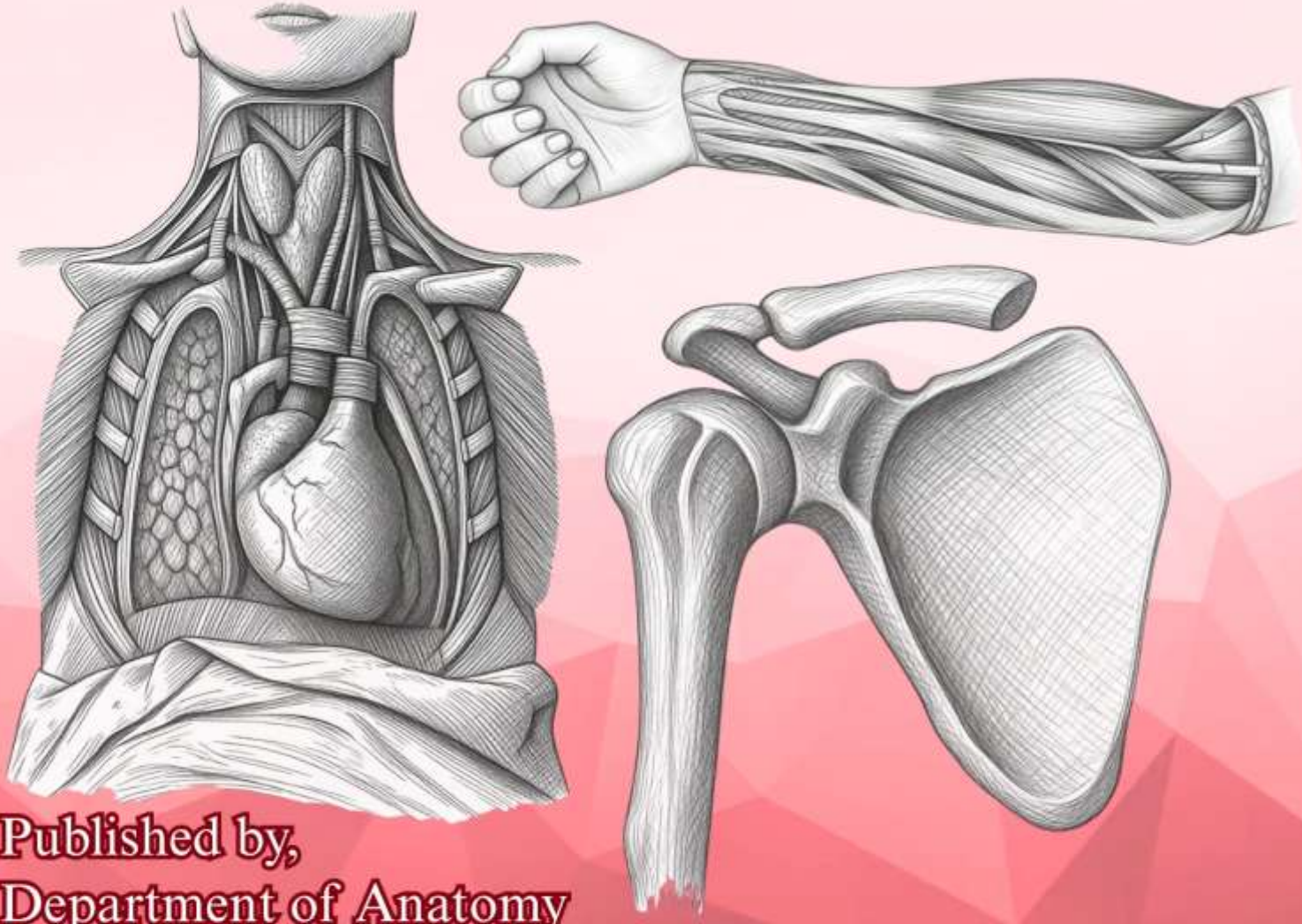
MASTERING ANATOMY
A Comprehensive Guide to MCQs, Essays, and OSPEs
Book - II

Batch 3 Semester 1

- **Introductory Module**
- **The Pectoral Region & Upper Limb**
- **Thorax**



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Authored by:

Department of Anatomy

Faculty of Medicine

Uva Wellassa University of Sri Lanka

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Mastering Anatomy
A Comprehensive Guide to
MCQs, Essays & OSPEs
(Book - II)

Batch 3 - Semester 1 (Book - II - 2026)

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Message from the Vice Chancellor

Dear Students,

It gives me great pleasure to extend my heartfelt congratulations and sincere appreciation to the Faculty of Medicine, Uva Wellassa University of Sri Lanka, and particularly to Senior Professor Muditha Vidanapathirana, Dean of the Faculty of Medicine, for their remarkable achievement in successfully publishing "Mastering Anatomy – Book – II - 2026: A Comprehensive Guide to MCQs, Essays & OSPEs."

This publication serves as an exceptional academic resource, offering considerable value not only to the MBBS undergraduates of Uva Wellassa University of Sri Lanka but also to medical students throughout the country.

I strongly encourage students to make the best use of the high-quality learning materials developed by the Faculty of Medicine. Resources such as this guide can greatly enhance the learning process, making studies more organized, productive, and rewarding.

I wish you every success in your future academic pursuits and professional careers.

Senior Professor Kolitha B. Wijesekara
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Vice Chancellor
Uva Wellassa University of Sri Lanka
06.01.2026



Message from the Head of the Department

Dear Students,

As the Head of the Department of Anatomy, I am pleased to share my thoughts on the publication of "Mastering Anatomy – Book – II - 2026: A Comprehensive Guide to MCQs, Essays, and OSPEs." This resource has been carefully developed to support your learning and enhance your understanding of anatomy, which serves as a fundamental pillar of medical education and clinical practice.

Medical training requires commitment, perseverance, and access to effective learning tools. In keeping with our department's dedication to academic excellence, this guide has been designed to help you strengthen your knowledge, apply concepts confidently, and prepare successfully for assessments. By combining different question formats with explanatory content, it provides opportunities to reinforce learning and develop a more comprehensive grasp of anatomical principles.

I encourage you to use this guide actively throughout your studies. Engaging with the questions and explanations will not only improve your knowledge but also cultivate critical thinking and analytical skills that are essential for your future roles as healthcare professionals. A strong foundation in anatomy will greatly contribute to your success in clinical learning and patient care.

I extend my sincere gratitude to the faculty members who generously contributed their expertise and effort to this publication. I hope this guide serves as a valuable companion in your academic journey and supports your future achievements in medicine.

Warm regards,

Dr. Lakmal Hewage
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ANATOMY
PRACTICE MCQs
(T/F & SBR)

(1) Introductory Module
(2) Pectoral Region & Upper Limb
(3) Thorax

Introductory Module Practice MCQs

(1) True or False regarding the glandular epithelium?
(A) It lies on basement membrane.
(B) It has rich blood supply.
(C) Simple Acini glands are found in the urethra.
(D) Pancreas has a holocrine mode of secretion.
(E) Brunner's gland is a compound acini gland.

(2) True or False regarding the type and site of the glands?
(A) Simple coiled tubular - Sweat gland
(B) Simple acinar - Sebaceous gland
(C) Compound tubular acinar - Pylorus in stomach
(D) Compound acinar - Pancreas
(E) Compound tubular acinar - Prostate gland

(3) True or False regarding epithelium?
(A) Simple columnar epithelium is rich in blood supply.
(B) Nasopharynx is consisted of transitional epithelium.
(C) Oral cavity epithelium is keratinized.
(D) Uterine tube is lined by simple columnar ciliated epithelium.
(E) Stratified cuboidal epithelium lines the ducts of sweat glands.

(4) Which of the following has stratified squamous non-keratinizing epithelium?
(A) Lining cells of the tonsils
(B) Thick skin
(C) Oesophagus
(D) Vagina
(E) Rectum

(5) True or False regarding the fertilization?
(A) Less than 1% sperms deposited at the vagina contribute to fertilization.
(B) Fertilization only occurs when sperm is deposited at the time of ovulation.
(C) Capacitation is a prerequisite for fertilization.
(D) Penetration of the corona radiata by the first sperm prevents the entry of other sperms.
(E) Acrosomal reaction releases a trypsin-like substance.

(6) True or false regarding the gastrulation?
(A) Epiblast cells migrate.
(B) The amniotic cavity is formed.
(C) Hypoblast becomes endoderm.
(D) Mesoderm is formed.
(E) Nutrients are supplied by the yolk sac.

(7) What are the events that occur during the 3rd week of embryogenesis?

(A) Initiation of cleavage.
(B) Appearance of primitive steak.
(C) Notocode appearance.
(D) Gastrulation
(E) Formation of allantoic diverticulum.

(8) True or False regarding cells?

(A) Mitochondria are basophilic.
(B) Nucleus is double membrane bounded.
(C) Nuclei are stained blue with hematoxylin and eosin.
(D) Micro filaments are present in skeletal muscles.
(E) Mucus secreting cells are pink to hematoxylin and eosin.

Pectoral Region & Upper Limb Practice MCQs

(1) Which of the following arteries supply the mammary gland?
(A) Internal thoracic artery
(B) Intercostal arteries
(C) Lateral thoracic artery
(D) Thoracoacromial artery
(E) Thoracodorsal artery

(2) A 45-year-old woman presents with a lump in the upper outer quadrant of the right breast.
Which of the following lymph nodes is the most likely first site of metastasis?
(A) Parasternal nodes
(B) Posterior intercostal nodes
(C) Apical axillary nodes
(D) Central axillary nodes
(E) Pectoral (anterior) axillary nodes

(3) A patient with carcinoma of the breast develops peau d'orange appearance.
What is the most likely underlying cause?
(A) Obstruction of superficial veins
(B) Infiltration of lactiferous ducts
(C) Blockage of cutaneous lymphatics
(D) Fibrosis of Cooper's ligaments
(E) Invasion of pectoralis major muscle

(4) True or False regarding the axillary artery?
(A) It begins at the lateral border of the first rib.
(B) It ends at the inferior border of the teres major.
(C) It is divided into three parts by the pectoralis major.
(D) The second part gives off the thoracoacromial artery.
(E) The third part gives off the anterior and posterior circumflex humoral arteries.

(5) True or False regarding the clavicle?
(A) The red bone marrow is present.
(B) It has no secondary centres of ossification.
(C) Its forward movement is produced by trapezius.
(D) Coracoclavicular ligament attached to inferior surface.
(E) It transmits weight of upper limb to axial skeleton.

(6) True or False regarding the surface anatomy of upper limb?
(A) Clavicle is subcutaneous throughout its length.
(B) Coracoid process of scapula can be palpated immediately beneath the middle and outer 1/3 of clavicle.
(C) The ulna can be palpated along its anterior length.
(D) Annular ligament surrounded the neck of the radius.
(E) Growing end of radius is upper end.

(7) Which of the following are difficult to palpate in living subjects?

(A) Superior angle of scapula.
(B) Spine of scapula.
(C) Coracoid process under the junction between middle and lateral 1/3 of clavicle.
(D) First rib
(E) Inferior angle of scapula

(8) True or False regarding the scapula?

(A) Its spine is at the level of T3.
(B) Coracoid process can be depressed by the anterior fibers of deltoid.
(C) The tendon of supraspinatus passes behind the coracoacromial arch.
(D) The epiphysis of the scapula is jointed to the body by puberty.
(E) The subscapular artery does not take part in scapular anastomosis.

(9) True or False regarding injury to the surgical neck of the humerus?

(A) The axillary nerve is commonly injured.
(B) There is loss of sensation over the "regimental badge" area.
(C) The deltoid muscle is paralyzed.
(D) Elbow flexion is primarily affected.
(E) Abduction of the arm from 15° to 90° is impaired.

(10) True or False regarding the radius?

(A) Annular ligament surrounds the neck of the radius.
(B) Lateral part of inferior articular surface is in contact with trapezium.
(C) Cannot be palpated.
(D) Brachialis is attached to the tubercle.
(E) The articular disk of the inferior radio-ulnar joint is attached to the lower margin of the ulnar notch.

(11) True or False regarding the ulna bone?

(A) It gives attachment to the brachialis muscle.
(B) It possesses a styloid process on the anteromedial surface of its lower end.
(C) It articulates at its lower end with an articular disc.
(D) It is palpable over the whole length of its posterior border.
(E) It is related inferiorly to the extensor carpi radialis muscle.

(12) True or False regarding Carpal tunnel syndrome?

(A) It involves compression of the median nerve.
(B) Thenar muscle wasting may be seen.
(C) Sensation over the little finger is affected.
(D) Thumb opposition is weakened.
(E) The flexor retinaculum forms the roof of the tunnel.

(13) A newborn presents with the arm adducted, medially rotated, extended at the elbow, and pronated ("waiter's tip").
Which part of the brachial plexus is most likely injured?
(A) Lower trunk
(B) Upper trunk
(C) Posterior cord
(D) Medial cord
(E) Lateral cord

(14) During a radical mastectomy, a nerve running on the medial wall of the axilla is damaged. Postoperatively, the patient has winging of the scapula.
Which nerve is most likely injured?
(A) Thoracodorsal nerve
(B) Long thoracic nerve
(C) Upper subscapular nerve
(D) Axillary nerve
(E) Suprascapular nerve

(15) Which structure provides the greatest stability to the shoulder joint?
(A) Glenoid labrum
(B) Joint capsule
(C) Rotator cuff muscles
(D) Coracoacromial ligament
(E) Deltoid muscle

(16) A 30-year-old man falls asleep with his arm over a chair after alcohol intake. He wakes up with wrist drop but intact triceps function.
Where is the most likely site of the lesion?
(A) Axilla
(B) Surgical neck of humerus
(C) Radial groove of humerus
(D) Lateral epicondyle
(E) Carpal tunnel

(17) A 35-year-old painter was presented to the surgical clinic with inability to paint with his right arm for last two weeks. When taking the history, he mentioned that his right shoulder dislocation was reduced a month ago using local anesthesia. On examination, right shoulder abduction impairment was detected.
Which of the following muscle is most likely to cause his disability?
(A) Deltoid muscle
(B) Serratus anterior
(C) Subscapularis
(D) Supraspinatus
(E) Teres minor

(18) A 30-year-old man presents with the inability to abduct his arm from 15° to 90° following a fracture at the surgical neck of the humerus.
Which nerve is most likely injured?
(A) Musculocutaneous nerve
(B) Radial nerve
(C) Axillary nerve
(D) Suprascapular nerve
(E) Long thoracic nerve

(19) A patient presents after a midshaft fracture of the humerus. On examination, there is wrist drop.
Which nerve is most likely injured?
(A) Axillary nerve
(B) Median nerve
(C) Radial nerve
(D) Ulnar nerve
(E) Musculocutaneous nerve

(20) A child falls on an outstretched hand and develops a supracondylar fracture of the humerus.
Which structure is most likely at risk?
(A) Radial nerve
(B) Median nerve
(C) Ulnar nerve
(D) Brachial artery
(E) Axillary artery

(21) A patient with trauma to the medial epicondyle presents with clawing of the hand.
Which movement is most likely affected?
(A) Wrist extension
(B) Thumb opposition
(C) Finger abduction and adduction
(D) Elbow extension
(E) Forearm supination

(22) A patient cannot extend fingers but wrist extension is preserved (with radial deviation).
Which nerve is most likely injured?
(A) Radial nerve (proximal)
(B) Posterior interosseous nerve
(C) Median nerve
(D) Ulnar nerve
(E) Axillary nerve

(23) A posterior elbow dislocation most commonly endangers which structure?

(A) Radial nerve
(B) Median nerve
(C) Ulnar nerve
(D) Brachial artery
(E) Cephalic vein

(24) A 34-year-old man presents with a deformity of his right forearm and hand and is diagnosed as having Volkmann ischemic contracture. He had a supracondylar fracture of the right humerus one year back, leading to this problem.
What is the most likely structure injured causing this deformity?

(A) Radial nerve at elbow joint
(B) Median nerve at the elbow joint
(C) Brachial artery at the elbow
(D) Common flexor muscles origin
(E) Common extensor muscles origin

(25) A patient falls on an outstretched hand and has tenderness in the anatomical snuffbox.
Which bone is most likely fractured?

(A) Lunate
(B) Scaphoid
(C) Capitate
(D) Triquetrum
(E) Pisiform

Thorax Practice MCQs

(1) True or False regarding the intercostal muscles?
(A) External intercostals elevate ribs during inspiration.
(B) Internal intercostals (interosseous part) depress ribs.
(C) External intercostals extend from sternum to vertebrae.
(D) Internal intercostals extend from sternum to angle of rib.
(E) Innermost intercostals are continuous throughout all intercostal spaces.

(2) True or False regarding the intercostal neurovascular bundle?
(A) It lies in the costal groove of the upper rib.
(B) It is arranged as nerve–artery–vein (NAV) from above downwards.
(C) It lies between internal and innermost intercostal muscles.
(D) It has collateral branches run along the superior border of the rib below.
(E) Intercostal nerves are ventral rami of thoracic spinal nerves.

(3) True or False regarding the intercostal space arterial supply?
(A) Costocervical trunk
(B) Thyrocervical trunk
(C) Superior epigastric artery
(D) Dorsal scapular artery
(E) Thoracic aorta

(4) True or False regarding the thoracic wall vessels & nerves?
(A) Posterior intercostal arteries arise from thoracic aorta.
(B) Anterior intercostal arteries arise from internal thoracic artery.
(C) Intercostal nerves supply only muscles, not skin.
(D) Dermatomes of thoracic nerves run in a segmental pattern.
(E) The internal thoracic artery runs lateral to the sternum.

(5) True or False regarding the ribs and their articulations?
(A) Typical ribs articulate with two vertebral bodies.
(B) The head of a rib articulates with the transverse process of vertebra.
(C) Costal cartilage forms synovial joints with sternum.
(D) Floating ribs have no anterior attachment.
(E) The angle of the rib is the site of greatest curvature.

(6) What are the structures that relate to a typical rib?
(A) Intercostal nerve - costal groove
(B) Parietal pleura - inner surface of the rib
(C) Sympathetic trunk - neck of the rib
(D) Internal thoracic artery - Costochondral joint
(E) Azygous vein - Angle of rib

(7) Which of the following structures are attached to the first rib?

(A) Superior cervical ganglia
(B) T1 nerve root
(C) Left subclavian artery
(D) Suprapleural membrane
(E) Serratus anterior

(8) True or False regarding the skeleton of the thoracic wall?

(A) It has an articulation with vertebra.
(B) The 8th costal cartilage has an interchondral junction.
(C) The manubriosternum is a symphysis.
(D) The costochondral joint is a primary cartilaginous joint.
(E) All sternocostal joints are synovial.

(9) True or False regarding the skeletal structure of thoracic cavity?

(A) The 7^{th} rib is a true rib.
(B) The 11^{th} rib contains a tubercle.
(C) Costotransverse joints are synovial joints.
(D) Cartilage of 9^{th} rib attach to the cartilage of the 8^{th} rib.
(E) There is no movement at manubriosternal joint

(10) During a surgical procedure a needle was inserted to lower part of the manubrium by mistake. Which of the following structures are likely to damage?

(A) Left brachiocephalic vein
(B) Arch of aorta
(C) Trachea
(D) Right subclavian artery
(E) Left brachiocephalic trunk

(11) True or False regarding the mediastinum?

(A) Posterior mediastinum extends up to first thoracic vertebra.
(B) Posterior mediastinum anteriorly binds to fibrous pericardium.
(C) Superior mediastinum extends beyond the first rib.
(D) Superior mediastinum contain contains left subclavian artery.
(E) Anterior mediastinum is bounded laterally by mediastinum pleura.

(12) True or False regarding the development of respiratory system?

(A) The respiratory system begins to develop during the 8" week of intra uterine life.
(B) Tracheoesophageal septum separates the foregut and respiratory diverticulum.
(C) Left primary bronchus divides into two secondary bronchi.
(D) Type II pneumocytes appear by 26 weeks of intrauterine life.
(E) Primitive alveoli increase in number during last two months of intra uterine life.

(13) True or False regarding the right lung?

(A) Has two lobes.
(B) Anterior border has a deep cardiac notch.
(C) Has a higher chance of receiving foreign particles than left lung.
(D) Microscopic structure is similar to the left lung.
(E) Apex is related to the sternoclavicular joint

(14) True or False regarding bronchopulmonary segment?

(A) Each segment is supplied by a segmental bronchus.
(B) Each segment has its own segmental artery.
(C) Pulmonary veins run in the intersegmental planes.
(D) Segments are surgically resectable units.
(E) Right lung has 8 segments.

(15) What are the structures that contact with the fibrous pericardium?

(A) Pleura
(B) Central tendon of diaphragm
(C) Oesophagus
(D) Vagus nerve
(E) Lower part of the body of sternum

(16) True or False regarding the external surface of the heart?

(A) The apex of the heart is formed mainly by the left ventricle.
(B) The right border of the heart is formed mainly by the right atrium.
(C) The anterior (sternocostal) surface is formed predominantly by the left ventricle.
(D) The diaphragmatic surface is formed mainly by the left ventricle and partly by the right ventricle.
(E) The coronary sulcus separates the atria from the ventricles.

(17) A 32-year-old man with pneumothorax requires intercostal chest drain insertion. The recommended site is within the "safe triangle."
Which of the following best describes the anterior boundary of this triangle?

(A) Anterior border of latissimus dorsi
(B) Lateral border of pectoralis major
(C) Midclavicular line
(D) Lateral border of rectus abdominis
(E) Anterior axillary line

(18) Which of the following anatomical planes contain the intercostal neurovascular bundle in the thoracic wall?

(A) Between external and internal intercostal muscles.
(B) Between internal and innermost intercostal muscles.
(C) Between skin and superficial fascia.
(D) Between pleura and lung.
(E) Between diaphragm and pericardium.

(19) There are features to differentiate left lung from the right lung.
Which of the following statement is most likely correct?

(A) The left lung has three lobes separated by two fissures.
(B) The right main bronchus is longer, narrower, and more vertical than the left.
(C) The cardiac notch is a feature of the right lung.
(D) The right middle lobe is bounded by the horizontal and oblique fissures.
(E) The lingula is a part of the right upper lobe.

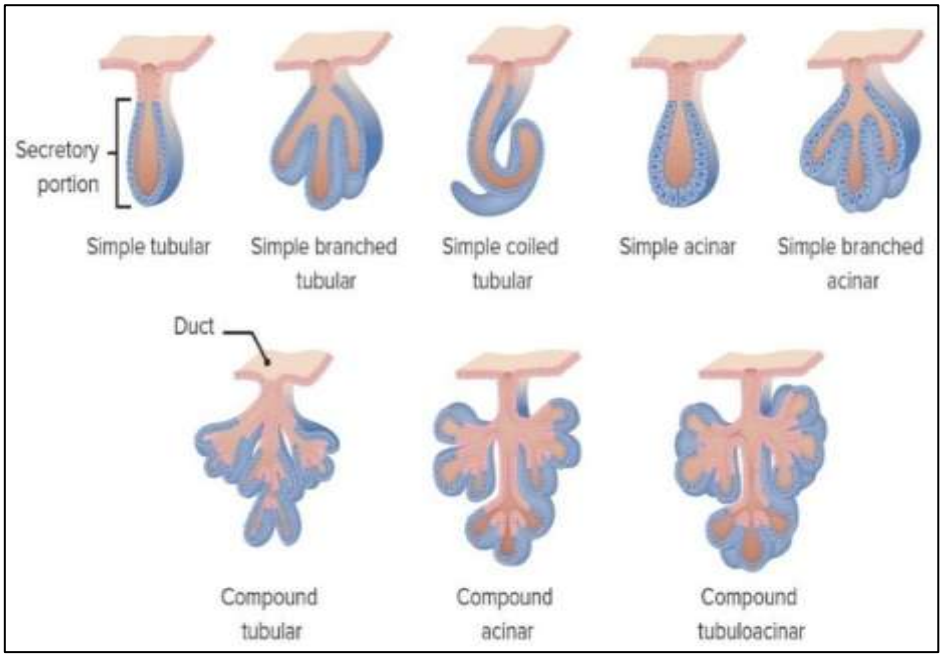
PRACTICE MCQs (T/F & SBR) ANSWERS

(1) Introductory Module
(2) Pectoral Region & Upper Limb
(3) Thorax

Introductory Module Practice MCQs Answers

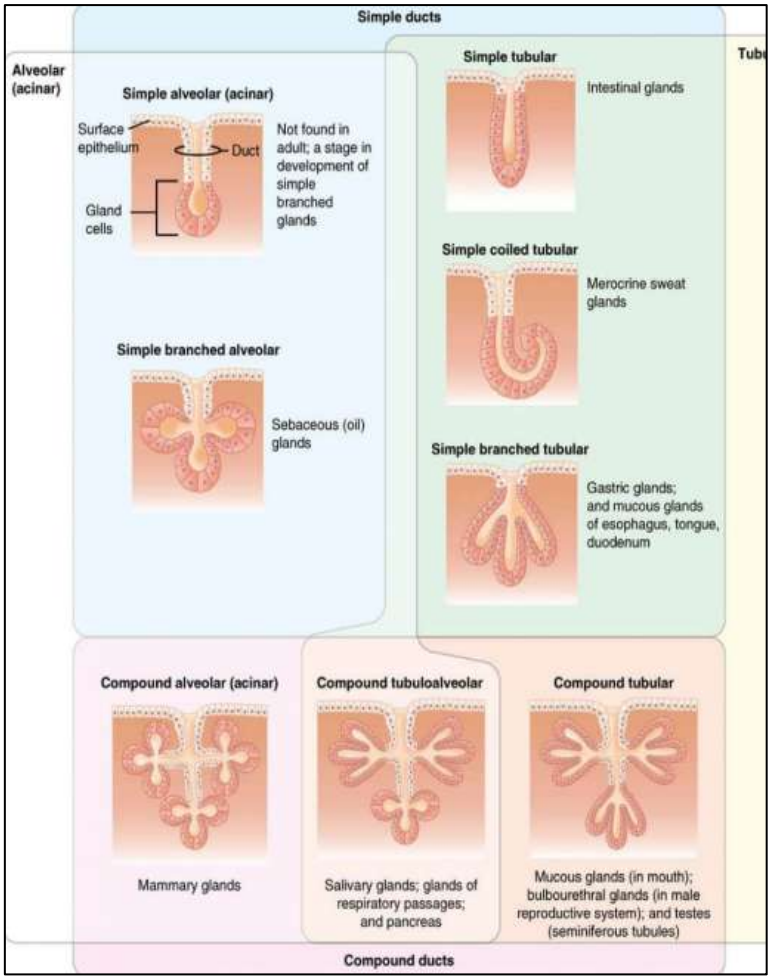
(1)

(A) **T** - All epithelial tissues, including glandular epithelium, rest on a basement membrane separating them from connective tissue.
(B) **F** - Glandular epithelium is avascular. It receives nutrients by diffusion from underlying connective tissue, which is vascular.
(C) **F** - Urethral glands (Littre's glands) are simple branched tubular or tubulo-alveolar, not simple acinar.
(D) **F** - Pancreas secretes by merocrine (eccrine) mode.
(E) **F** - Holocrine secretion is seen in sebaceous glands only.



