretory Units Converge into Larger Ducts)

Class	Tubular	Acinar (Alveolar)	Tubuloacinar
Features	Several elongated coiled secretory units and their ducts converge to form larger ducts	Several saclike secretory units with small ducts converge at a larger duct	Ducts of both tubular and acinar secretory units converge at larger ducts
Examples	Submucosal mucous glands (of Brunner) in the duodenum	Exocrine pancreas	Salivary glands

71. Tissue specimen composed of striations, branching of fibers , with centrally located nucleus

- a. Cardiac Muscle
- b. Smooth Muscle
- c. Skeletal Muscle

a. Cardiac Muscle



TYPES OF MUSCLE TISSUE

TYPE	SKELETAL (Most Muscle, attached to bones)	CARDIAC (Heart)	SMOOTH (Hollow Organs)
NUCLEUS	Many	One	One
DETAIL	- Muscle fibers - do not divide for new cells - new cells made by stem cells	- Cardiocytes - Branching cells located in the intercalated discs - pacemaker cells	- small and pointed at ends - can divide and regenerate - contracts
FUNCTION	Voluntary	Inv.	Inv.
NUCLEUS LOCATION	Peripheral	Central	Central
STRIATION	Yes	Yes	No

72. Which of the ff. Junctional complexes appear in the longitudinal oriented region of each intercalated disc?

- a. Desmosome
- b. Fascia Adherentes
- c. Gap Junctions
- d. Tight Junctions

c. Gap Junctions

Less abundant, longitudinally oriented regions of each intercalated disc run parallel to the myofibrils and are filled with **gap junction** that provide ionic continuity between cells

73. A stab wound results in peripheral nerve transection. Which of the following cells is responsible for forming a scaffolding for regenerating axons?

- a. Oligodendrocytes
- b. Microglial cells
- c. Schwann cells
- d. Astrocytes

c. Schwann cells

Schwann cells in the PNS; **Oligodendrocytes** in the CNS

74. What receptor is classified as unencapsulated mechanoreceptor

- a. Merkel disks
- b. Meissner's corpuscles
- c. Pacinian corpuscles
- d. Muscle spindle receptors

a. Merkel disks

Merkel cells – unencapsulated sensory receptor located at the basal layer of epidermis; tonic receptor for sustained light touches, sensing texture; Magaan (MM for unencapsulated)

Meissner corpuscle – light touch = Magaan; Mitochondria-like (MM for encapsulated)

Pacinian corpuscle – encapsulated; for Pressure and vibrations at the deeper dermis and subcutaneous tissue

75. Which part of the neuron is devoid of the nissl

b. Dendrite



body? a. Axon b. Dendrite c. Soma		
76. Which of the following receptors BEST detects changes in muscle tension? a. Nerve endings b. Golgi Tendon Muscle c. Pacinian Corpuscle d. Neuromuscular spindle	b. Golgi tendon muscle	 Golgi TENdon = TENsion Neuromuscular Spindle = Stretch
77. Which of the following synaptic communications denotes transmission of impulse between axons and cell bodies? a. Axodendritic b. Axoaxonic c. Axosomatic d. Somatodendritic	c. Axosomatic	 Classification of synapse according by the site of contact: - Axodendritic: axon and dendrite - Axoaxonic: axon to another neuron's axon - Axosomatic: axon to another cell body
78. A pictomicrograph with a small cell and dark elongated nucleus with a few short branching processes. a. Astrocytes b. Oligodendrocytes c. Microglia d. Schwann Cells	c. Microglia	 Microglia – nuclei are small, dense, slightly elongated structure
79. A separate axon needs which of the following proteins to regenerate? a. Desmin b. Vimentin c. Neurokeratin d. Keratin	d. Neurokeratin	
80. Classify the sympathetic ganglion according to its morphology a. Pseudounipolar b. Bipolar c. Multipolar d. Unipolar	c. Multipolar	 Classification of neurons based on shape: - Unipolar (pseudounipolar) neurons: sensory neuron of PNS and found in spinal and CN ganglia - Bipolar neurons: found in association with <u>special sense</u> (eg. olfaction, vision, hearing) - Multipolar neurons: most common in CNS (eg. motor cells in ant. and lat. horns of spinal cord, autonomic ganglion cells)
81. Which part of the sarcomere remains unaltered? a. A band b. Z disk c. M Line d. H zone	a. A band	 A band which is present alternatively in the myofibrils stays untouched during the contraction and relaxation of skeletal muscles.
82. Which component of the sarcomere is bisected by the Z-disc at its center? a. I Band b. H Band c. A Band d. M Line	a. I band	 I (isotropic) band or Light band – contains actin filament; bisected by Z band A (anisotropic) band or Dark band – contains actin and myosin filament H band – located at the center of A band M line – bisects each H band
83. Cells in the connective tissue are irregularly shaped with basophilic cytoplasm and pale staining nucleus at the center: a. Plasma cell b. Neutrophil c. Mast Cells d. Macrophage	c. Mast Cells	 Mast cells – oval/irregularly shaped cells of CT filled with basophilic granules which often obscure the central nucleus. Macrophage – eccentrically located, oval/kidney-shaped nucleus
84. Abnormal production of which of the following protein fibers resulted in excessive keloid formation? a. Elastic b. Collagen c. Reticular	b. Collagen	 Keloid - Local swelling caused by excessive deposition of collagen due to abnormal synthesis at the site of wound healing
85. Which of the following macromolecules in the ground substance of the connective tissue bind the cells to the protein fibers? a. Proteoglycans b. Glycosaminoglycans c. Multi-adhesive glycoproteins	c. Multi-adhesive glycoproteins	 Multiadhesive glycoproteins all have multiple binding sites for all cell surface integrins and for other matrix macromolecules. Example of multiadhesive glycoprotein: Chondronectin for adherence of chondrocytes to the ECM

86. Which type of collagen fiber forms the supportive stroma that allows movement of hematopoietic organs?

- a. Type I
- b. Type II
- c. Type III
- d. Type IV

c. Type III

TABLE 5-3 Collagen types.					
Type	α -Chain Composition	Structure	Optical Microscopy	Major Location	Main Function
Fibril-Forming Collagens					
I	$[\alpha 1 (I)]_2 [\alpha 2 (I)]$	300-nm molecule, 67-nm banded fibrils	Thick, highly picrosirius birefringent fibers	Skin, tendon, bone, dentin	Resistance to tension
II	$[\alpha 1 (II)]_3$	300-nm molecule, 67-nm banded fibrils	Loose aggregates of fibrils, birefringent	Cartilage, vitreous body	Resistance to pressure
III	$[\alpha 1 (III)]_3$	67-nm banded fibrils	Thin, weakly birefringent, argyrophilic (silver-binding) fibers	Skin, muscle, blood vessels; frequently together with type I	Structural maintenance in expandable organs
V	$[\alpha 1 (V)]_3$	390-nm molecule, N-terminal globular domain	Frequently forms fiber together with type I	Fetal tissues, skin, bone, placenta, most interstitial tissues	Participates in type I collagen function
XI	$[\alpha 1 (XI)]_2 [\alpha 2 (XI)]$ $[\alpha 3 (XI)]$	300-nm molecule	Small fibers	Cartilage	Participates in type II collagen function

👉 **Type III:** More common in reticulocytes, which can be found in lymph node and spleen

👉 **Type I:** Present in fibrocartilage; **Type II:** Present in hyaline cartilage, rendering glass-like appearance; **Type IV:** Sheet forming basal lamina ("floor sound like four")

87. Heat is generated by large accumulation found in brown adipose tissue

- a. Golgi bodies
- b. Lysosomes
- c. Mitochondria
- d. Ribosomes

c. Mitochondria

📖 Mitochondria which generates ATP and this energy is converted into heat.

📖 Brown adipose tissue can be found in newborns and hibernating animals for the purpose of thermoregulation

88. What does ground substance in connective tissues serve?

- a. Allow exchange of nutrients
- b. Allow stretch and return
- c. For texture and form
- d. Synthesizes protein fibers

a. Allow exchange of nutrients

📖 The ECM filled with ground substance in connective tissues function to allow exchange of nutrients from cell to cell. It also allows for support and adhesion

89. Which of the following produce elastic fibers in the aortic wall?

- a. Fibroblasts
- b. Skeletal muscle
- c. Smooth muscle
- d. Reticular

c. Smooth Muscle

📖 Elastic lamellae in the wall of aorta are incomplete sheets of elastin between layers of eosinophilic smooth muscle.

90. Which of the following structures controls the direction of blood flow to and from the surface of the skin to regulate body temperature?

- a. Arteriovenous anastomosis
- b. Subpapillary plexus
- c. Cutaneous plexus
- d. Pilobaceous unit

a. Arteriovenous anastomosis

📖 A-V anastomosis or shunts located between subpapillary plexus and cutaneous plexus.

In cold conditions, blood from SPP is shunted away from the skin surface decreasing blood flow through constriction of blood vessels minimizing heat loss = cold and pale skin .

In warm conditions, blood flow is increased to the papillary layer by vasodilation of blood vessels to facilitate heat loss = flushed skin.