(2)

(A) **T**
(B) **F**- Branched Acinar
(C) **F** - Compound tubular acinar: Prostate Gland, Mixed Salivary Gland
Simple branched tubular: Pylorus of the Stomach
(D) **T**
(E) **T**



(3)

(A) **F -** All epithelia are avascular. They get nutrients by diffusion from the underlying connective tissue.

(B) **F** - Nasopharynx is lined by pseudostratified ciliated columnar epithelium (respiratory epithelium). Transitional epithelium is found in the urinary tract.

(C) **F** - Most of the oral cavity is non-keratinized stratified squamous epithelium. (Keratinized only in areas like gingiva and hard palate.)

(D) **T** - Cilia help in ovum transport toward the uterus.

(E) **T** -Classical example of stratified cuboidal epithelium.

Cells	Location	Function
Simple squamous epithelium 	Air sacs of lungs and the lining of the heart, blood vessels, and lymphatic vessels	Allows materials to pass through by diffusion and filtration, and secretes lubricating substance
Simple cuboidal epithelium 	In ducts and secretory portions of small glands and in kidney tubules	Secretes and absorbs
Simple columnar epithelium 	Ciliated tissues are in bronchi, uterine tubes, and uterus; smooth (nonciliated tissues) are in the digestive tract, bladder	Absorbs; it also secretes mucous and enzymes
Pseudostratified columnar epithelium 	Ciliated tissue lines the trachea and much of the upper respiratory tract	Secretes mucus; ciliated tissue moves mucus
Stratified squamous epithelium 	Lines the esophagus, mouth, and vagina	Protects against abrasion
Stratified cuboidal epithelium 	Sweat glands, salivary glands, and the mammary glands	Protective tissue
Stratified columnar epithelium 	The male urethra and the ducts of some glands	Secretes and protects
Transitional epithelium 	Lines the bladder, uretha, and the ureters	Allows the urinary organs to expand and stretch

(4)

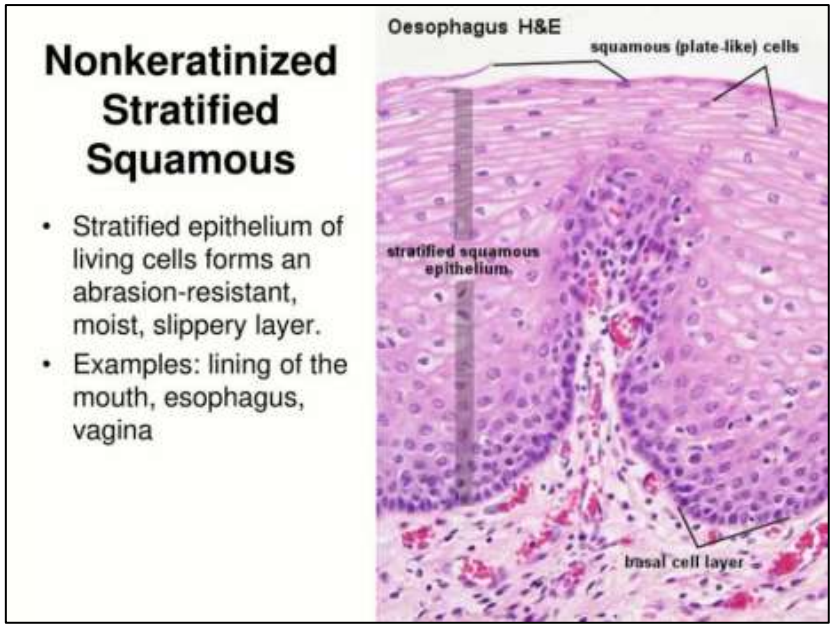
(A) **T**

(B) **F** - Stratified squamous keratinized epithelium.

(C) **T**

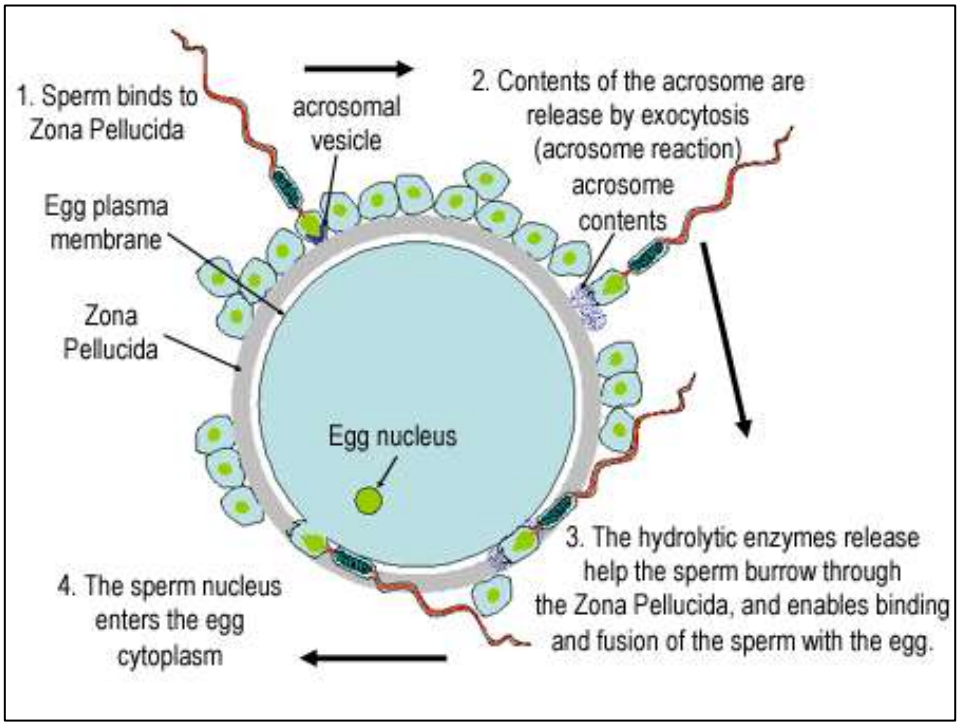
(D) **T**

(E) **F** - Rectum is mainly simple columnar epithelium. Stratified squamous epithelium appears only in the anal canal distal part, not the rectum.



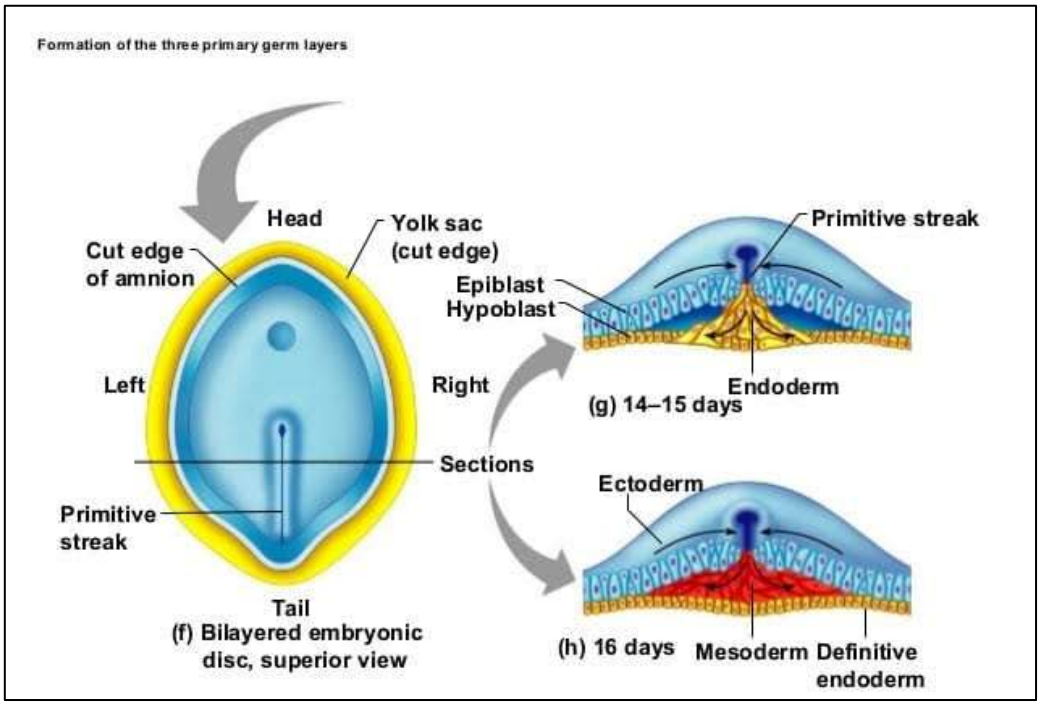
(5)

(A) **T** - Number of sperm per ejaculation- 0.5 billion
Number of Sperms reaching Ovum- 100
Only one sperm fertilizes
(B) **F**- 4 to 5 days before ovulation and 1 day after ovulation.
(C) **T**- Capacitation and Acrosomal Reaction.
(D) **F**- Zona Pellucida
(E) **T**- Trypsin-like Substance and Acrosin.



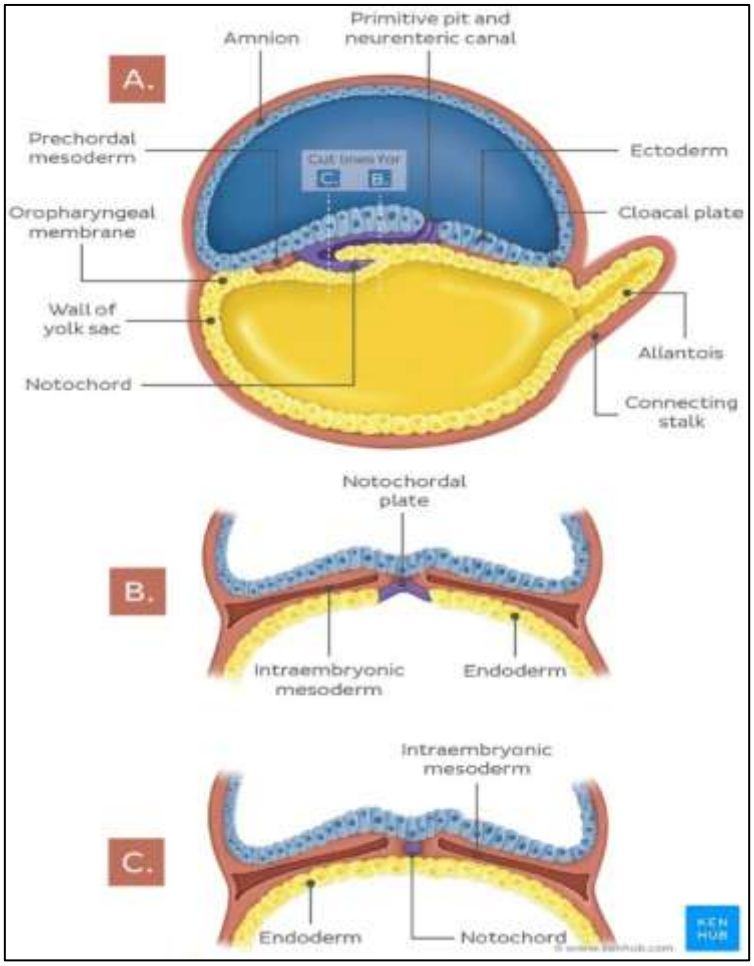
(6)

(A) **T -** Epiblast cells move toward the primitive streak. They invaginate and migrate to form: endoderm, mesoderm & remaining epiblast → ectoderm.
(B) **F -** Amniotic cavity forms in the 2nd week.
(C) **F -** From epiblast.
(D) **T**
(E) **F -** Not a process of gastrulation.



(7)

(A) **F** - Cleavage begins in the 1st week, soon after fertilization.
(B) **T** -Primitive streak appears around day 15, marking the beginning of the 3rd week.
(C) **T** - The notochordal process forms in the 3rd week from mesoderm migrating through the primitive node, later forming the definitive notochord.
(D) **T** - Major event of the 3rd week - formation of ectoderm, mesoderm, and endoderm.
(E) **T** - Appears around day 16 as an endodermal outpouching of the yolk sac.



(8)

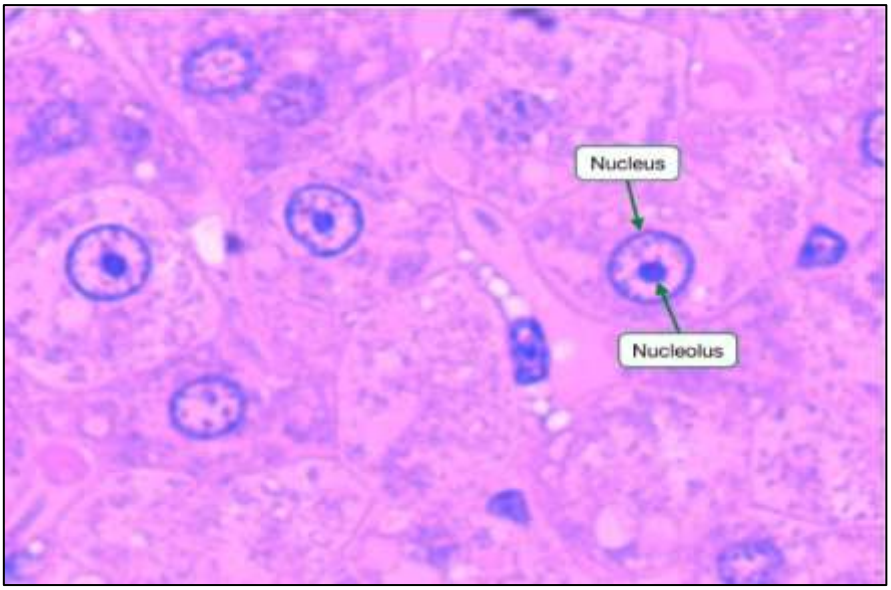
(A) **F** - Basophilic structures stain blue with hematoxylin due to RNA/DNA. Mitochondria are rich in proteins and enzymes, so they are acidophilic (eosinophilic) and stain pink with eosin.

(B) **T** - The nucleus is surrounded by the nuclear envelope, which consists of two membranes (inner and outer) with nuclear pores.

(C) **T** - Hematoxylin is a basic dye that stains acidic structures (DNA, RNA). The nucleus contains DNA → stains blue/purple.

(D) **T** - Microfilaments are made of actin. Skeletal muscle contains actin (thin filaments) and myosin (thick filaments). Therefore, microfilaments are present.

(E) **F** - Mucus is rich in glycoproteins and does not stain well with H&E. Mucus-secreting cells usually appear pale or clear, not pink. They stain better with PAS stain.


Nucleus
Nucleolus

Pectoral Region & Upper Limb Practice MCQs Answers

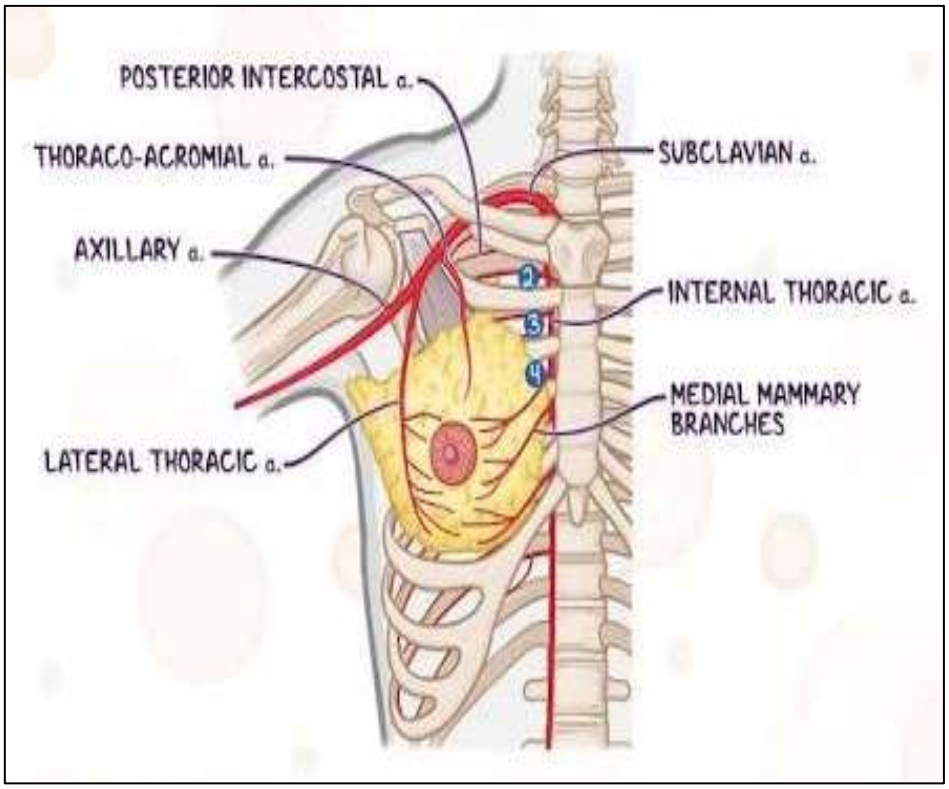
(1)

(A) **T**
(B) **T**
(C) **T**
(D) **T**
(E) **F**

The arterial supply of the breast is as following.

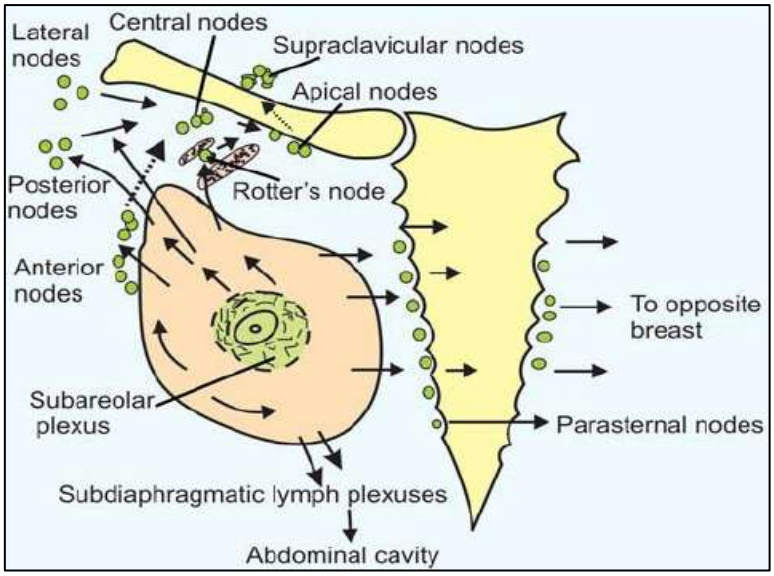
- Internal thoracic artery - Gives the major supply.
- Lateral thoracic artery - A branch of the axillary artery; supplies the lateral part.
- Thoracoacromial artery - Through its pectoral branch.
- Posterior intercostal arteries. - Contribute small lateral branches.

(E) Thoracodorsal artery mainly supplies latissimus dorsi, not breast.



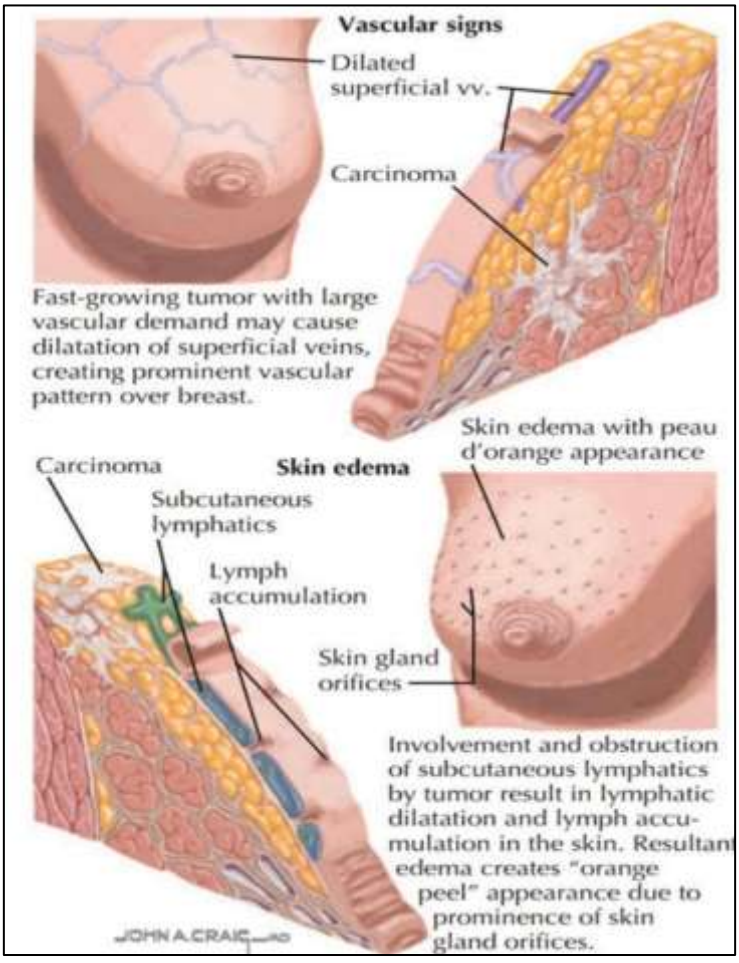
(2) E

Upper outer quadrant drains mainly to anterior (pectoral) axillary nodes. Then drains to central nodes and finally to apical nodes.



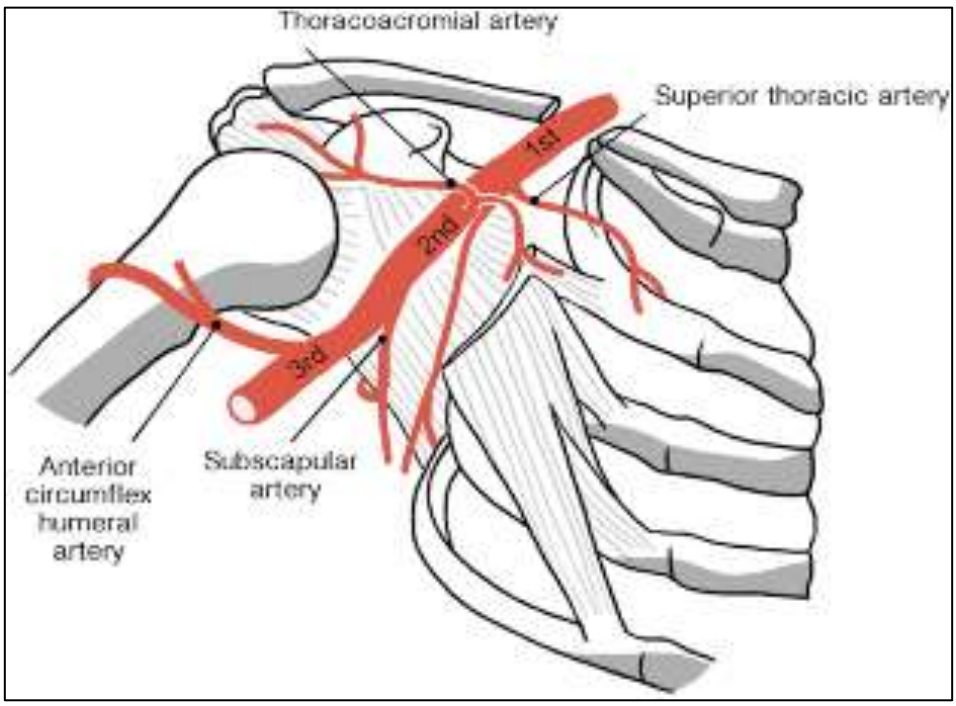
(3) C

Tumor blocks dermal lymphatics causing skin edema.
Hair follicles get tethered forming the "orange peel" appearance.



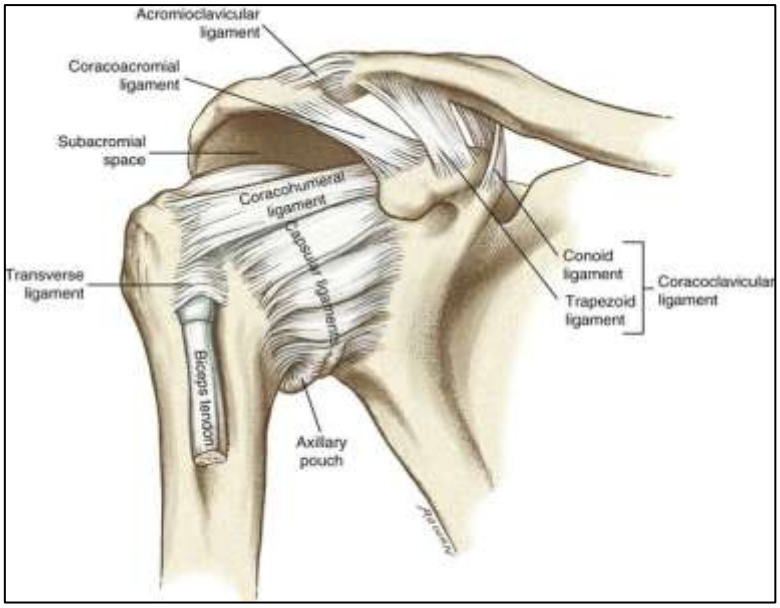
(4)

(A) **T**
(B) **T**
(C) **F -** Divided by pectoralis minor
(D) **T**
(E) **T**



(5)

(A) **T** - Clavicle is a long bone and contains red marrow (especially in younger individuals).
(B) **F** - The clavicle has a secondary ossification centre at the sternal (medial) end, which appears around puberty and fuses in the early 20s.
(C) **F** - Forward movement (protraction) of the clavicle occurs at the sternoclavicular joint and is mainly produced by serratus anterior. Trapezius mainly elevates, retracts, and rotates the scapula — not protracts the clavicle.
(D) **T** - Coracoclavicular ligament (conoid + trapezoid parts) attaches to the inferior surface of the lateral third of the clavicle.
(E) **T** - The clavicle acts as a strut and transmits forces from the upper limb to the axial skeleton via the sternoclavicular joint.



(6)

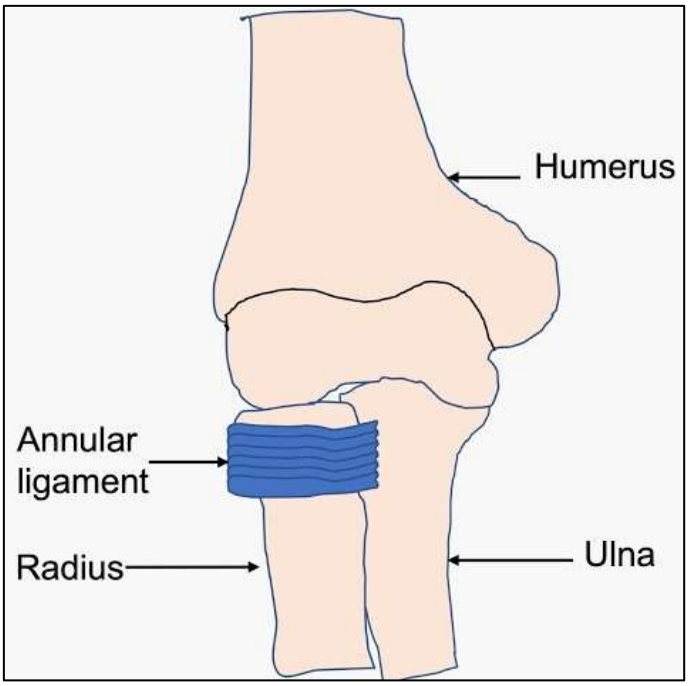
(A) **T** - The Clavicle lies directly beneath the skin with no muscle covering along its entire length, so it is easily palpable.

(B) **F** - The Coracoid process is palpable just below the lateral third of the clavicle, not beneath the junction of the middle and outer thirds.

(C) **F** - The Ulna is subcutaneous along its posterior border, not the anterior surface.

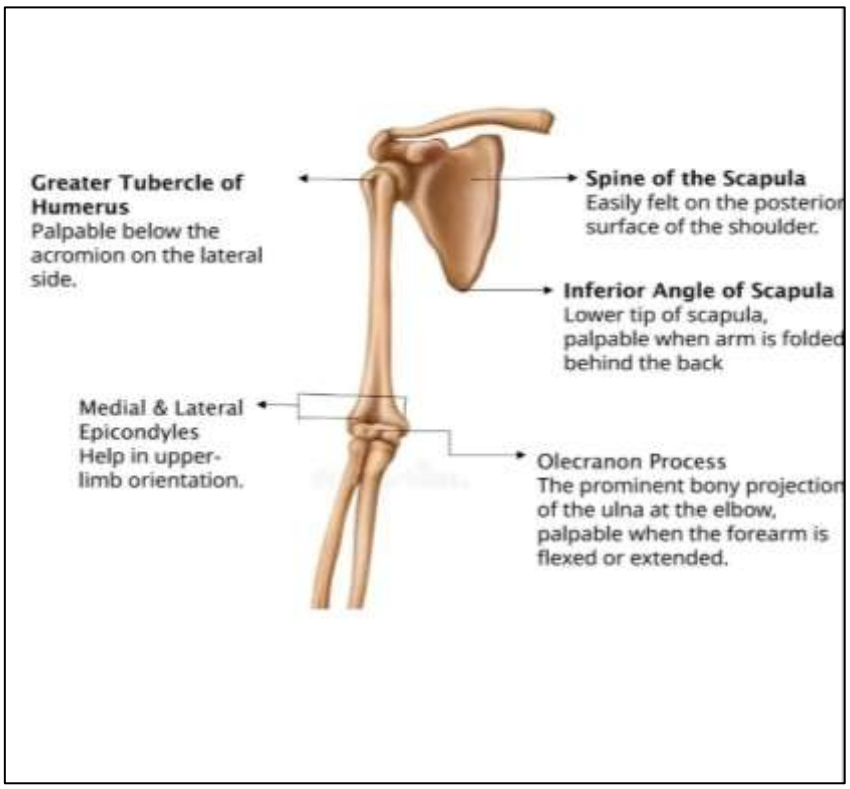
(D) **F** - The Annular ligament of radius surrounds the head of the radius, holding it against the radial notch of the ulna.

(E) **F** - The growing end of the Radius is the lower (distal) end, which contributes most to longitudinal growth.



(7)

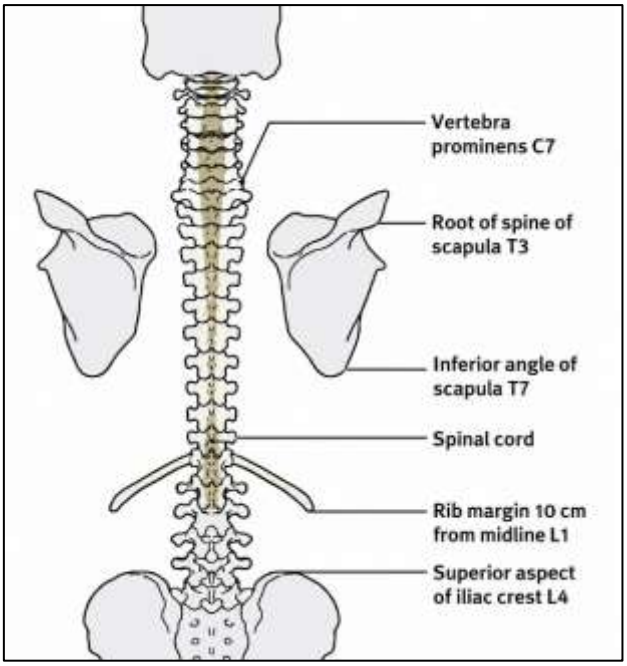
(A) **T** - The Superior angle of scapula lies deep to the trapezius muscle, so it is difficult to palpate.
(B) **F** - The Spine of scapula is easily palpable across the back.
(C) **F** - The Coracoid process can usually be palpated just below the lateral third of the clavicle.
(D) **T** - The First rib lies deep beneath the clavicle and surrounding structures, making it very difficult to palpate.
(E) **F** - The Inferior angle of scapula is easily palpable, especially when the arm is placed behind the back.



(8)

(A) **T** - The Spine of scapula lies opposite the T3 spinous process at its root.
(B) **F** - The Coracoid process is not acted upon by the deltoid. Muscles attached include,
- Short head of biceps
- Coracobrachialis
- Pectoralis minor, but not the deltoid.

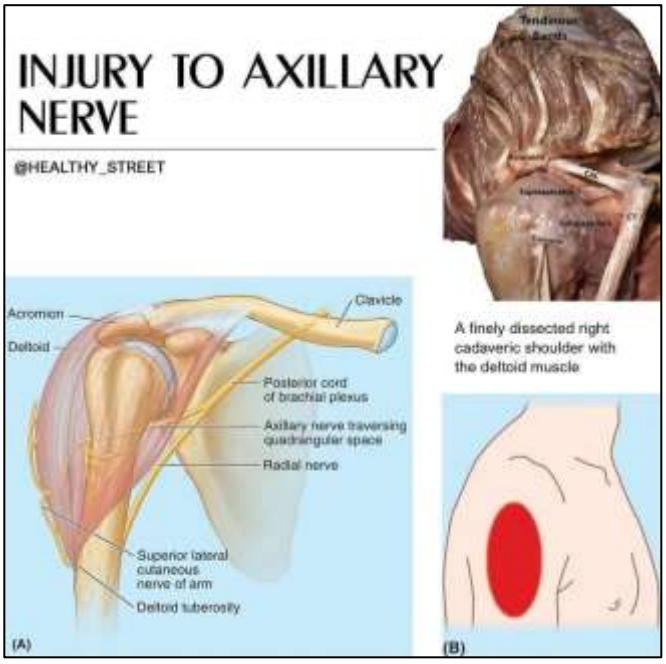
(C) **T** - The tendon of the Supraspinatus muscle passes under (deep to) the Coracoacromial arch before inserting into the greater tubercle.
(D) **F** - Secondary ossification centers of the scapula fuse after puberty (late adolescence), not by puberty.
(E) **F** - The Subscapular artery contributes via its branch, the Circumflex scapular artery, to the Scapular anastomosis.



(9)

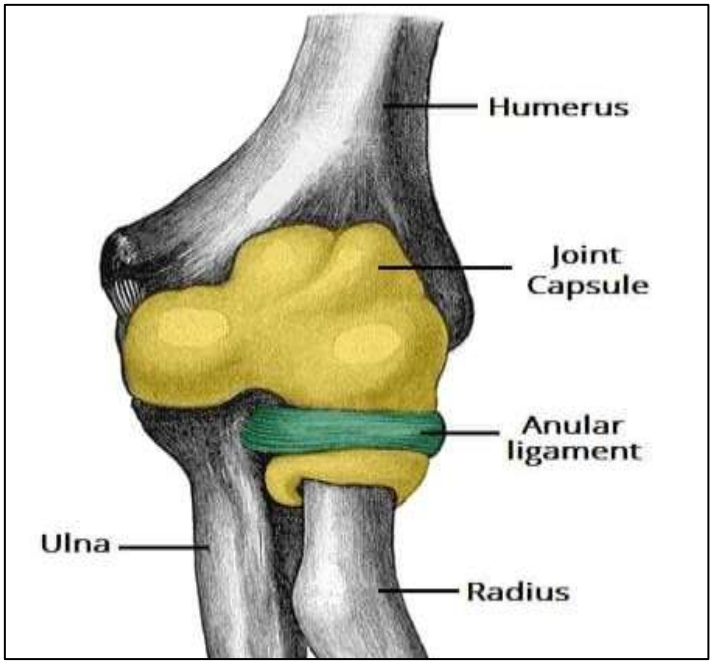
(A) **T**
(B) **T**
(C) **T**
(D) **F**
(E) **T**

The axillary nerve winds around the surgical neck → highly vulnerable in fractures.
It supplies the deltoid muscle → loss of shoulder contour + impaired abduction (15°–90°).
Sensory loss over the "regimental badge area" (lateral shoulder) is classic.
Elbow flexion is spared (mainly the musculocutaneous nerve).
Surgical neck fracture = axillary nerve + deltoid paralysis + lateral shoulder sensory loss.



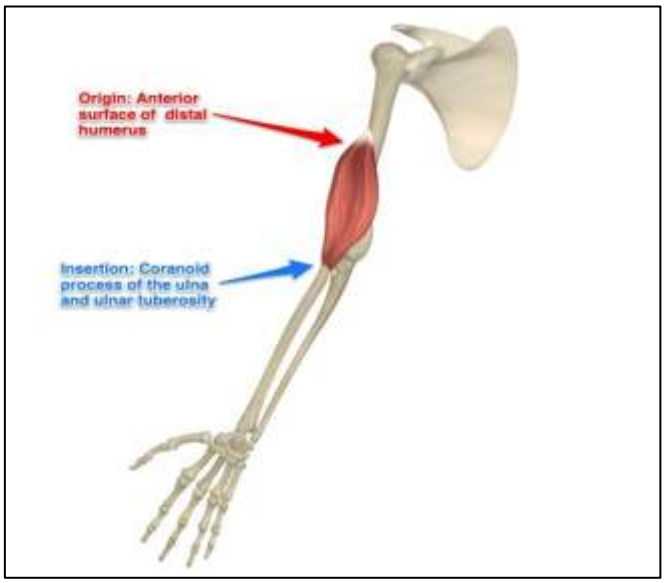
(10)

(A) **F** - Annular ligament encircles the head of radius.
(B) **F** - Distal radius articulates with scaphoid & lunate, not trapezium.
(C) **F** - Radius can be palpated (especially distally).
(D) **F** - Brachialis inserts to ulnar tuberosity, not radius.
(E) **F** - Articular disc attaches to inferior margin of ulnar notch of radius, not "ulnar notch margin" as stated here.



(11)

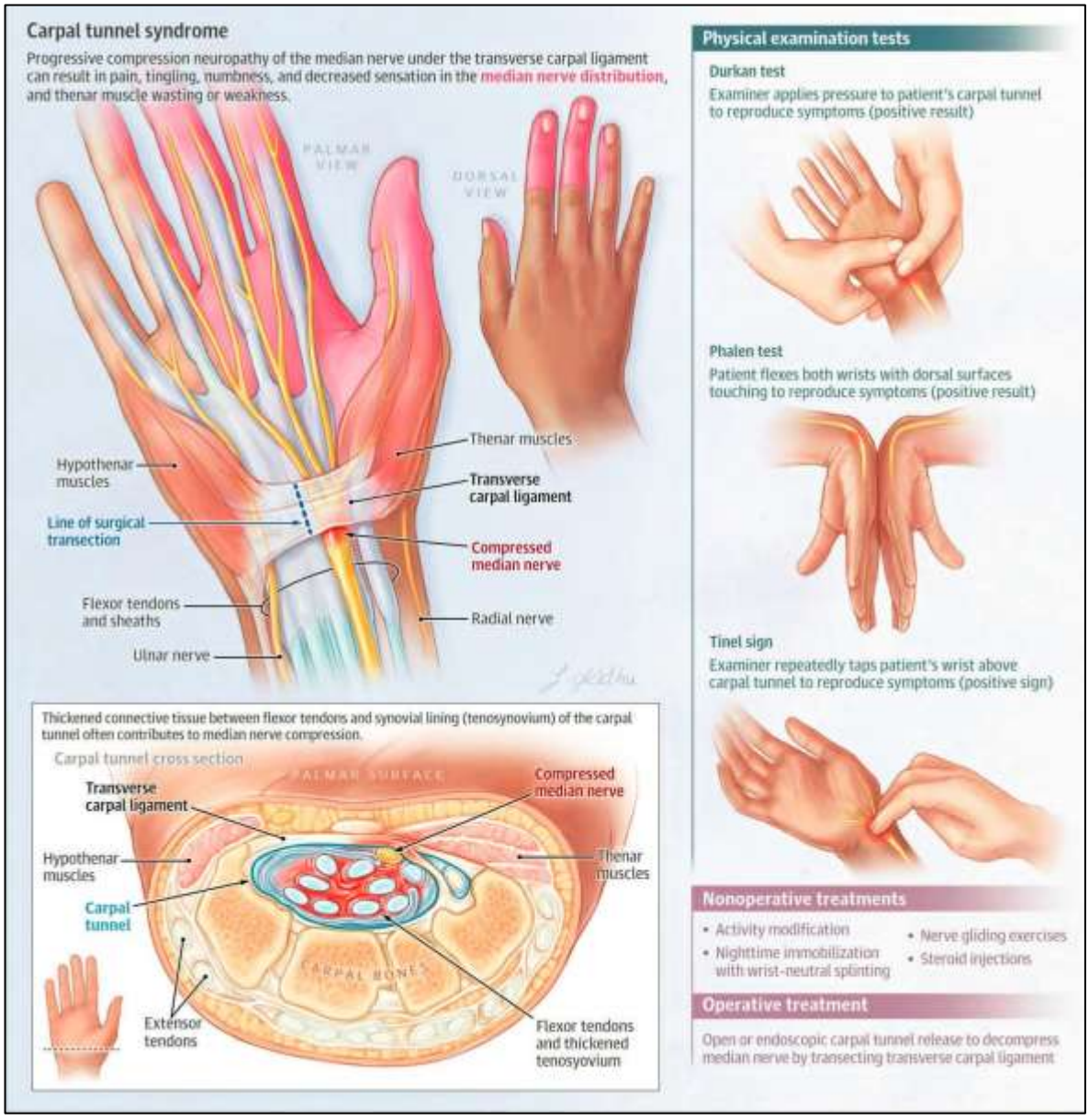
(A) **T** - Brachialis inserts into ulnar tuberosity.
(B) **F** - Styloid is posteromedial, not anteromedial.
(C) **F** - The articular disc attaches to radius, not to the ulna.
(D) **T** - Posterior border is subcutaneous & palpable throughout.
(E) **F** - The extensor carpi radialis is related to radius, not ulna.



(12)

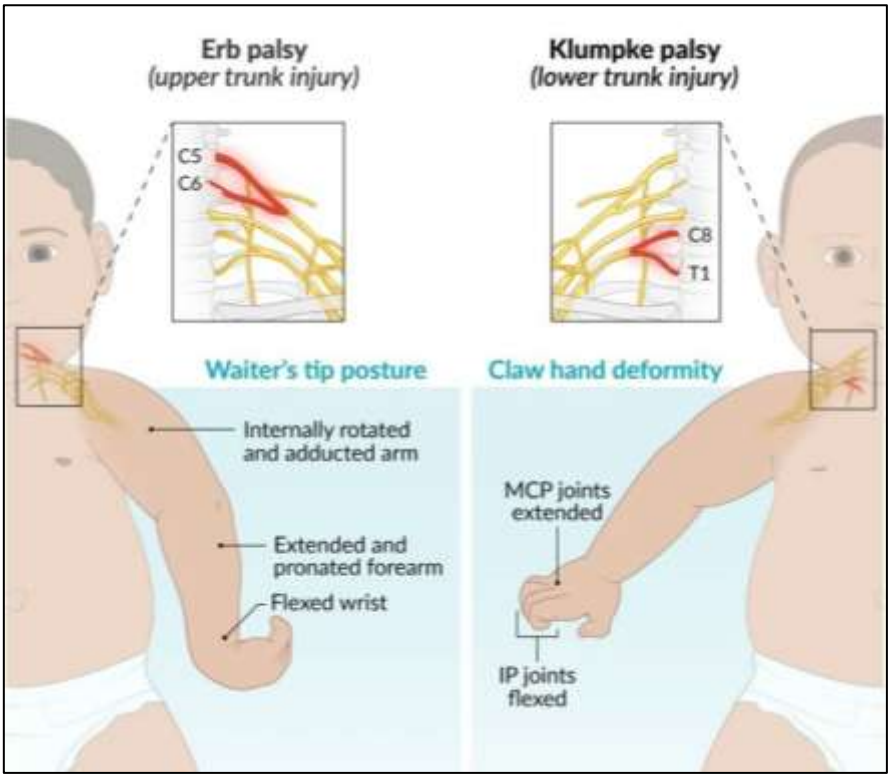
(A) **T**
(B) **T**
(C) **F**
(D) **T**
(E) **T**

Compression of the median nerve under the flexor retinaculum.
Affects thenar muscles → wasting + loss of thumb opposition.
Sensory loss: lateral 3½ digits (palmar side).
Little finger spared (ulnar nerve territory).
Thenar wasting + preserved little finger sensation = median nerve at wrist.



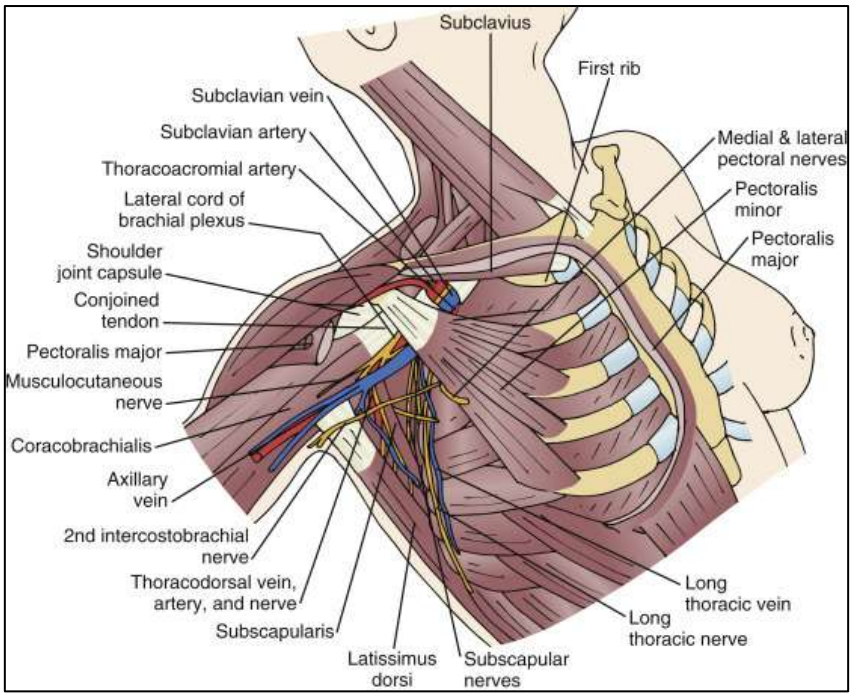
(13) **B**

Injury to the upper trunk (C5–C6) leads to Erb's palsy, affecting shoulder abduction and lateral rotation.



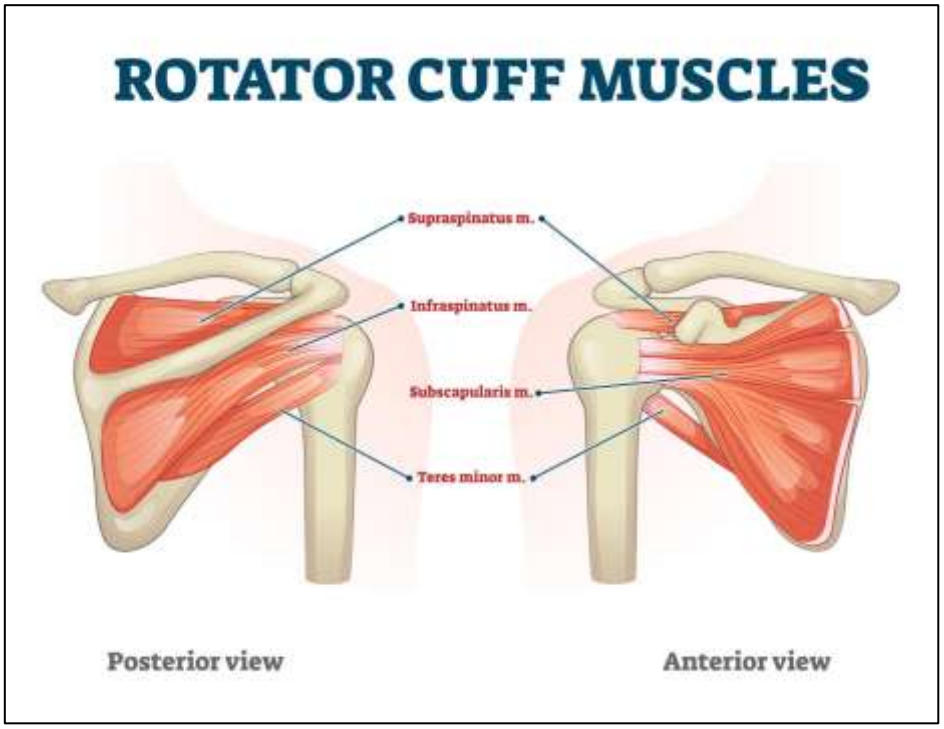
(14) B

The long thoracic nerve runs on the serratus anterior along the medial wall of the axilla → injury causes a winged scapula and difficulty abducting the arm above 90°.



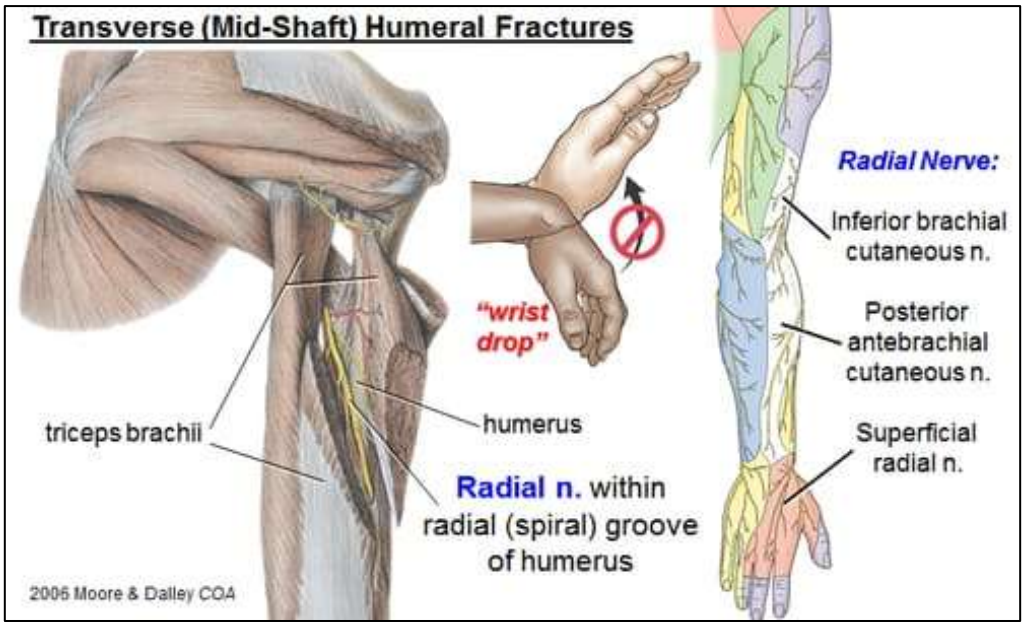
(15) C

The rotator cuff muscles dynamically stabilize the shoulder joint.



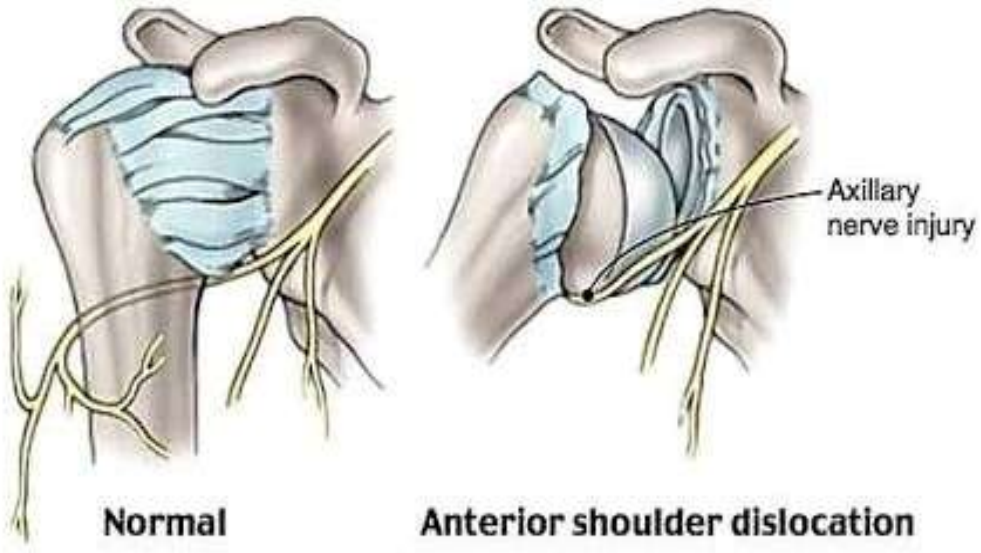
(16) C

Compression in the radial groove spares triceps (already innervated proximally) but causes wrist drop.



(17) A

Shoulder dislocation commonly injures the Axillary nerve, which winds around the surgical neck of the humerus and is vulnerable during anterior shoulder dislocation.
The axillary nerve supplies the Deltoid muscle and Teres minor muscle.