👉 Thermoregulation is done via vasoconstriction and vasodilation

91. Which layer of the hair follicle continuous with the epidermis of the skin

- a. cortex
- b. External root sheath
- c. Internal root sheath

b. External root sheath

📖 Epithelial root sheath is part of the 5 concentric layers of the hair follicle. Under it would be the external and internal root sheath. **External root sheath** is continuous with the epidermal cells while, internal root sheath degenerates above sebaceous.

92. Which structure matures and hardens into nail plate

- a. Hyponychium
- b. Cuticle
- c. Nail Matrix
- d. Nail Root

d. Nail root

👉 A - Skin beneath the free end of the nail

👉 B - Thin layer of dead skin cells above the end of the nail root

👉 C - Where cell divide, move distally, and become keratinized to form the nail root

👉 D - The nail root grows and hardens into the nail plate

93. Which of the following structures strengthens the adhesion between the epidermis and the dermal papillae in friction prone areas?

- a. Stratum lucidum
- b. Basement membrane
- c. Rete ridges
- d. Langer lines

c. Rete ridges

👉 Rete ridges / Epidermal ridges - fingerlike projections that interface with dermal papillae

📖 "At the irregular junctions between the dermis and the epidermis, projections called dermal papillae interdigitate with invaginating epidermal ridges to strengthen adhesion of the two layers" - Junqueira, 15th edition

94. Dermal papillae is classified as what type of connective tissue?

- a. Areolar CT
- b. Dense irregular CT
- c. Dense regular CT
- d. Elastic CT

a. Areolar CT

📖 **Papillary layer** - areolar or loose CT

📖 **Reticular layer** - dense irregular CT

95. Carcinoma of the skin cells arise from what layer of

a. Stratum germinativum

👉 **Stratum basale** is also known as the **stratum germinativum**.

<p>the skin?</p> <ol style="list-style-type: none"> Stratum corneum Stratum germinativum Stratum granulosum Stratum lucidum 		<p> Melanocytes are located between the stratum basale and stratum spinosum of the epidermis.</p>
<p>96. A person fell from a tree and developed a deformity on the right shoulder with a firm mass anterior to the glenohumeral joint. The complaint of the patient is pain only when trying to move the arm. What is this injury?</p> <ol style="list-style-type: none"> Dislocation Tumor Fracture Trauma 	a. Dislocation	<p> Since the patient's complaint is only pain when trying to move the arm, this is an indication of Dislocation. The firm mass anterior to the glenohumeral joint is a sign that the joint is out of its normal position.</p> <p> Tumor - An abnormal growth of body tissue</p> <p> Fracture - If appendage is immovable. Confirm with X-ray</p> <p> Trauma - blunt force or caused by accidents. Usually creates a big damage</p>
<p>97. A 33 year old man sustained a gunshot wound at his right arm. He could not extend his finger and thumb. Which nerve could be affected?</p> <ol style="list-style-type: none"> Median nerve Musculocutaneous nerve Radial nerve Ulnar nerve 	c. Radial Nerve	<p style="text-align: right;">See item # 36</p>
<p>98. Patient develops an abscess on the volar aspect of her thumb 2 days after cutting her thumb. Which compartment will the infection likely spread?</p> <ol style="list-style-type: none"> Central Hypothenar Carpal Tunnel Thenar 	d. Thenar	<p> Central - No significant structure pass through</p> <p> Hypothenar - Ulnar nerve injury: Atrophy of hypothenar compartment/claw hand deformity</p> <p> Carpal Tunnel - Median nerve injury - Median nerve innervation: 5 intrinsic muscles, thenar half of the palm and palmar skin</p> <p> Thenar - thumb compartment</p>
<p>99. A 25 year old man complains of wrist pain. What test is used to rule out De Quervain Tenosynovitis?</p> <ol style="list-style-type: none"> Finkelstein's Test Hoffmann Test Phalen's Sign Tinel's Sign 	a. Finkelstein's Test	<p> Finkelstein's test - test to rule out De Quervain Tenosynovitis</p> <p> Hoffman test - for determination of spinal damage</p> <p> Phalen's & Tinel's test - test for carpal tunnel syndrome</p>
<p>100. A 40 year old female tripped and fell on her outstretched right hand. There was noted wrist swelling and pain prompting ER consult. When viewed from the side, the forearm and hand appears like a dinner fork facing downwards. This most likely results from a fracture of which bone?</p> <ol style="list-style-type: none"> Scaphoid Ulna 1st metacarpal Radius 	d. Radius	<p> Dinner fork deformity: Fractured right distal radius, dorsally displaced</p>