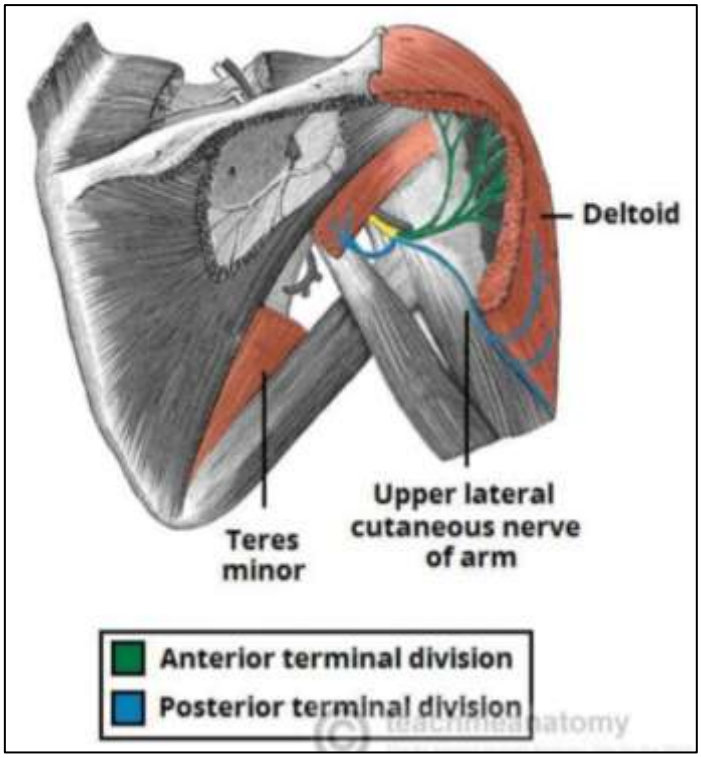
Axillary nerve supplies three muscles:
- Deltoid
- Teres minor
- Triceps brachii (long head)

Axillary nerve supplies sensory from:
- Shoulder joint
- Skin covering the inferior deltoid

RoshReview

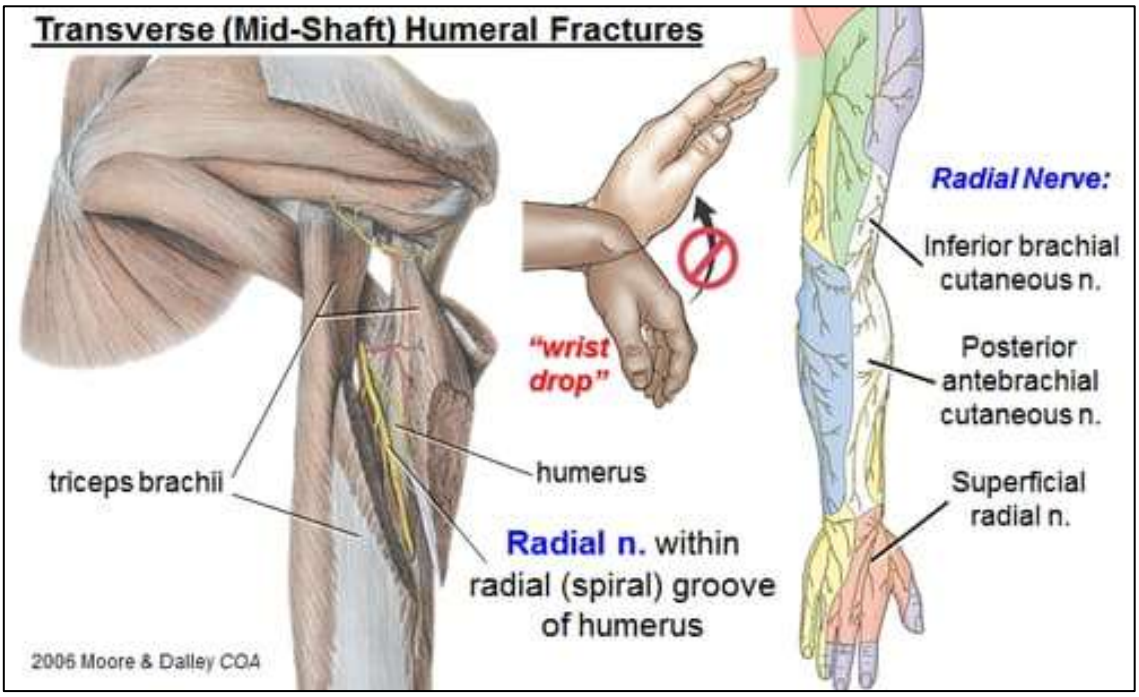
(18) C

Axillary nerve supplies deltoid → main abductor from 15°–90°.
It winds around the surgical neck of the humerus with the posterior circumflex humoral artery.



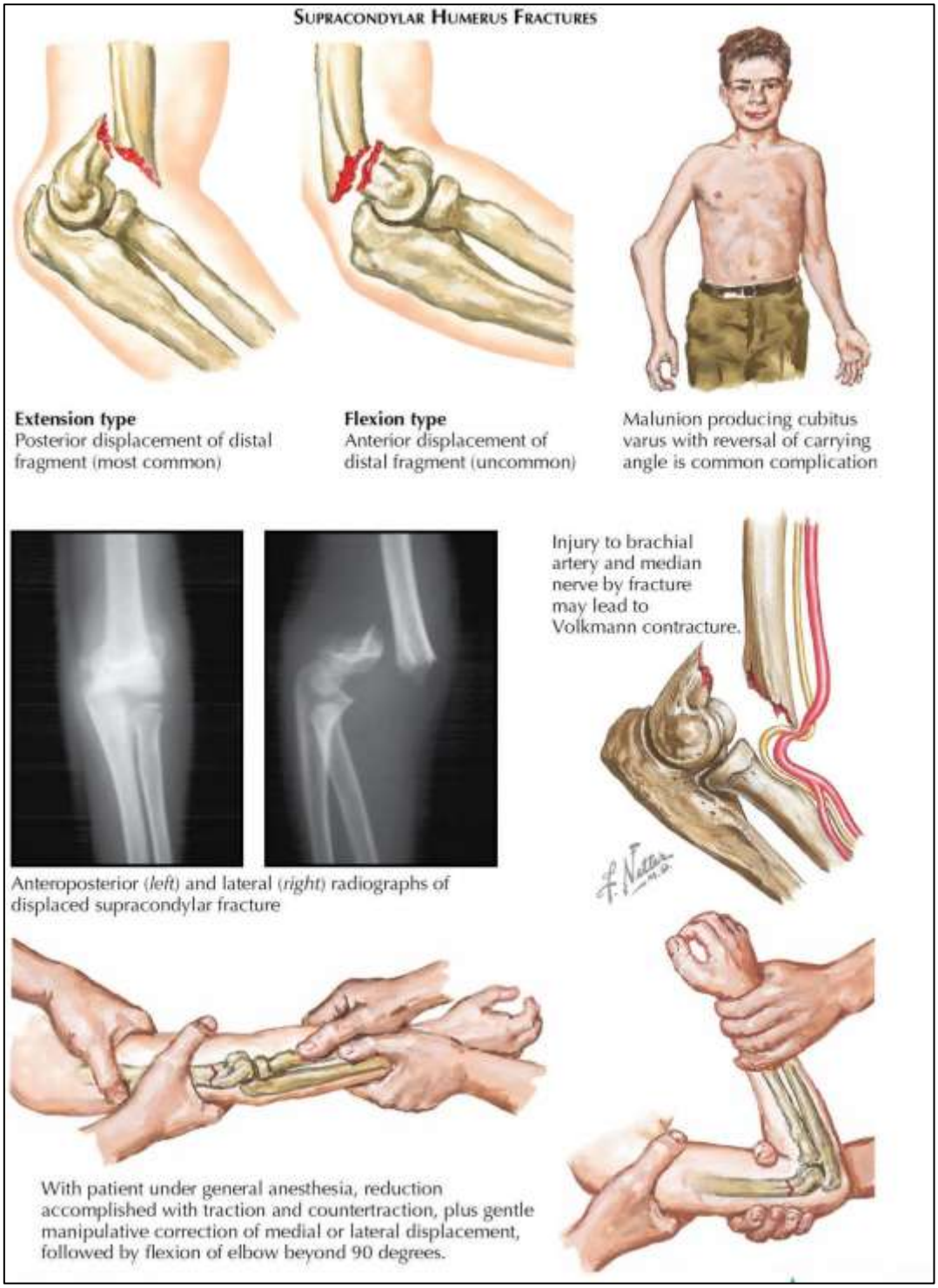
(19) C

The radial nerve runs in the spiral groove of the humerus → easily injured.
Supplies wrist/finger extensors → injury causes wrist drop.
Midshaft fracture + wrist drop = radial nerve injury.



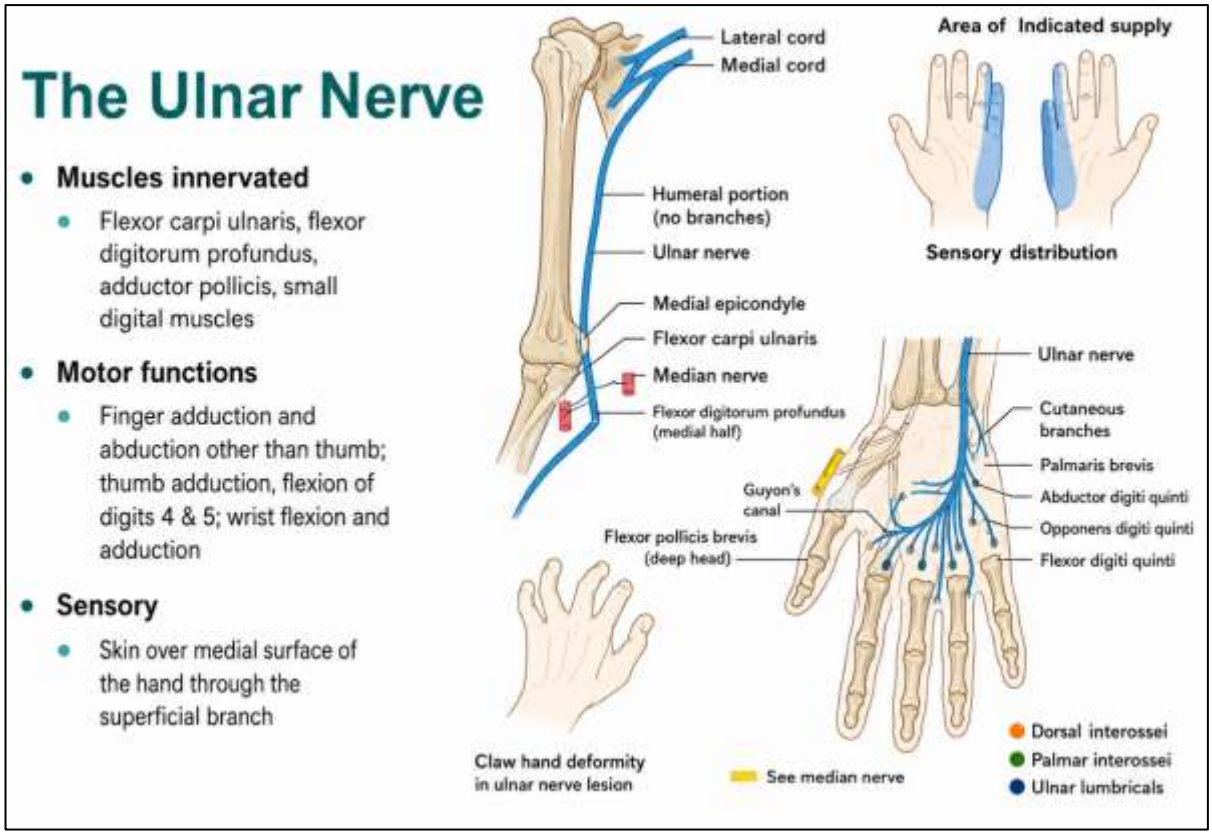
(20) D

Most clinically significant due to risk of ischemia → Volkmann contracture
The brachial artery lies anterior to distal humerus → at high risk.
Injury → forearm ischemia → Volkmann ischemic contracture if untreated.
Median nerve may also be affected, but artery is most critical clinically.
Supracondylar fracture = check pulse urgently.



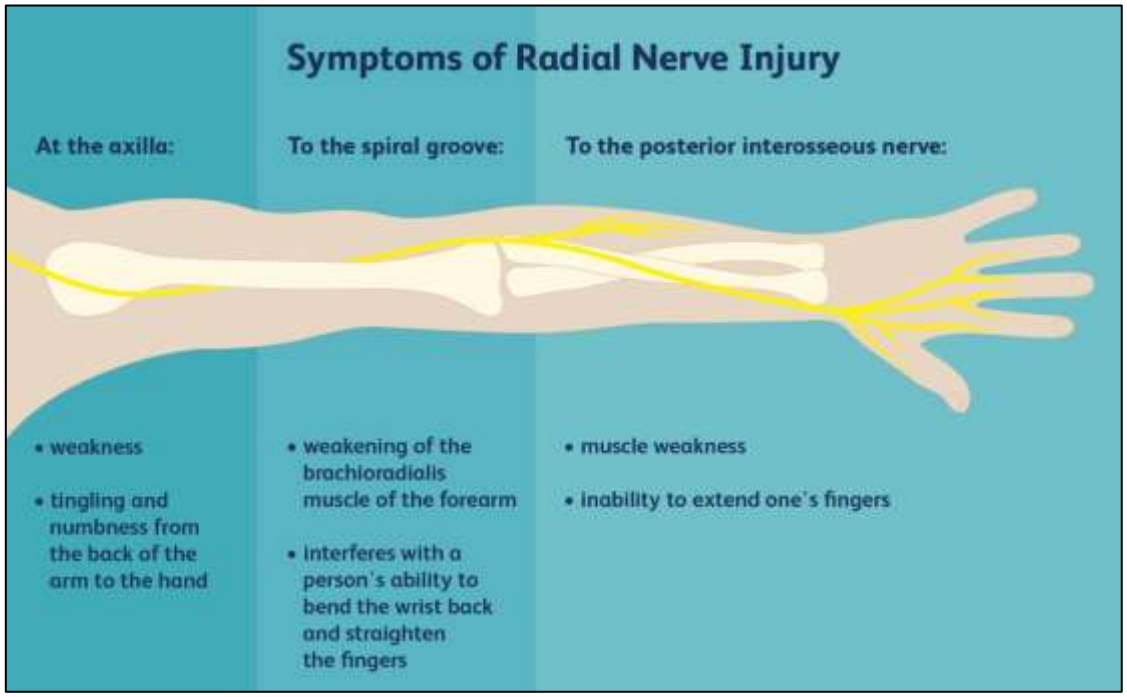
(21) C

Interossei supplied by ulnar nerve.
ulnar nerve passes behind medial epicondyle (“funny bone”).
Supplies interossei → finger abduction/adduction lost.
Leads to ulnar claw hand (especially 4th & 5th digits).
Ulnar nerve = PAD & DAB
(Palmar interossei ADduct, Dorsal interossei ABduct)



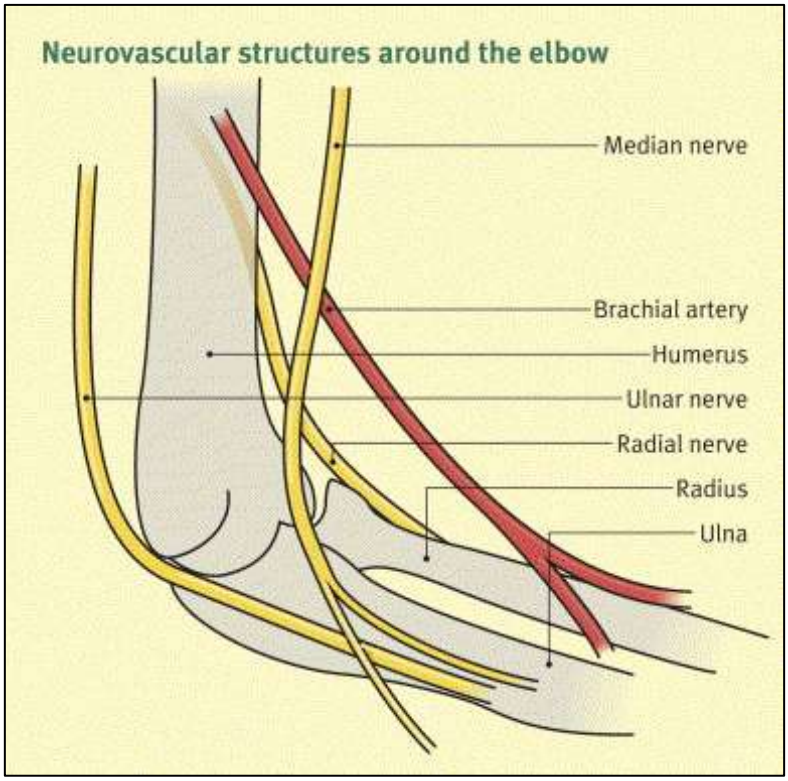
(22) B

PIN lesion → finger drop but wrist extension preserved via ECRL.



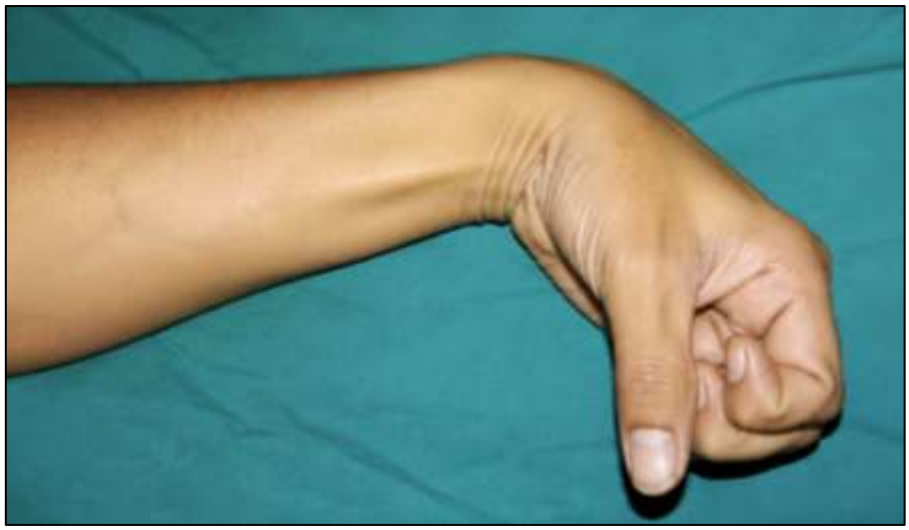
(23) D

The brachial artery lies anterior to the elbow joint and is at risk in dislocations.



(24) C

Volkmann ischemic contracture occurs due to ischemia of the forearm flexor muscles following compartment syndrome. The most common cause is vascular compromise after a supracondylar fracture of the humerus. In Supracondylar fracture of humerus, the structure most commonly injured is the Brachial artery at the elbow.
Damage or compression of this artery causes reduction of blood supply to forearm flexor compartment. Ischemia leads to muscle necrosis and fibrosis, producing the classic flexion deformity of wrist and fingers.



(25) B

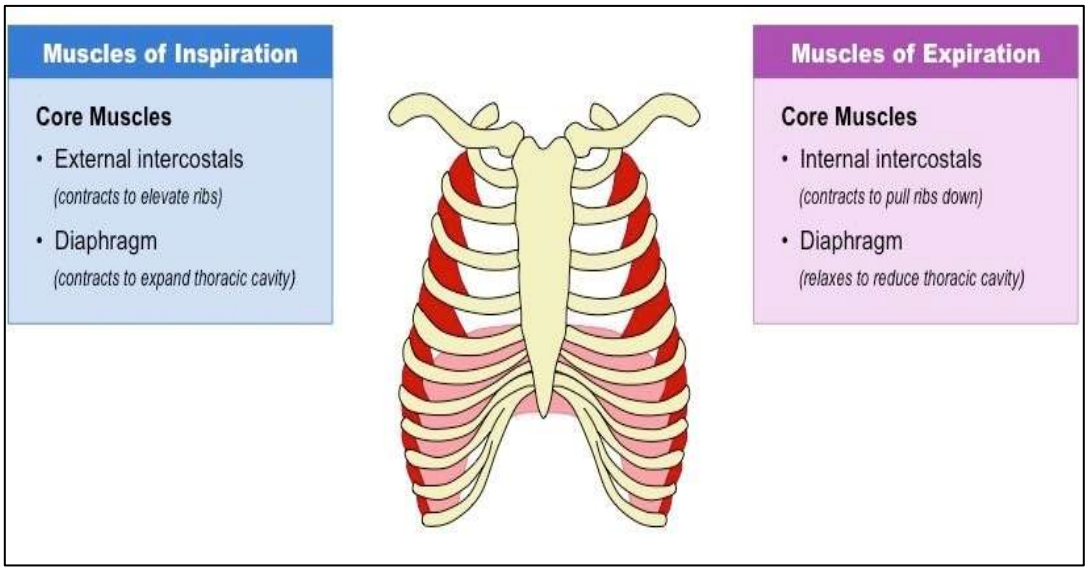
Snuffbox tenderness suggests a scaphoid fracture, which is clinically important due to risk of avascular necrosis.



Thorax Practice MCQs Answers

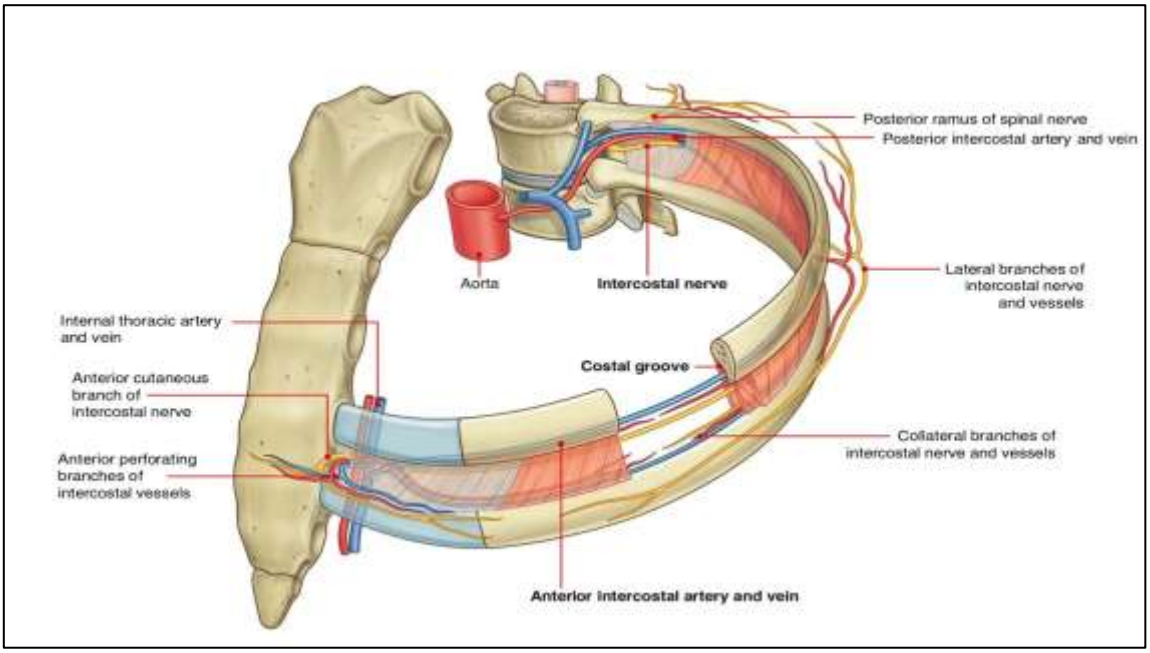
(1)

(A) **T** - External intercostals elevate ribs.
(B) **T** - Internal intercostals (interosseous part) depress ribs.
(C) **F** - External intercostals do NOT reach sternum (replaced by membrane anteriorly).
(D) **T** - Internal intercostals extend from the sternum to the angle of rib.
(E) **F** - The innermost layer is incomplete.



(2)

(A) **T** - In the costal groove of upper rib.
(B) **F** - The order is VAN, not NAV.
(C) **T** - Between the internal & innermost muscles.
(D) **T** - The collateral branches run along superior border of rib below.
(E) **T** - Intercostal nerves = ventral rami.

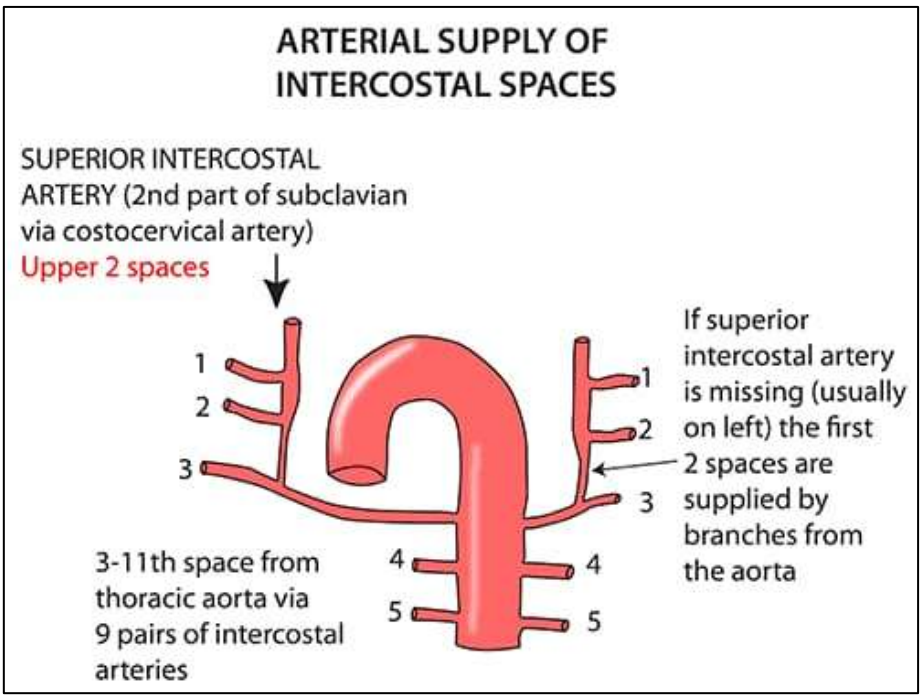


(3)

(A) **T**
(B) **F**
(C) **F**
(D) **F**
(E) **T**

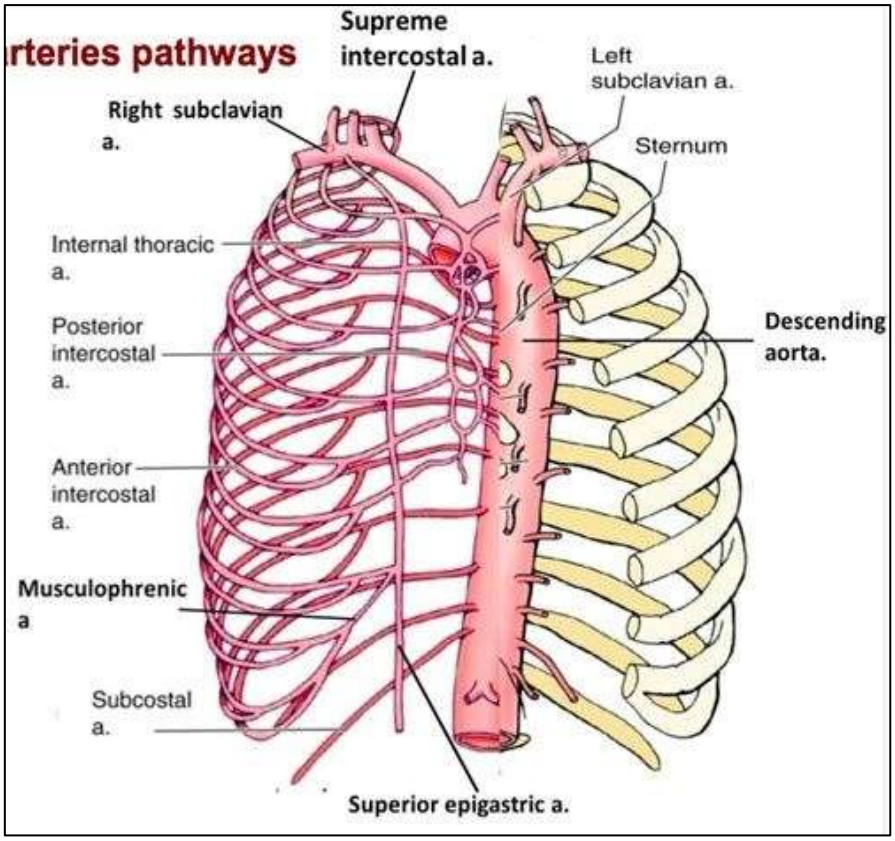
1st & 2nd intercostal spaces → supplied by superior intercostal artery (branch of costocervical trunk)
3rd –11th spaces → supplied by thoracic aorta

Upper two spaces = costocervical trunk.
Rest from the thoracic aorta.



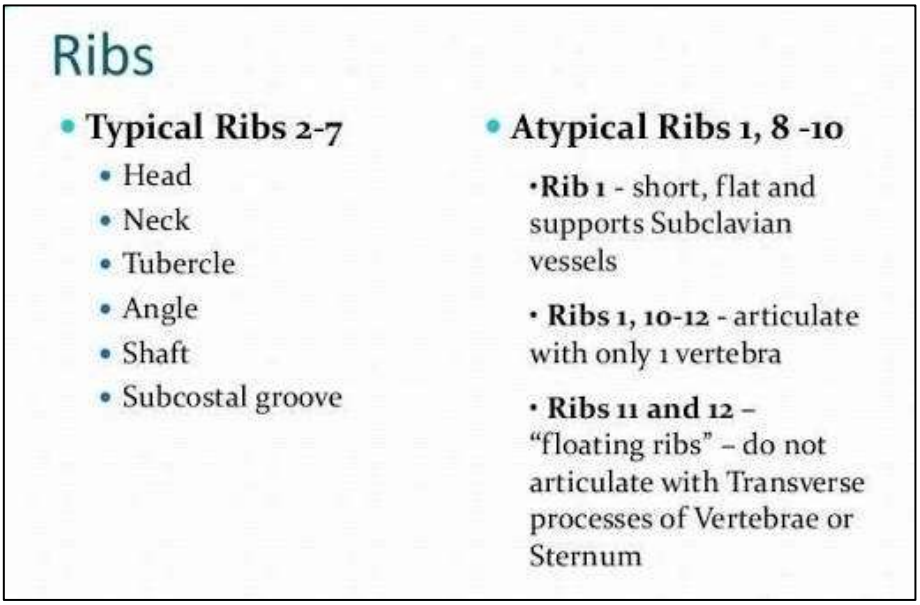
(4)

(A) **T** - Posterior intercostal arteries arise from the thoracic aorta.
(B) **T** - Anterior intercostal arteries arise from the internal thoracic artery.
(C) **F** - Intercostal nerves supply both muscle & skin.
(D) **T** - Dermatomes are segmental.
(E) **T** - Internal thoracic artery runs just lateral to sternum (not far lateral, but close).



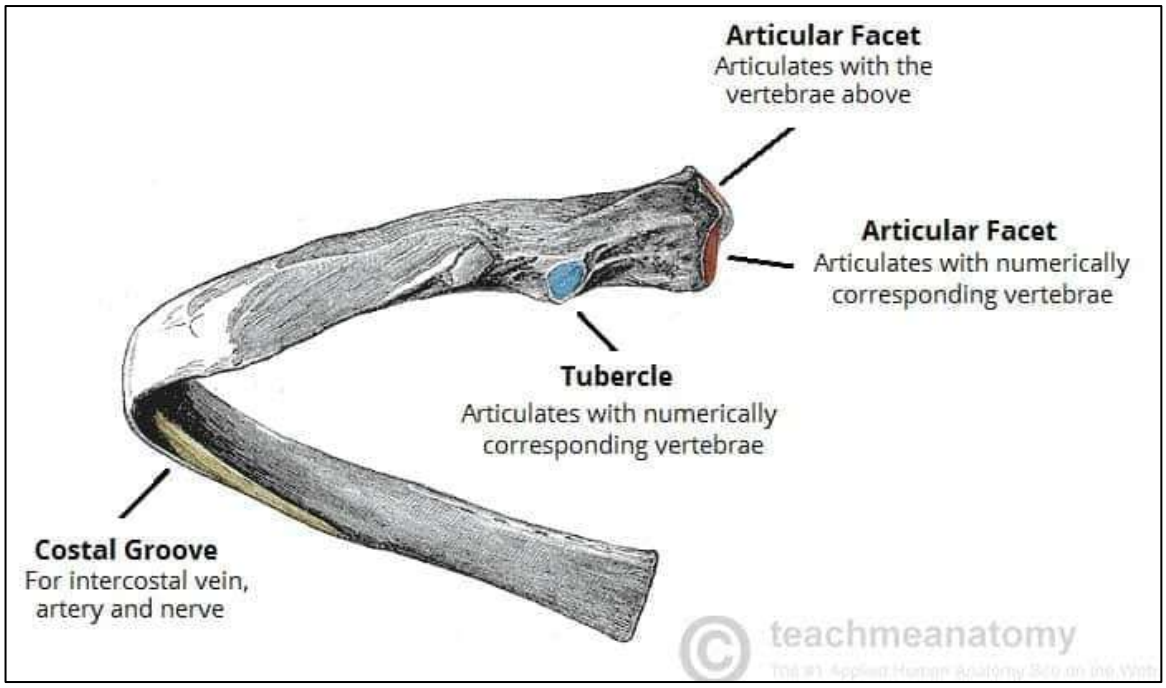
(5)

(A) **T** - Typical ribs articulate with two vertebral bodies.
(B) **F** - Head articulates with vertebral bodies, not transverse process.
(C) **F** - Sternocostal joints mostly synovial except 1st (primary cartilaginous).
(D) **T** - Floating ribs have no anterior attachment.
(E) **T** – Angle of the rib is the point of maximum curvature.



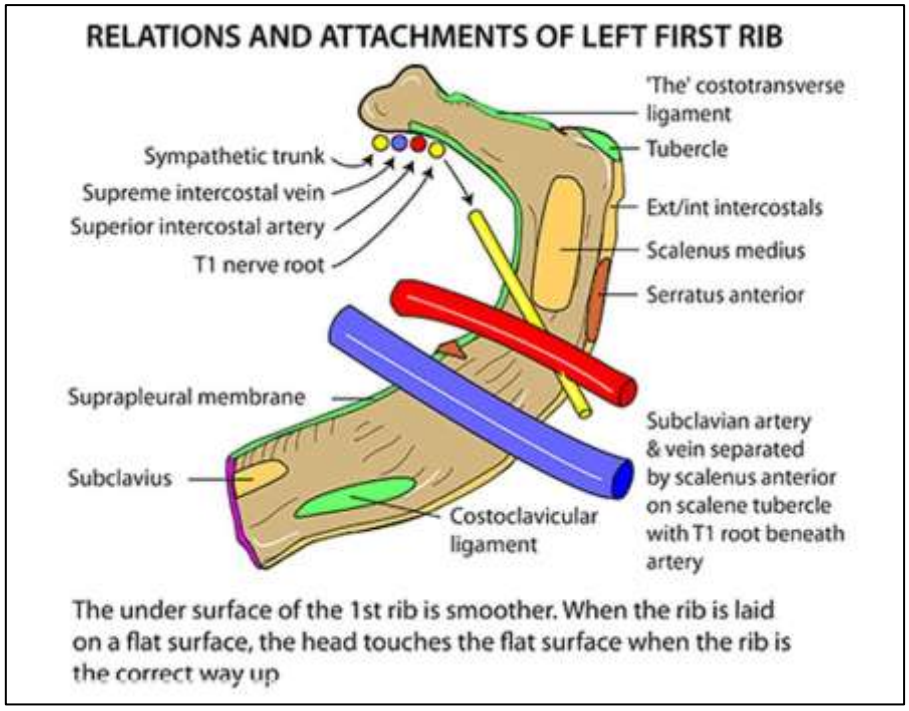
(6)

(A) **T** - Neurovascular bundle (VAN) runs in the costal groove along the inferior border.
(B) **T** - Costal pleura lines the internal surface of ribs.
(C) **T** - Lies just anterior to the neck of ribs in the thorax.
(D) **F** - Runs vertically near the sternum, not specifically at costochondral joints.
(E) **F** - Azygos vein ascends in the posterior mediastinum, not specifically related to rib angles.



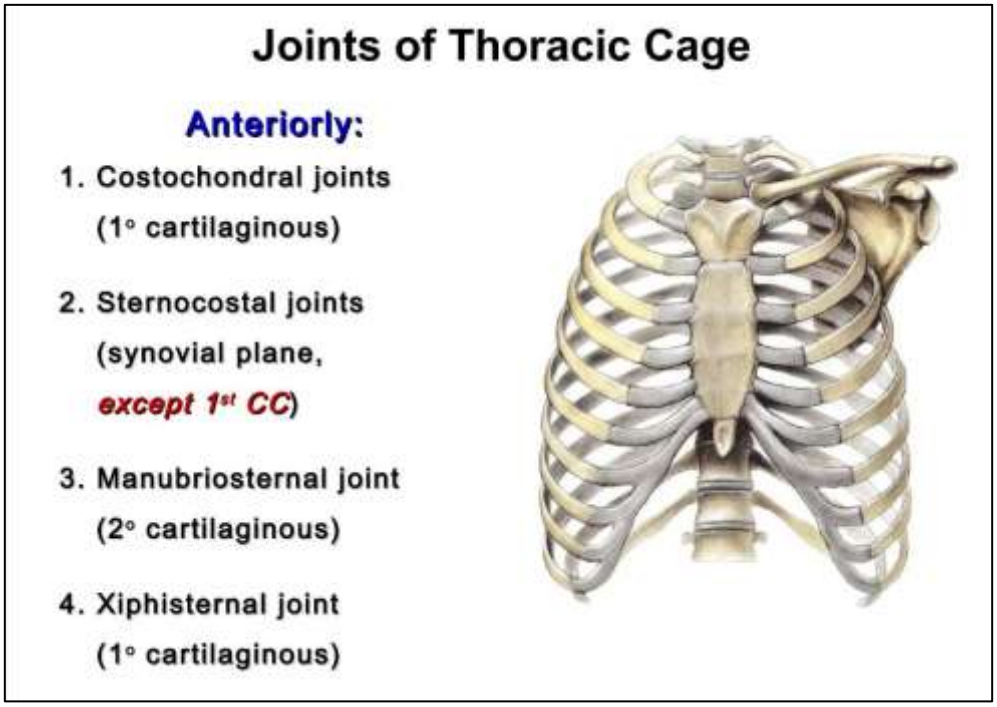
(7)

(A) **T** - Superior cervical ganglion is in the neck (around C2–C3), not related to 1st rib.
(B) **T** - T1 nerve root contributes to the first intercostal nerve and passes near the 1st rib.
(C) **T** - Subclavian artery grooves the superior surface of the 1st rib.
(D) **T** - Suprapleural membrane (Sibson's fascia) attaches to the inner border of the 1st rib.
(E) **T**



(8)

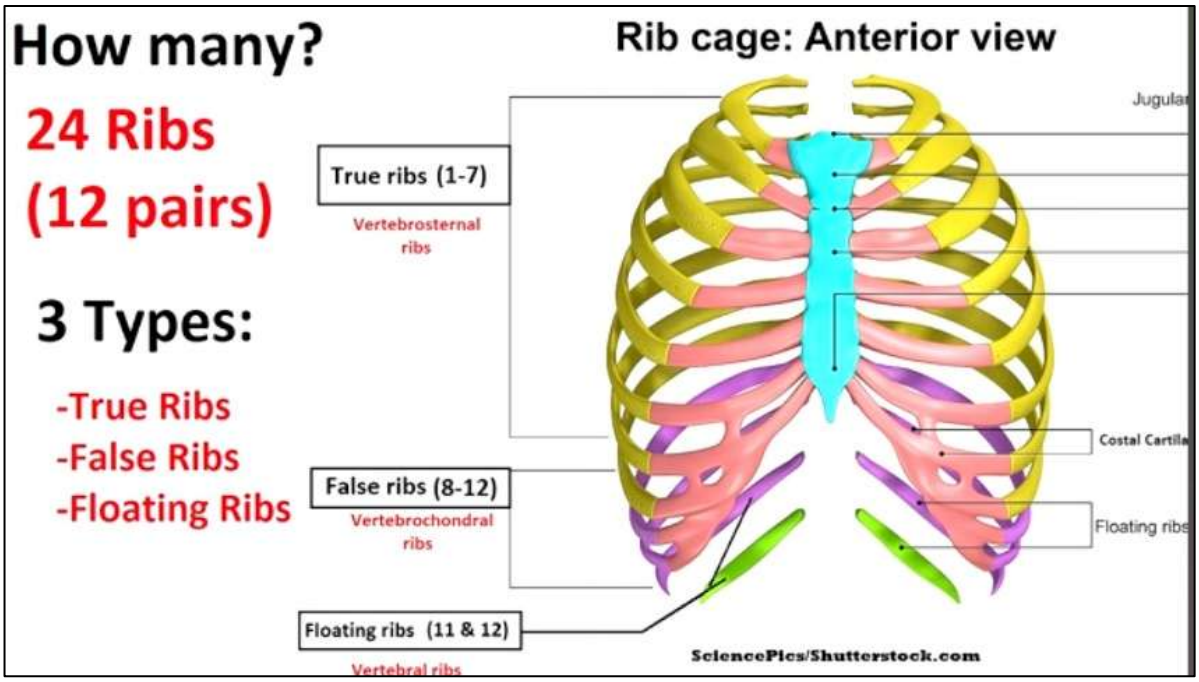
(A) **T** - Ribs articulate with thoracic vertebrae (costovertebral & costotransverse joints).
(B) **T** - 8th costal cartilage forms interchondral joints with the cartilage above.
(C) **T** - Manubriosternal joint is a secondary cartilaginous joint (symphysis).
(D) **T** - Costochondral joints are primary cartilaginous (synchondrosis).
(E) **F** - Not all are synovial: 1st sternocostal joint is primary cartilaginous, others (2–7) are synovial.



(9)

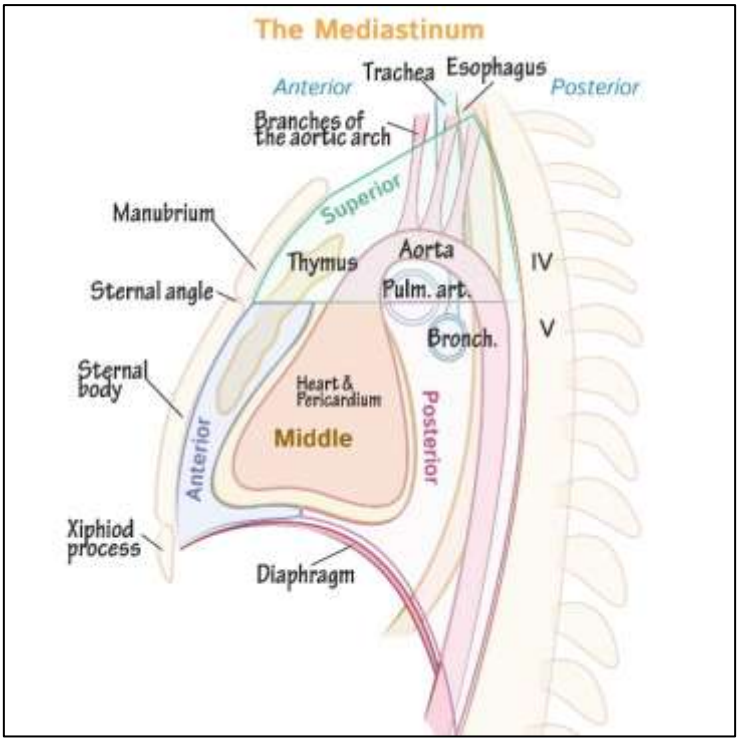
(A) **T** - True ribs are those attached directly to the sternum by their costal cartilage.
- 1-7 – true ribs
- 8-10 – false ribs
- 11-12 – floating rib

(B) **F** - Atypical rib
(C) **T**
(D) **T**
(E) **T** - Manubriosternal joint is a symphysis.



(10) The lower part of the manubrium corresponds to the superior mediastinum (around the sternal angle, T4–T5 level). Structures lying just posterior here are at risk.

(A) **T** - Lies just behind the manubrium, crossing from left to right → highly vulnerable.
(B) **T** - Located in the superior mediastinum, posterior to manubrium.
(C) **T** - Lies posterior to the great vessels, can be injured with deeper penetration.
(D) **F** - More lateral and posterior, not directly behind lower manubrium.
(E) **T** - Present in superior mediastinum, posterior to manubrium.



(11)

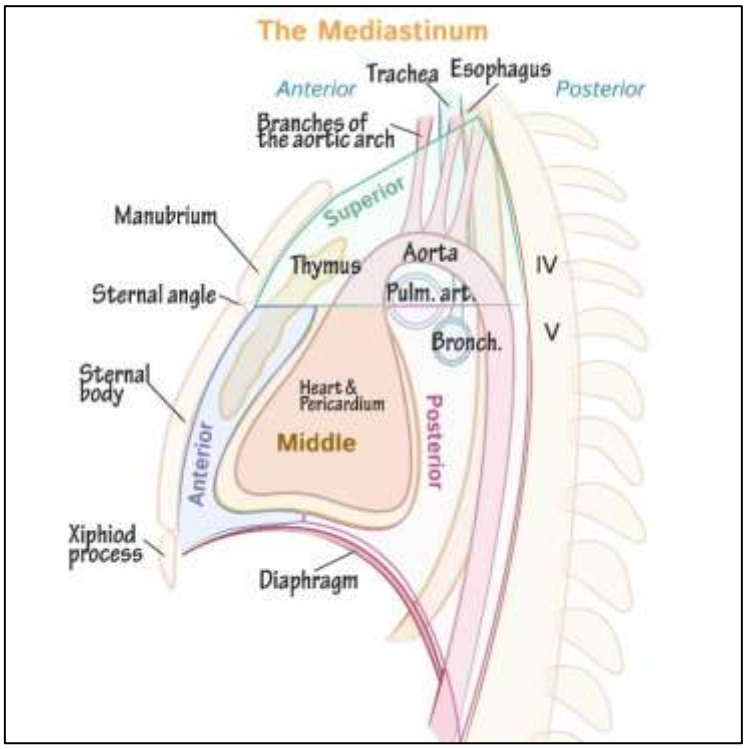
(A) **F** - Posterior mediastinum lies below the transverse thoracic plane (T4–T5) down to T12, not up to T1.

(B) **T** - Its anterior boundary is the fibrous pericardium.

(C) **F** - It extends from thoracic inlet (level of 1st rib) down to T4–T5 plane, not above it.

(D) **T**

(E) **T**



(12)

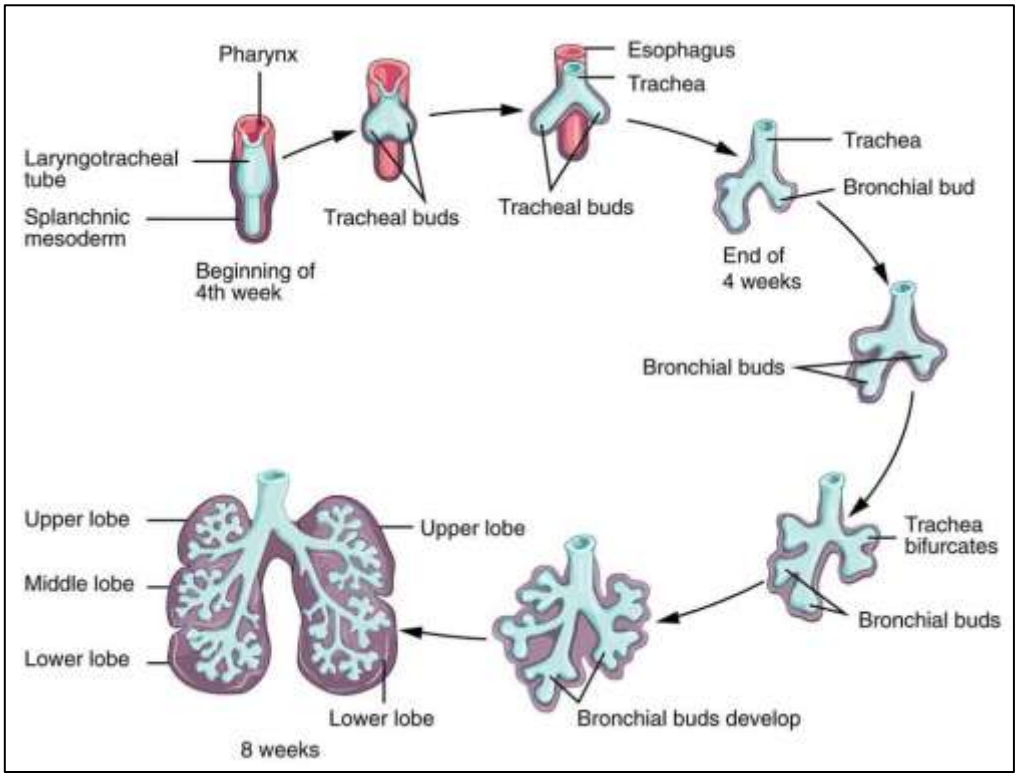
(A) **F** - starts at 4th week IUL.

(B) **T** - Tracheoesophageal ridges form the tracheoesophageal septum.

(C) **T**

(D) **T** - Type II pneumocytes appear by end of 6 months IUL.

(E) **T**



(13)

(A) **F** - 3 Lobes.

(B) **F** - Left lung, anterior border has cardiac notch.

(C) **T** - As right branch is shorter wider and more vertical than left branches, materials tend to get into right bronchus.
Materials aspired by a supine, comatose or anesthetized, patient would tend to gravitate in to superior segment of the right lower lobe. (Also, common site for aspiration pneumonia and abscess formation.

(D) **T**

(E) **F** - Apex is about 4cm superior to middle clavicle.

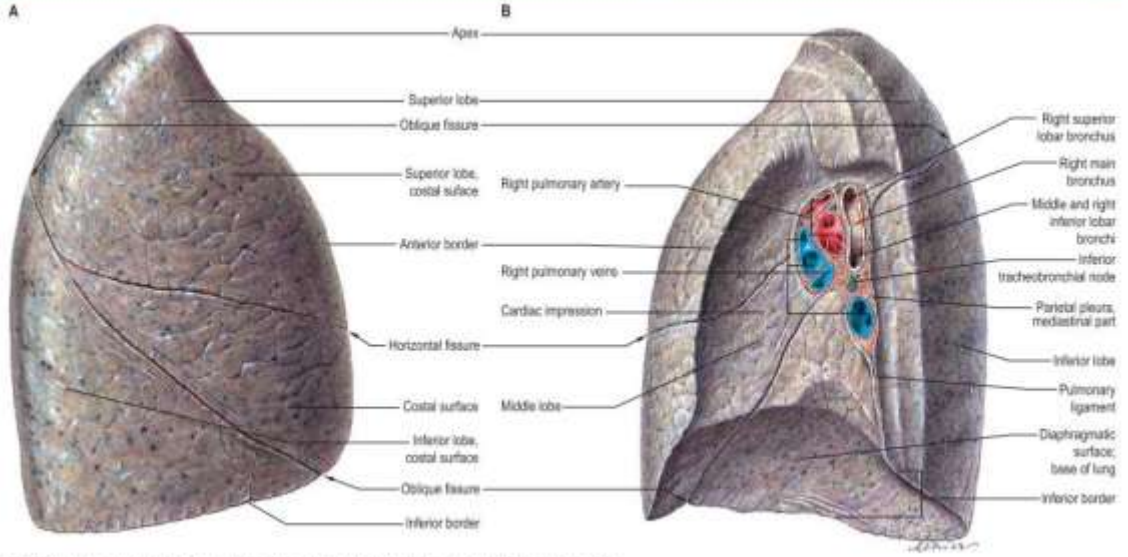


Fig. 57.3 The right lung. **A,** Lateral surface. **B,** Medial surface. (From Sobotta 2006.)

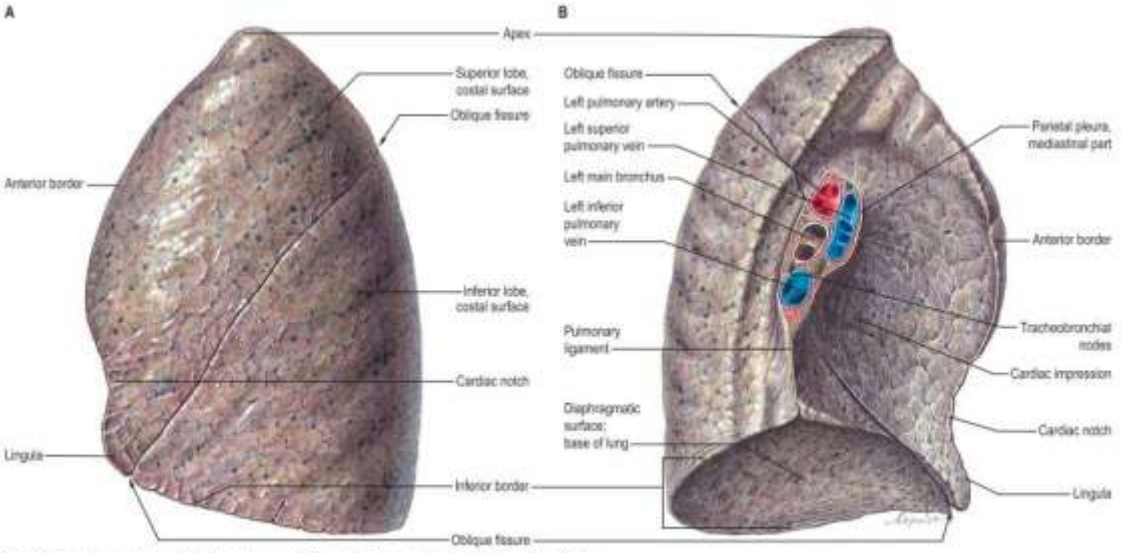


Fig. 57.4 The left lung. **A,** Lateral surface. **B,** Medial surface. (From Sobotta 2006.)

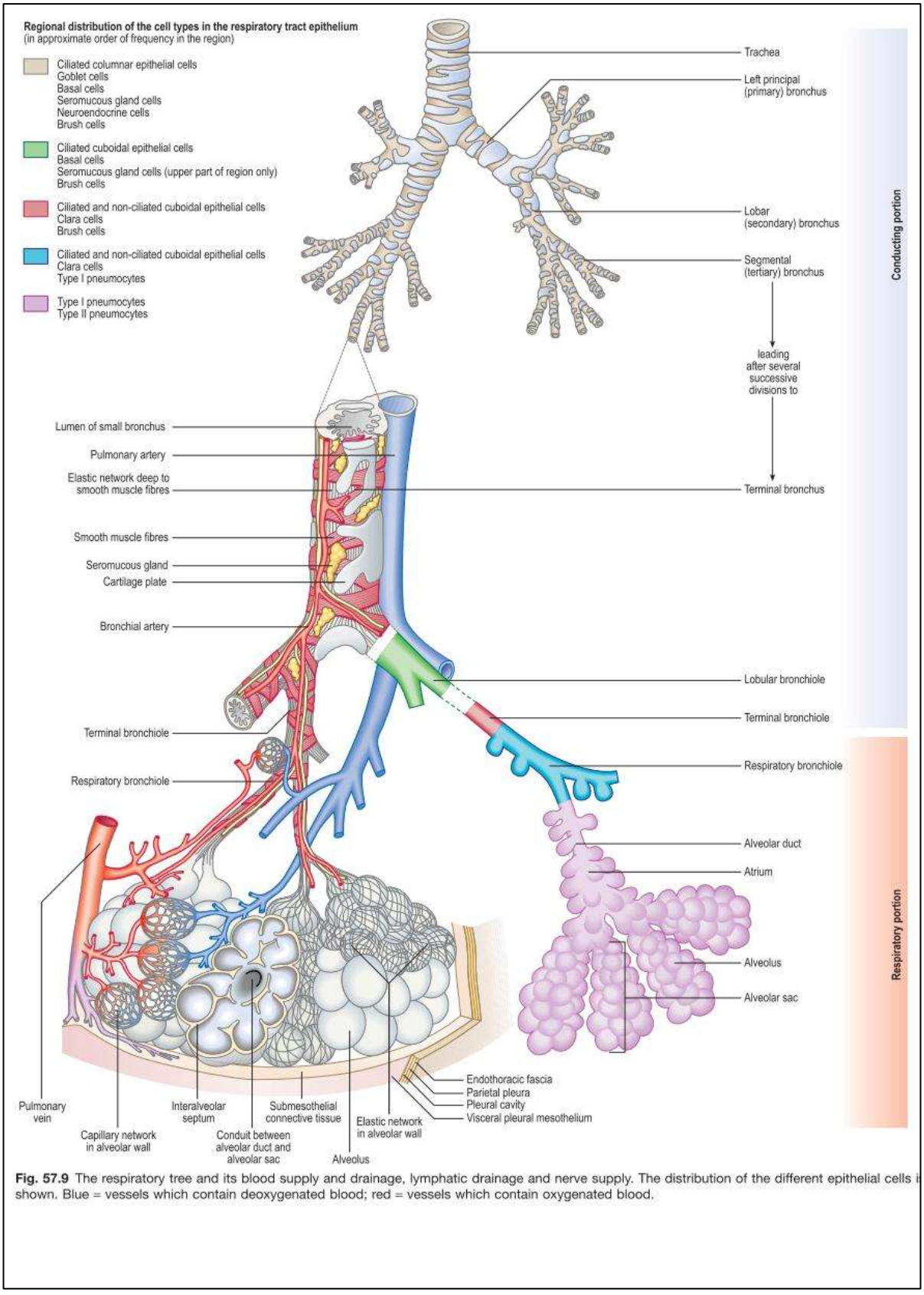
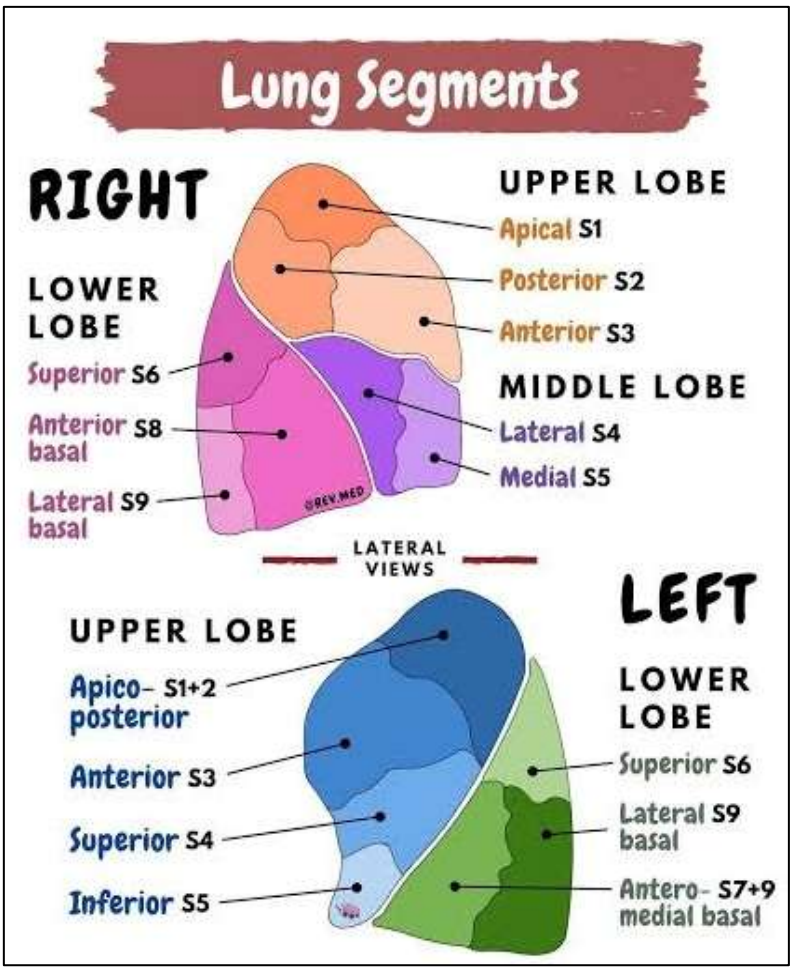


Fig. 57.9 The respiratory tree and its blood supply and drainage, lymphatic drainage and nerve supply. The distribution of the different epithelial cells i shown. Blue = vessels which contain deoxygenated blood; red = vessels which contain oxygenated blood.

(14)

(A) **T**
(B) **T**
(C) **T**
(D) **T**
(E) **F**

Segments are independent units (bronchus + artery), veins are intersegmental, allowing segmentectomy. Right lung has 10 segments. The left lung has 8 – 10 segments.

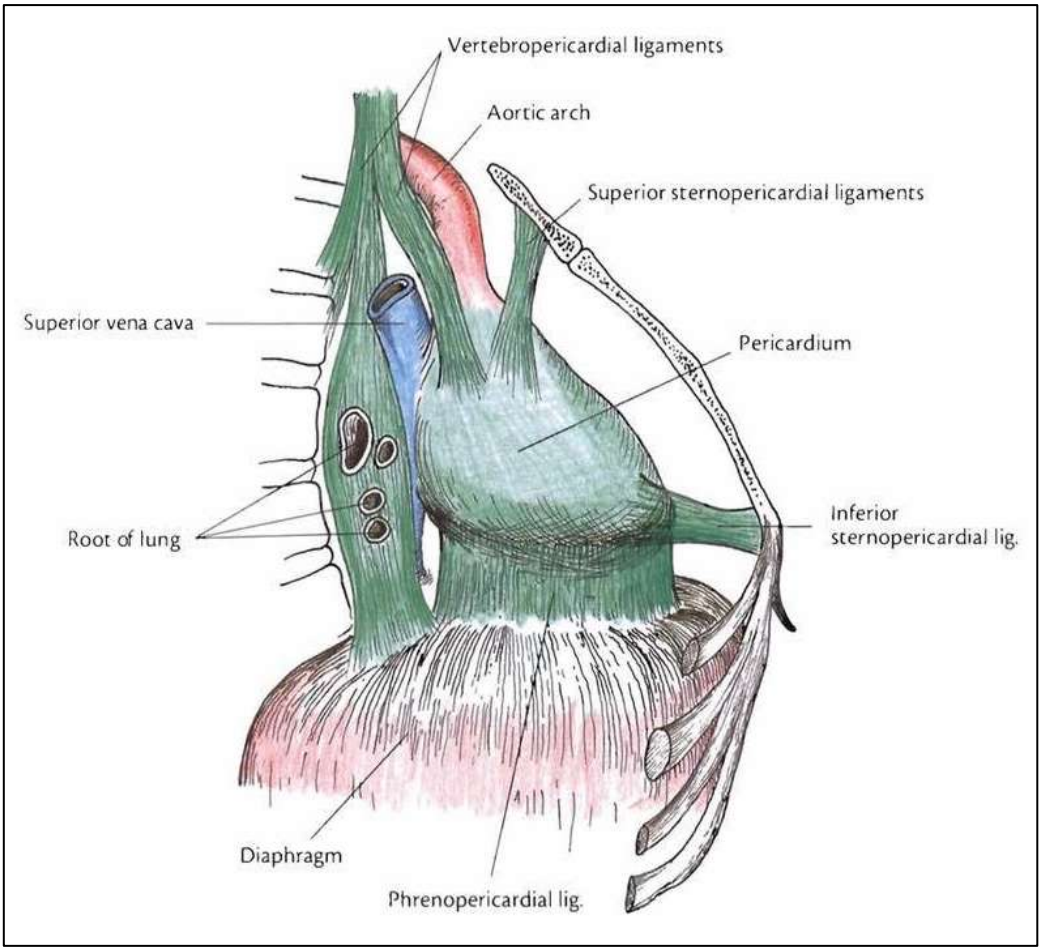


(15)

(A) **T**
(B) **T**
(C) **F**
(D) **F**
(E) **T**

Direct contacts

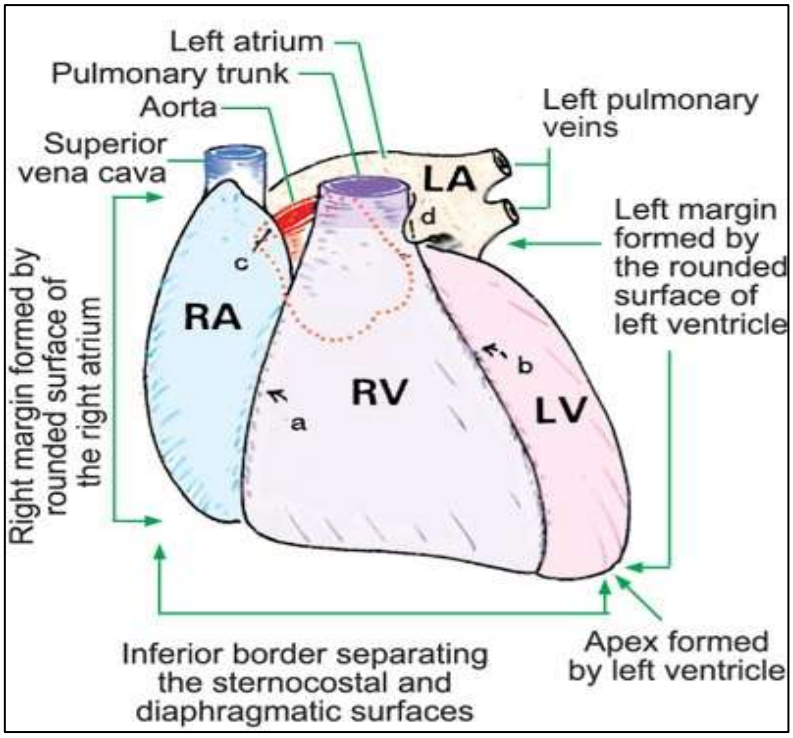
- Mediastinal pleura (laterally)
- Central tendon of diaphragm (inferiorly, firmly fused)
- Posterior sternum via sternopericardial ligaments (anteriorly)



(16)

(A) **T**
(B) **T**
(C) **F**
(D) **T**
(E) **T**

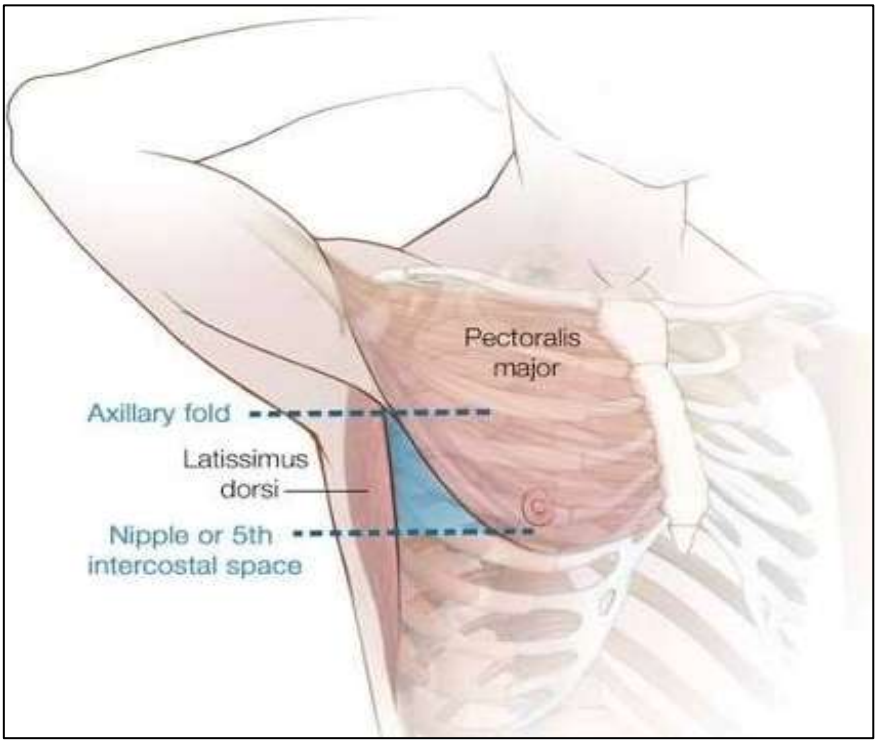
Apex: Directed downward, forward, and to the left; formed by the left ventricle.
Right border: Mainly the right atrium.
Anterior surface: Mostly formed by the right ventricle, not the left ventricle.
Diaphragmatic surface: Mainly left ventricle with contribution from the right ventricle.
Coronary sulcus (atrioventricular groove): Separates atria from ventricles externally.



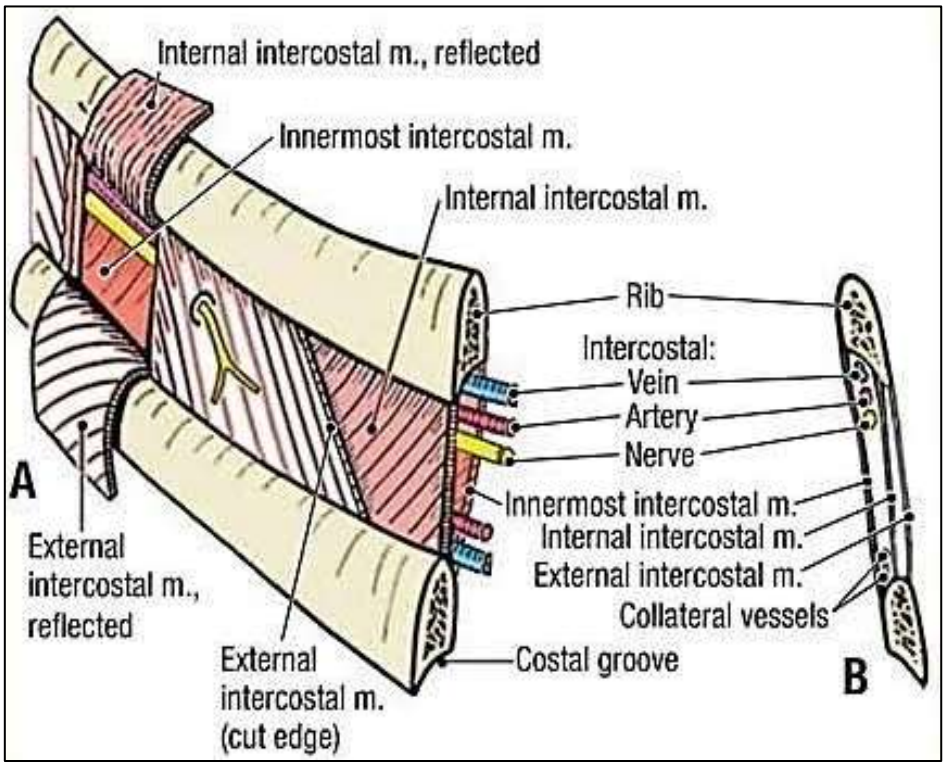
(17) B

The boundaries of the safe triangle are,

- Anterior: lateral border of pectoralis major
- Posterior: anterior border of latissimus dorsi
- Inferior: 5th intercostal space

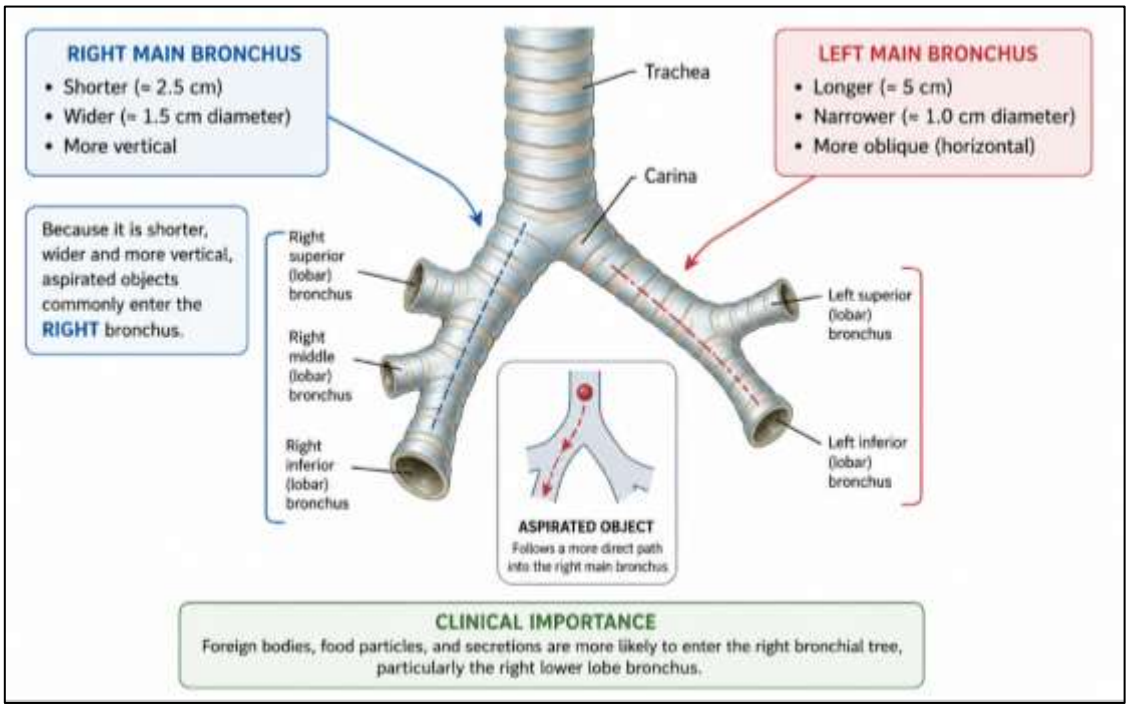


(18) B



(19) D

The left lung has only 2 lobes and 1 fissure while the right lung has 3 lobes and 2 fissures. The right main bronchus is shorter, wider, and more vertical than the left, which is why aspirated objects commonly enter the right bronchus.
The cardiac notch is a feature of the left lung, accommodating the heart. Lingula is part of the left upper lobe, not the right lung.



BATCH 03 - SEMESTER 01 SMALL GROUP DISCUSSIONS (SGDs) WITH ANSWERS

SGD 01 - Upper Arm & Shoulder Joint

(1) A 57-year-old man presents with pain in the right shoulder during abduction over a few weeks' duration. Investigations revealed that the problem is due to an inflammation of a tendon of a rotator cuff muscle. The condition is diagnosed as painful arc syndrome.

(1.1) What is the muscle involved? (10 marks)

(1.2) What is the anatomical basis for the painful arc syndrome? (20 marks)

(1.3) Describe the formation of the rotator cuff and its functional significance. (20 marks)

(1.4) List the rotator cuff muscles, their innervation, and action/s using a table. (30 marks)

(1.5) Describe the mechanism of shoulder abduction. (20 marks)

(2) Explain the anatomical basis of the following observations.

(2.1) A patient sustained a mid-shaft fracture of the humerus following a fall. On examination, he was found to have a wrist drop, but could extend the elbow joint against resistance.
(40 marks)

(2.2) Describe the origin, course and distribution of the axillary nerve, emphasizing the anatomical basis of the nerve injury in this patient. (30 marks)

(2.3) Describe the symptoms and examination findings of axillary neve injury that can be observed in this patient. (30 marks)

SGD 01 - Upper Arm & Shoulder Joint Answers

(1)

(1.1) What is the muscle involved?

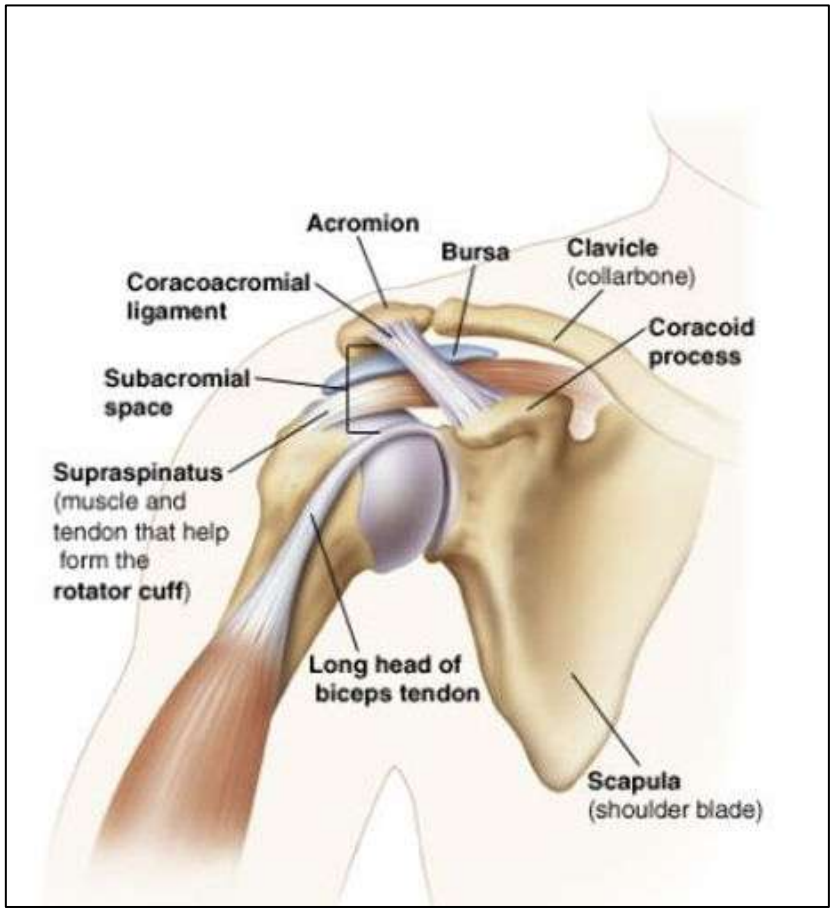
Supraspinatus muscle

(1.2) What is the anatomical basis for the painful arc syndrome?

Painful arc syndrome occurs due to compression of the supraspinatus tendon.

- The supraspinatus tendon passes through the **subacromial space.**
- It lies between:
  - Head of humerus (below)
  - Acromion & coracoacromial ligament (above)
- During abduction (60°–120°):
  - The tendon is compressed
  - Inflammation causes pain
- Associated structure:
  - Subacromial bursa (may also be inflamed)

Thus, narrowing of the subacromial space leads to tendon impingement → pain during mid-abduction (painful arc).



(1.3)Describe the formation of the rotator cuff and its functional significance.

- Tendons of supraspinatus, infraspinatus, teres minor, and subscapularis fuse with shoulder joint capsule.
- Form a musculotendinous cuff around the head of humerus.
- Reinforces capsule superiorly, anteriorly, and posteriorly.
- Inferior aspect is weak (common site of dislocation).

Significance:

- Dynamic stabilization
- Prevents upward displacement of humeral head during abduction

(1.4)List the rotator cuff muscles, their innervation, and action/s using a table.

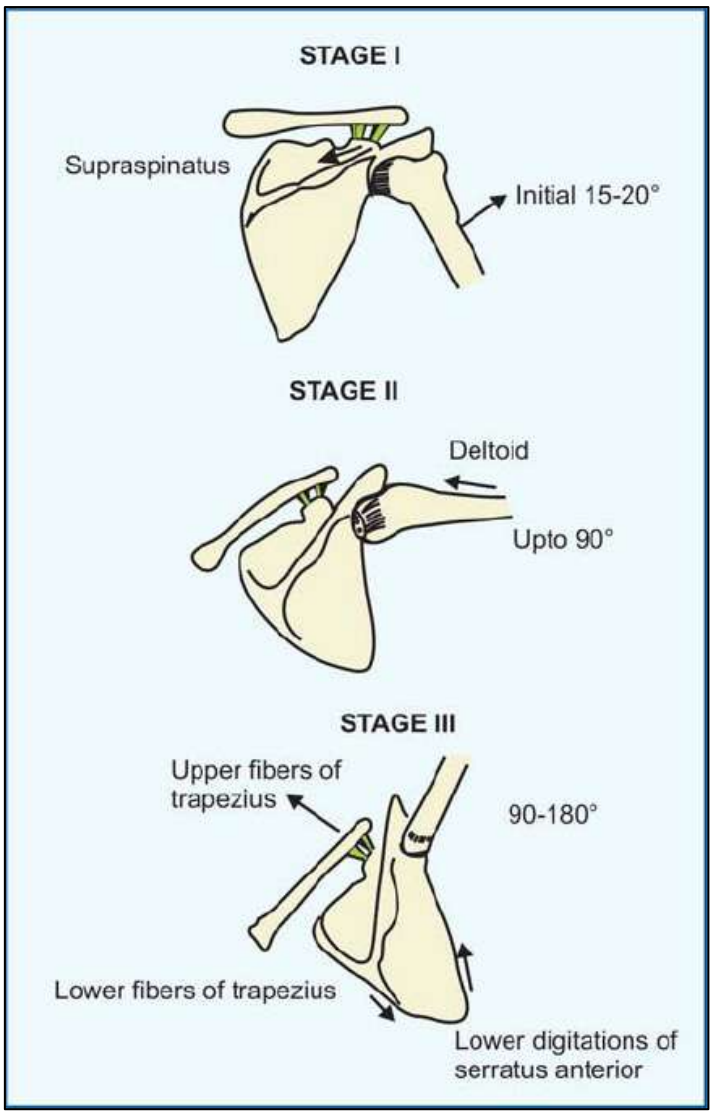
Muscle	Origin	Insertion	Nerve Supply	Action
Supraspinatus muscle	Supraspinous fossa	Greater tubercle (superior facet)	Suprascapular nerve (C5–C6)	Initiates abduction (0–15°)
Infraspinatus muscle	Infraspinous fossa	Greater tubercle (middle facet)	Suprascapular nerve (C5–C6)	Lateral rotation
Teres minor muscle	Lateral border of scapula	Greater tubercle (inferior facet)	Axillary nerve (C5–C6)	Lateral rotation
Subscapularis muscle	Subscapular fossa	Lesser tubercle	Upper & lower subscapular nerves (C5–C7)	Medial rotation

(1.5)Describe the mechanism of shoulder abduction.

Abduction occurs in stages:

- 0–15° → Supraspinatus
- 15–90° → Deltoid
- 90–180° → Trapezius + Serratus anterior (scapular rotation)

This coordinated movement is called **scapulohumeral rhythm**.

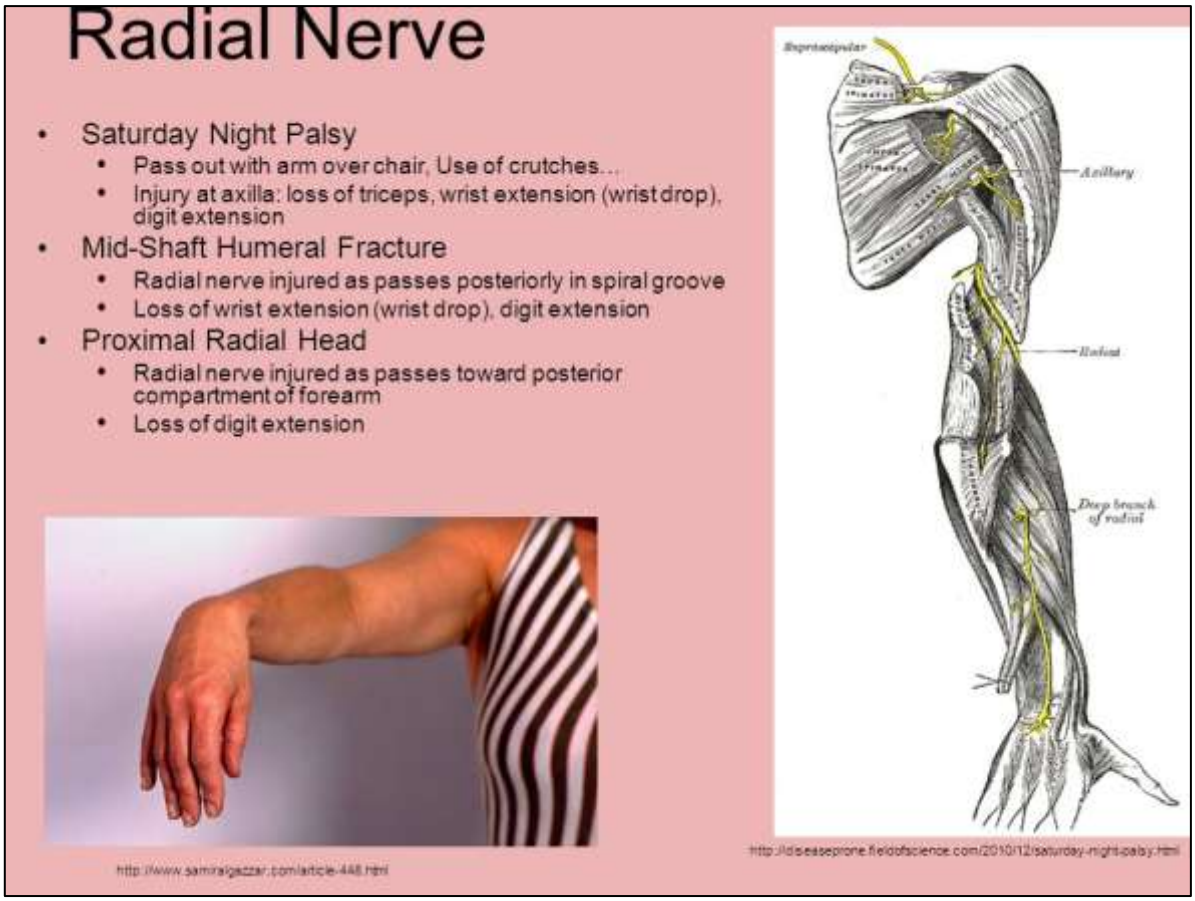


(2)

(2.1) A patient sustained a mid-shaft fracture of the humerus following a fall. On examination, he was found to have a wrist drop, but could extend the elbow joint against resistance.

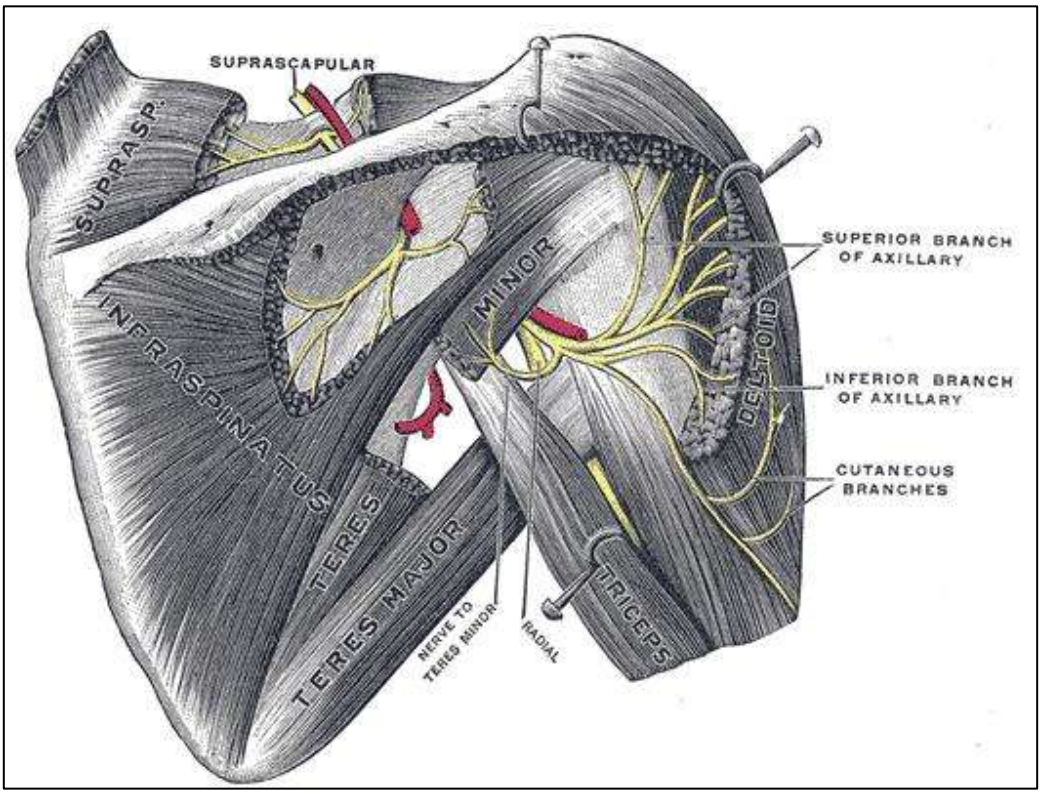
- Radial nerve damage can result from a mid-shaft fracture of the humerus as the radial nerve **runs through the radial groove of the humerus**.
- **All the extensor muscles** of the forearm and arm are innervated by the radial nerve.
- The extension of wrist joint is done by extensor carpi radialis longus and brevis, extensor carpi ulnaris and extensor digitorum.
- As a result of damage to the radial nerve at mid-shaft of the humerus, these muscles get paralyzed and the **wrist drop** occurs as a result of the **unopposed action** of the muscles in the **flexor compartment** of the forearm.
- The **extension of the elbow** joint is mainly done by the **triceps** brachii muscle which is a combination of long, medial, and lateral heads.

- **In the axilla, the radial nerve gives off branches to the long and medial** head of the triceps before it enters the radial groove.
- So the **impairment of the extension of the elbow joint does not occur** in the damage of the mid-shaft of the humerus.



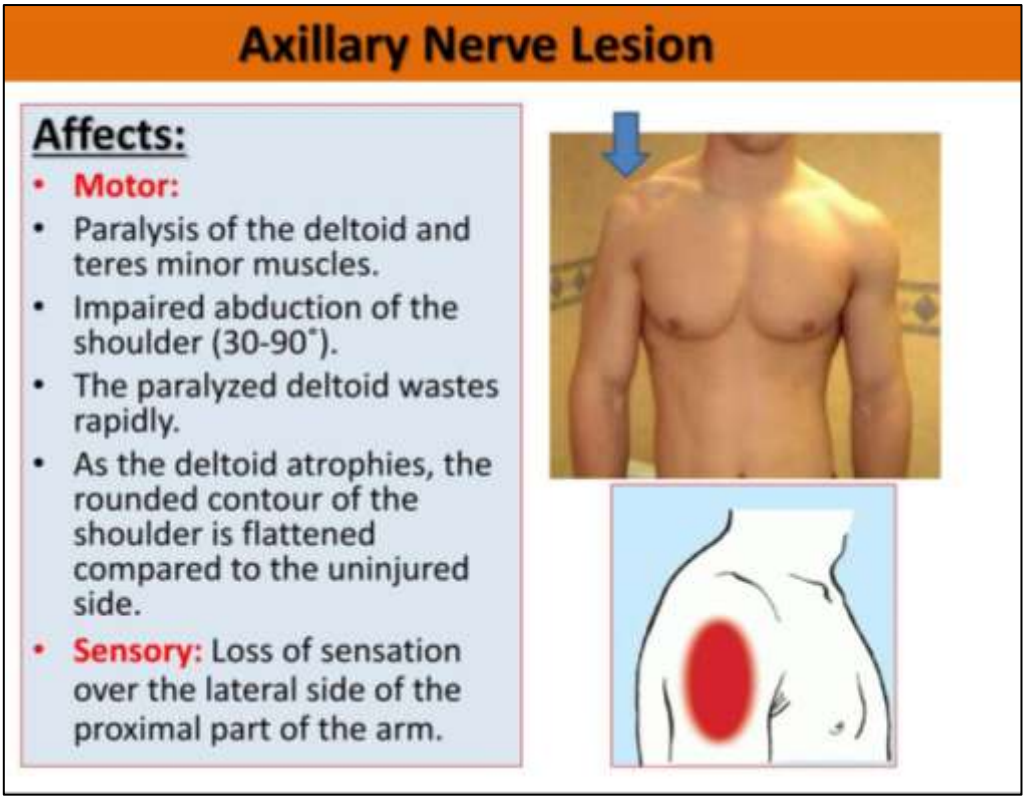
(2.2) Describe the origin, course and distribution of the axillary nerve, emphasizing the anatomical basis of the nerve injury in this patient.

- The axillary nerve is a large branch originating from the **posterior cord** of the brachial plexus.
- The posterior chord is formed by the union of the **3 posterior divisions of all 3 trunks** of the plexus.
- The nerve contains supply from the nerve roots of **C5 and C6**.
- It initially lies **behind the axillary artery** and **passes** posteriorly **through** the **quadrangular space** bounded by the subscapularis muscle above, and the teres major below, the long head of triceps brachii medially and the surgical neck of the humerus laterally.
- It emerges at the back of the axilla below the teres minor and gives a twig to the **shoulder joint.**
- The **anterior branch** in contact with the humeral periosteum supplies the deep surface of the **deltoid** and a few twigs supply the **skin over the deltoid.**
- Anterior branch **wind around the surgical neck of humerus alone** with posterior circumflex humeral artery.
- Therefore, more prone to getting **damaged during surgical neck fracture.**
- The **posterior branch** supplies the **teres minor** and the deltoid and finally winds around the posterior border of the deltoid to become the upper lateral cutaneous nerve of the arm.
- The axillary nerve has **no supply in the axilla.**



(2.3) Describe the symptoms and examination findings of axillary neve injury that can be observed in this patient.

- If the axillary nerve is injured, both the **deltoid muscle and the teres minor** muscle will be paralyzed.
- This will lead to **wasting of the deltoid** causing flattening of the bulge of the shoulder **exposing the acromion process and the greater tubercle of the humerus**.
- There will also be wasting of the teres minor muscle.
- Hence, abduction of the arm will be impossible although **initiation of abduction to about 15^0 may be possible** due to the supraspinatus muscle being unaffected, but this will also be very weak as the supraspinatus functions as a synergist in shoulder abduction and **deltoid acts as a prime mover.**
- The patient may also have **weakness of lateral rotation of the arm** and slight **instability of the shoulder joint** due to paralysis of the teres minor muscle, but this **may not be evident** upon clinical examination as other muscles compensate for its functions.
- There will be **sensory loss over the upper lateral region of the arm** which can usually be isolated to a badge like area, hence known as "**the badge deformity".**
- There will be sensory loss mostly over the deltoid muscle.
- A patient who suffered fracture of the surgical neck of the humerus may have an axillary nerve palsy even six months after the fracture because of neurotmesis or axonotmesis of the nerve or because of poor blood supply to this region of the humerus which may have resulted in fibrosis of the bone and resultant compression of the overlying axillary nerve.



SGD 02 – Female Breast

(1) A 45-year-old woman presents with a painless lump in the upper outer quadrant of her right breast. On examination, there is slight skin dimpling and a palpable axillary lymph node.

(1.1) Describe the anatomical structure of the breast. (20 marks)
(1.2) Describe the lymphatic drainage of the breast. (20 marks)
(1.3) Explain the anatomical basis of the clinical signs in this patient. (60 marks)

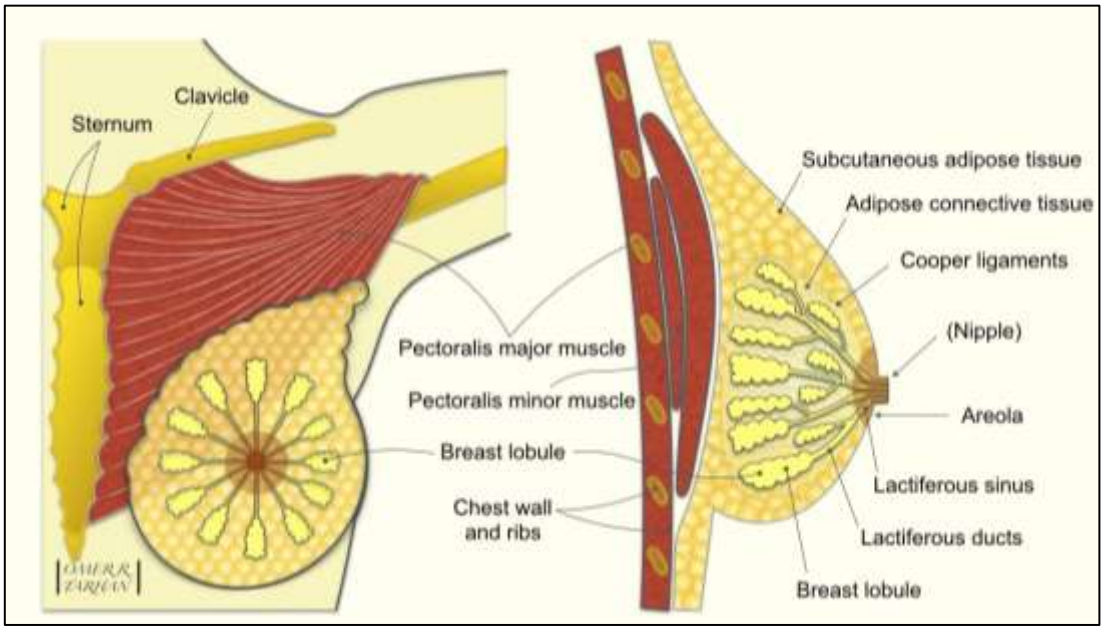
(2) Describe the arterial supply of the breast. (100 marks)

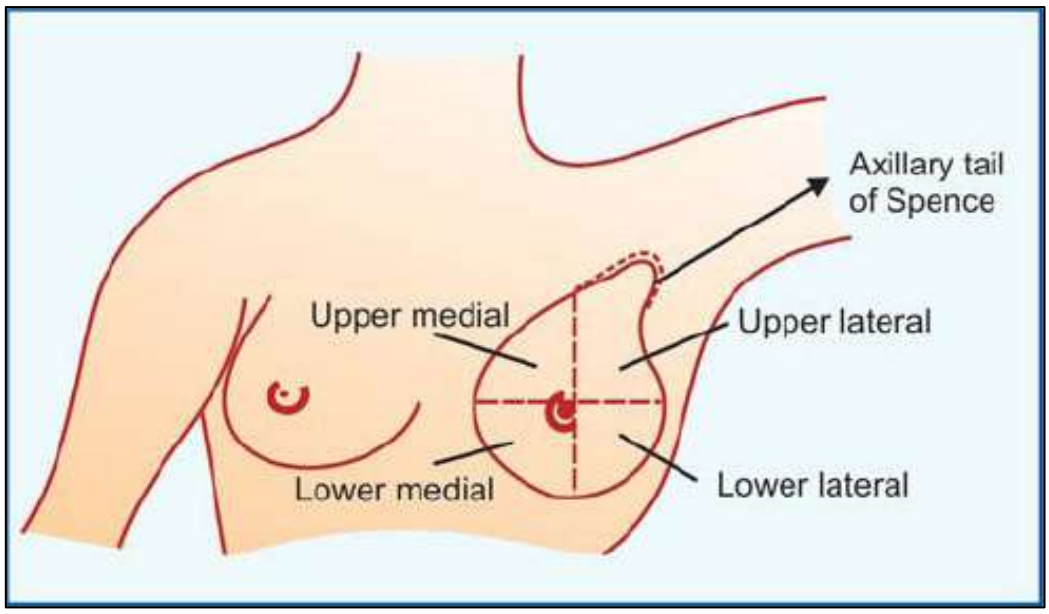
SGD 02 – Female Breast Answers

(1)

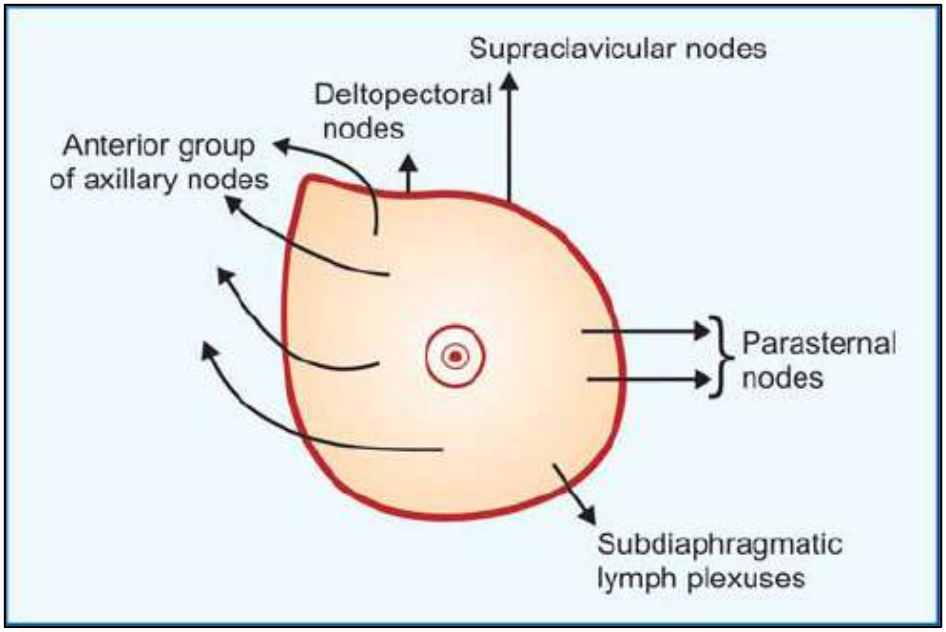
(1.1) Describe the anatomical structure of the breast.

- The breast is a modified sweat gland located in the superficial fascia of the anterior chest wall.
- Extends vertically from the 2nd to 6th ribs and horizontally from the lateral border of sternum to mid-axillary line.
- Has an axillary tail (of Spence) extending into the axilla.
- Composed of:
    - 15–20 lobes, each drained by a lactiferous duct
    - Ducts open at the nipple
- Areola: Pigmented area around the nipple containing sebaceous glands.
- Suspensory ligaments (of Cooper): Fibrous bands supporting the breast.
- Lies on:
    - Pectoralis major (2/3)
    - Serratus anterior (1/3)
- Separated from deep fascia by the retromammary space (allows mobility).



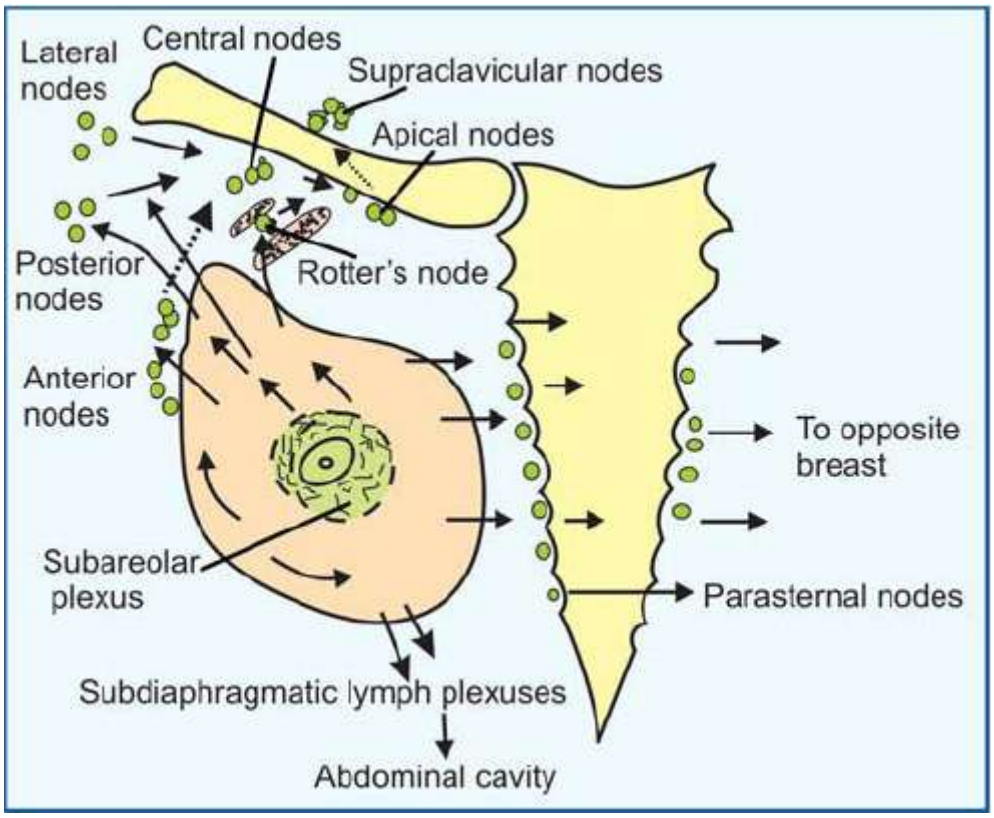


(1.2) Describe the lymphatic drainage of the breast.



- About 75% of the lymph from the breast drains into the axillary nodes, 20% into the internal thoracic nodes, and the remaining 5% into the posterior intercostal nodes.
- The lateral quadrant of the breast drains to anterior axillary group of nodes. (Situated just posterior to the lower border of pec minor.)
- Among the axillary nodes, most drain to anterior group and some into posterior and apical groups.
- Lymph from the anterior and posterior groups drains into central and lateral groups and then into apical and finally into supraclavicular nodes.

- Medial quadrants into parasternal (internal thoracic) nodes. (Situated along the course of internal thoracic artery.)
- Few follow the posterior intercostal arteries and drain posteriorly into posterior intercostal nodes.
- Some lymphatics communicate with the opposite breast.
- Inferior quadrants drain into abdominal (subdiaphragmatic) nodes.



(1.3) Explain the anatomical basis of the clinical signs in this patient.

- **Upper outer quadrant lump:**
  - Most breast cancers occur here due to greater glandular tissue and proximity to axillary tail.
- **Skin dimpling:**
  - Caused by involvement and shortening of suspensory ligaments (Cooper's ligaments).
- **Axillary lymph node enlargement:**
  - Due to spread via lymphatic drainage to axillary nodes.
- Additional related signs (if present):
  - **Peau d'orange:** Edema due to lymphatic obstruction.
  - **Nipple retraction:** Fibrosis of lactiferous ducts.


Notice a dimple on your breast?
Don't ignore it!



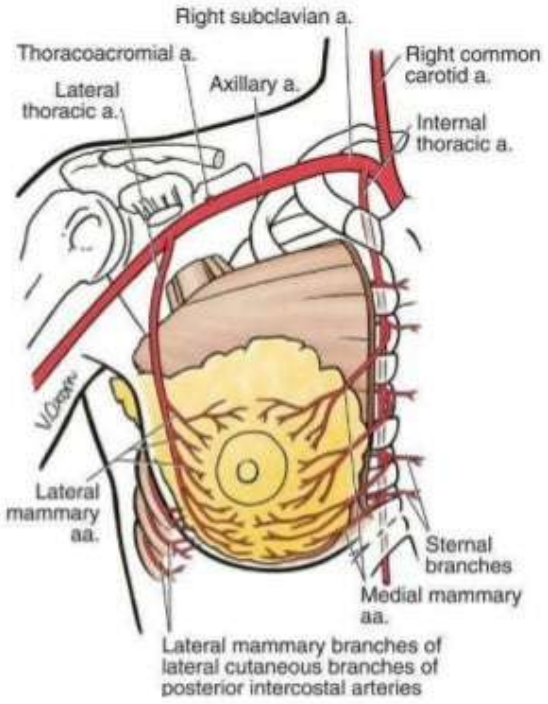


(2) Describe the arterial supply of the breast.

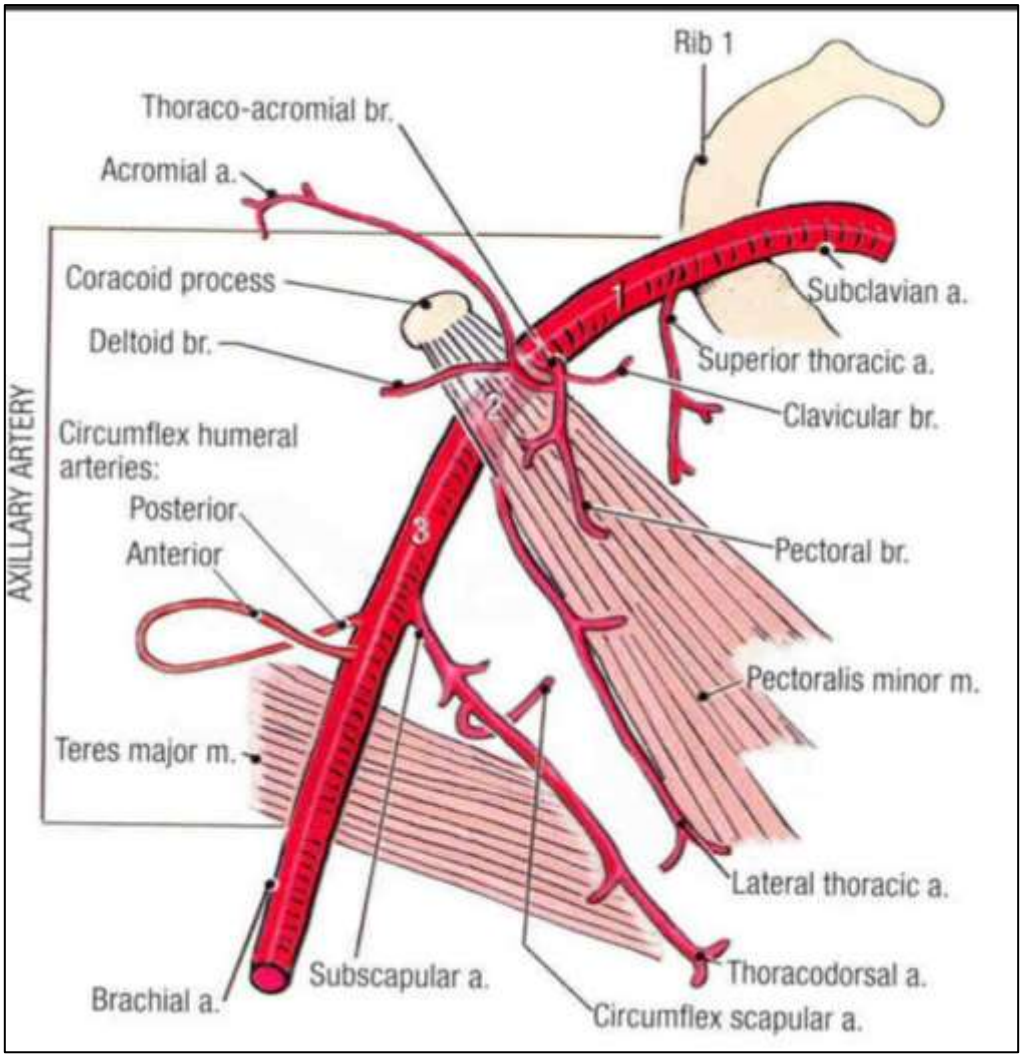
- The breasts are supplied by branches of the **axillary artery, the internal thoracic artery,** and **some intercostal arteries.**
- The **axillary artery** supplies blood via the
  - **superior thoracic artery**,
  - the pectoral branches of the **thoracoacromial** artery
  - **lateral thoracic artery** (via branches which curve around the lateral border of pectoralis major to supply the lateral aspect of the breast)
  - **subscapular artery**.
- The **internal thoracic artery** supplies perforating branches to the **anteromedial** part of the breast.
- The **second to fourth anterior intercostal arteries** supply **perforatin**g branches more laterally in the anterior thorax
  - **The second perforating** artery is usually the **largest**, and supplies the upper region of the breast, and the nipple, areola and adjacent breast tissue.

Blood Supply

- Axillary artery
  - Superior thoracic
  - Thoracoacromial artery
  - Lateral thoracic artery
  - Subscapular artery.
- Internal thoracic:
  - Perforating branches to the anteromedial breast.
- The second to fourth anterior intercostal arteries.
  - The second perforating artery is usually the largest; supplies the upper region of the breast, the nipple, areola and adjacent breast.



Posterior surface is relatively avascular.


Rib 1
Thoraco-acromial br.
Acromial a.
Coracoid process
Deltoid br.
AXILLARY ARTERY
Circumflex humeral arteries:
Posterior
Anterior
Teres major m.
Brachial a.
Subscapular a.
Circumflex scapular a.
Thoracodorsal a.
Lateral thoracic a.
Pectoralis minor m.
Pectoral br.
Clavicular br.
Superior thoracic a.
Subclavian a.
1
2
3

SGD 03 - Mediastinum

(1)

(1.1) Define term mediastinum. (10 Marks)

(1.2) Explain how it is divided into parts. (40 Marks)

(1.3) List the contents of each part of the mediastinum. (50 Marks)

(2) A chest radiograph of a newborn baby has revealed a large defect on the left side of the diaphragm; abdominal viscera have entered the thorax through this defect. The baby was diagnosed to have a congenital diaphragmatic hernia.

(2.1) Name two abdominal viscera that you would expect to observe in the thoracic cavity of this baby. (20 Marks)

(2.2) Describe origin, insertion, blood supply and innervation of the diaphragm. (40 Marks)

(2.3) State the openings of the diaphragm and the structures passing through them. (40 Marks)

SGD 03 – Mediastinum Answers

(1)

(1.1) Define term mediastinum.

Mediastinum is the space between the two pleural sacs bounded anteriorly by the sternum and posteriorly by the thoracic vertebral column and extending vertically from the thoracic inlet to the diaphragm.

(1.2) Explain how it is divided into parts.

Horizontal plane passing through the sternal angle & T4/T5 junction divides it into superior and inferior mediastinum.

Inferior mediastinum again divides into anterior middle posterior parts by fibrous pericardium.

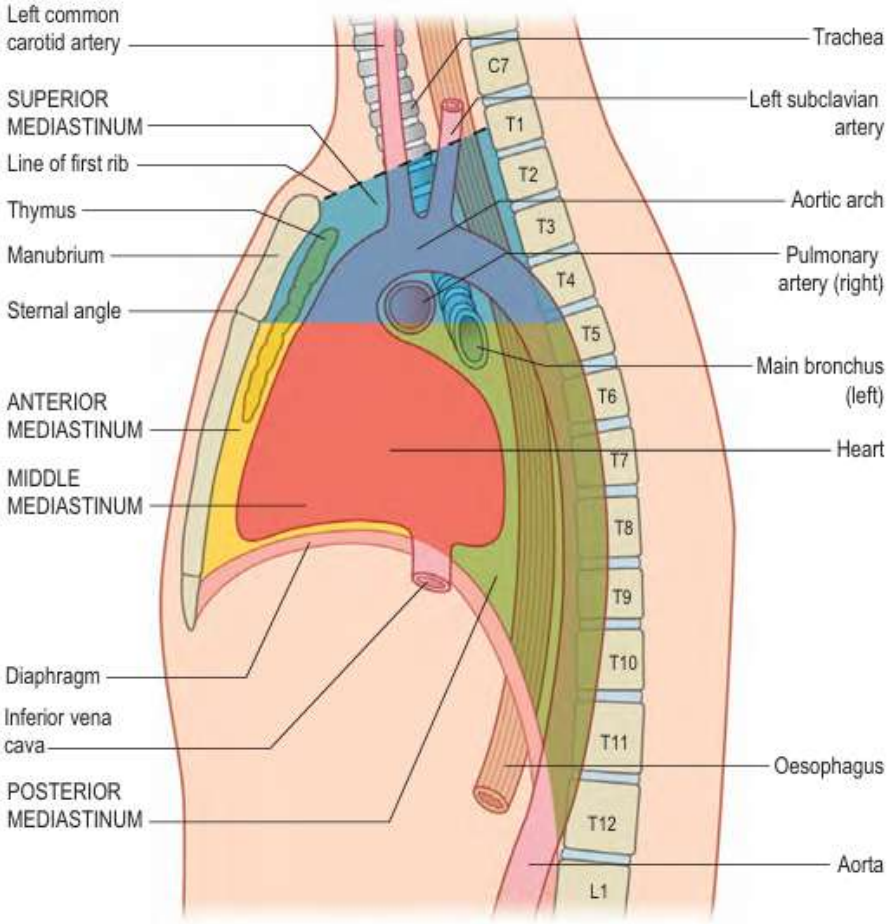
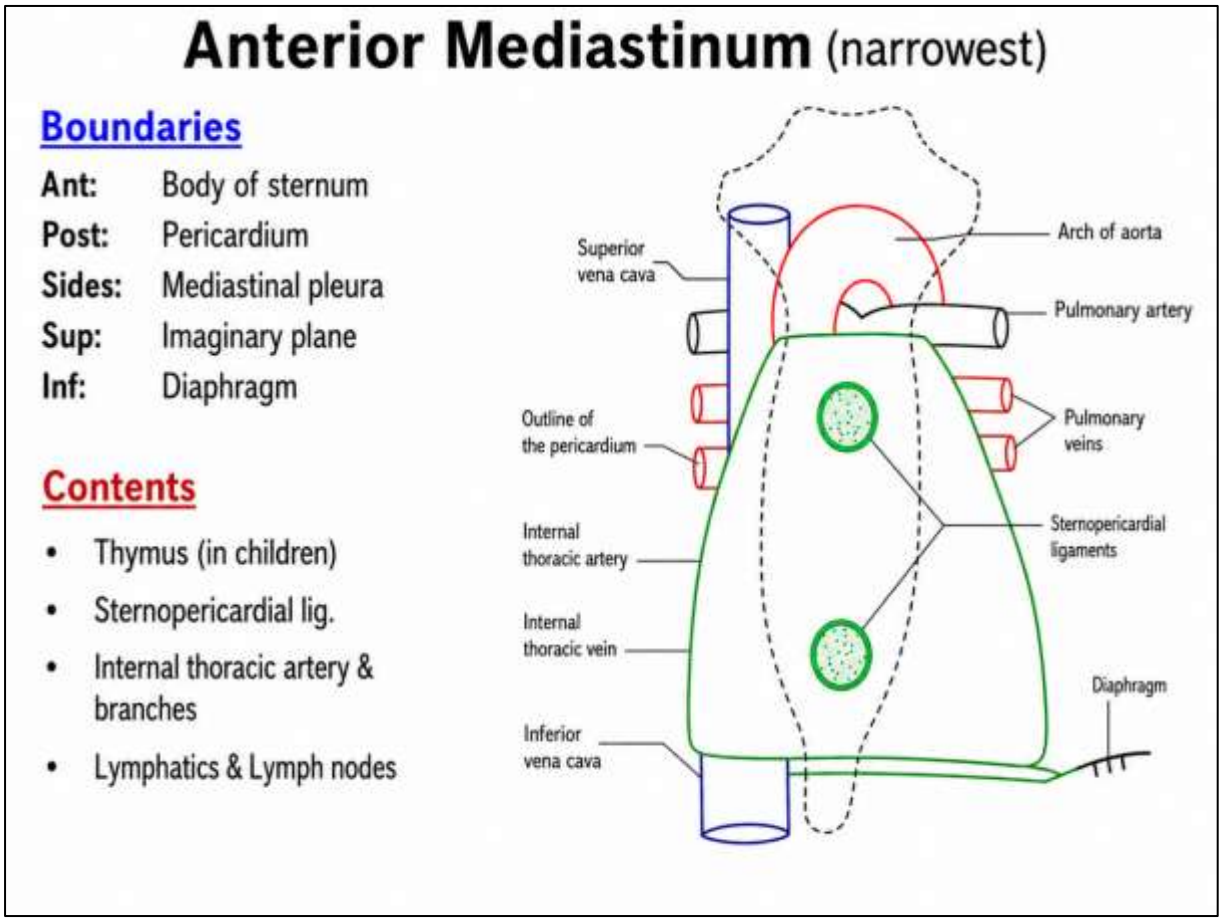
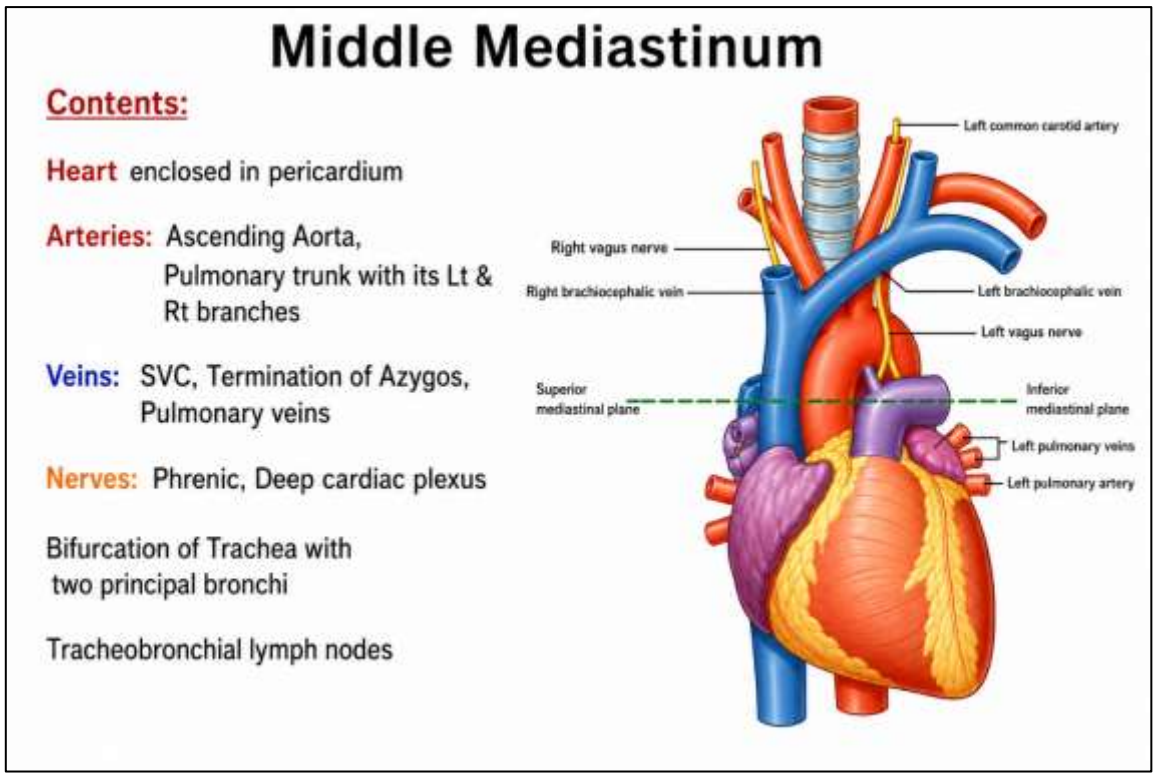


Fig. 55.1 The major divisions of the mediastinum (see text for further details). Note that not all mediastinal contents are depicted.

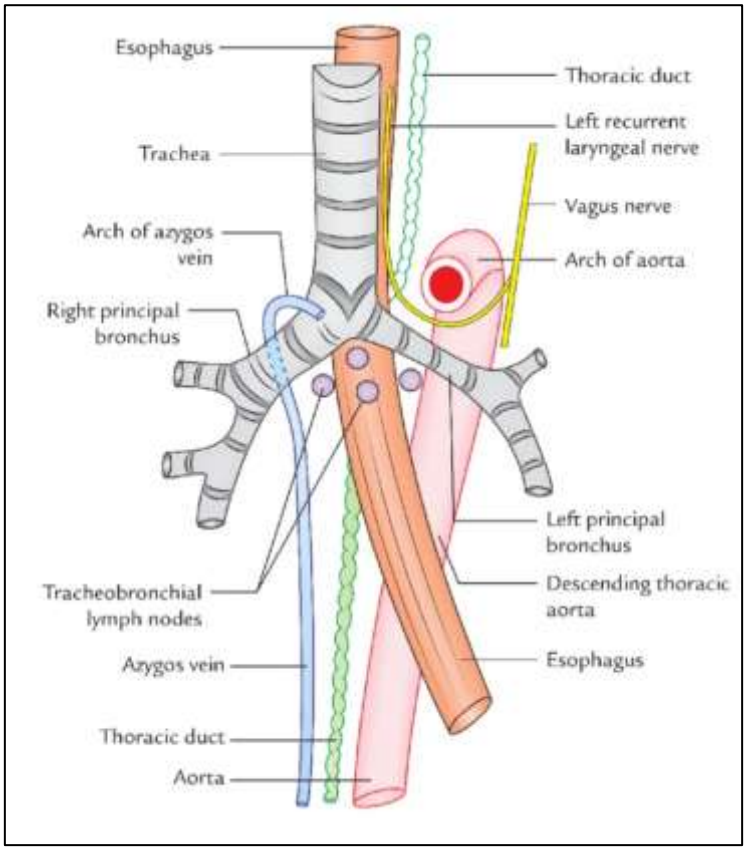
Anterior mediastinum - loose connective tissue, the sternopericardial ligaments, a few lymph nodes and the mediastinal branches of the internal thoracic artery. The anterior mediastinum may sometimes contain part of the thymus gland.



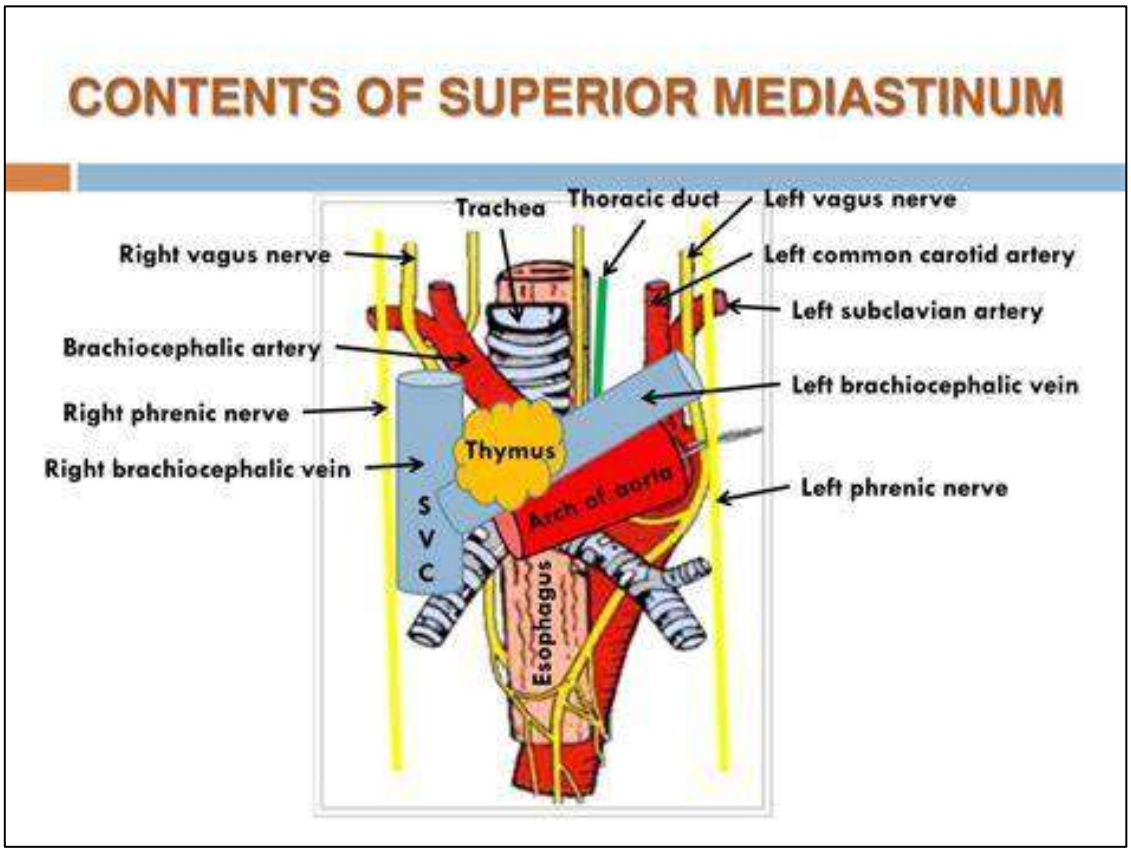
Middle mediastinum - pericardium, the heart and the ascending aorta; the lower half of the superior vena cava receiving the azygos venous arch posteriorly; the tracheal bifurcation and both main bronchi; the pulmonary trunk and right and left pulmonary arteries and veins; the right and left phrenic nerves; the deep part of the cardiac plexus; the tracheobronchial lymph nodes.



Posterior mediastinum - descending thoracic aorta and the azygos, hemiazygos and accessory azygos veins; the right and left sympathetic chains, the splanchnic nerves and the right and left vagi; the oesophagus; the thoracic duct and posterior mediastinal lymph nodes.



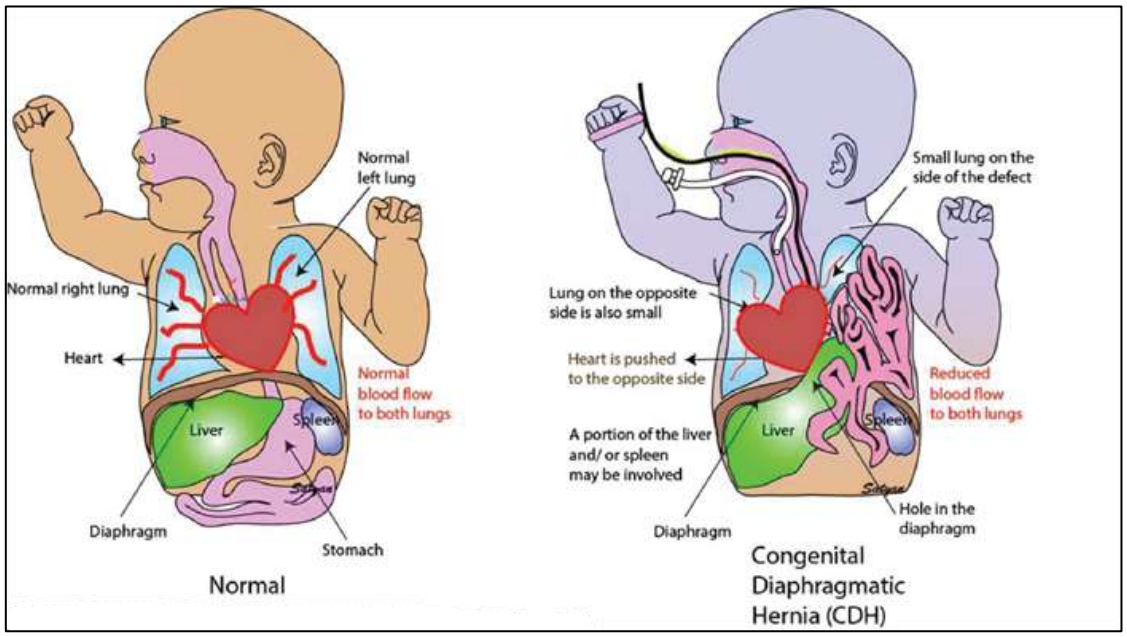
Superior mediastinum - the lower ends of sternohyoid, sternothyroid and longus colli; thymic remnants; the internal thoracic arteries and veins, the brachiocephalic veins and the upper half of the superior vena cava, the aortic arch, the brachiocephalic, left common carotid and subclavian arteries and the left superior intercostal vein; the right and left vagi and phrenic nerves, the left recurrent laryngeal nerve, the cardiac nerves and the superficial part of the cardiac plexus; the trachea, oesophagus and thoracic duct. It also contains the paratracheal, brachiocephalic and tracheobronchial lymph nodes associated with their named structures.



(2)

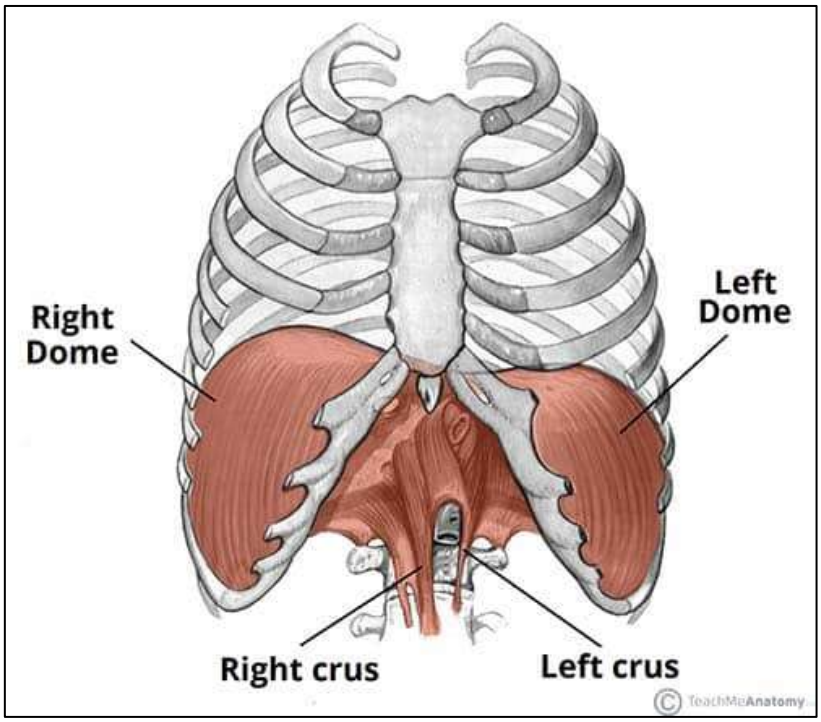
(2.1) Name two abdominal viscera that you would expect to observe in the thoracic cavity of this baby.

Stomach
Spleen
Intestinal loops
Parts of the liver





(2.2) Describe origin, insertion, blood supply and innervation of the diaphragm



The diaphragm is a dome-shaped musculotendinous structure that separates the thoracic and abdominal cavities and plays a major role in respiration.

- **Origin**

The diaphragm arises from three parts:

1. Sternal part
- Posterior surface of xiphoid process

2. Costal part
- Inner surfaces of lower six ribs and their costal cartilages (7th–12th ribs)

3. Lumbar part

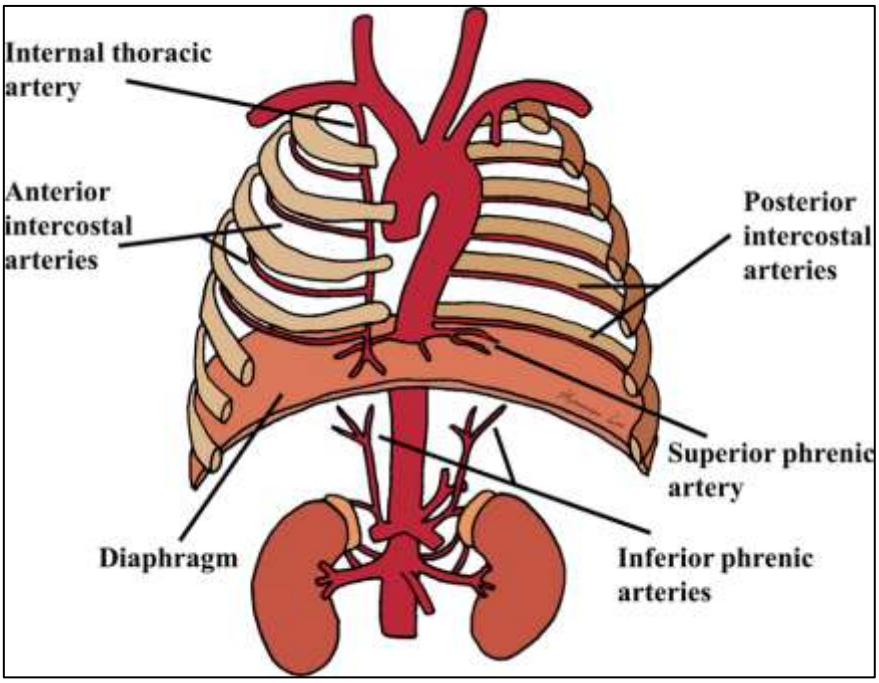
Arises from lumbar vertebrae via:
- Right crus: bodies and intervertebral discs of L1–L3
- Left crus: bodies and intervertebral discs of L1–L2
- Arcuate ligaments:
  - Medial arcuate ligament (over psoas major)
  - Lateral arcuate ligament (over quadratus lumborum)
  - Median arcuate ligament (joins the two crura)

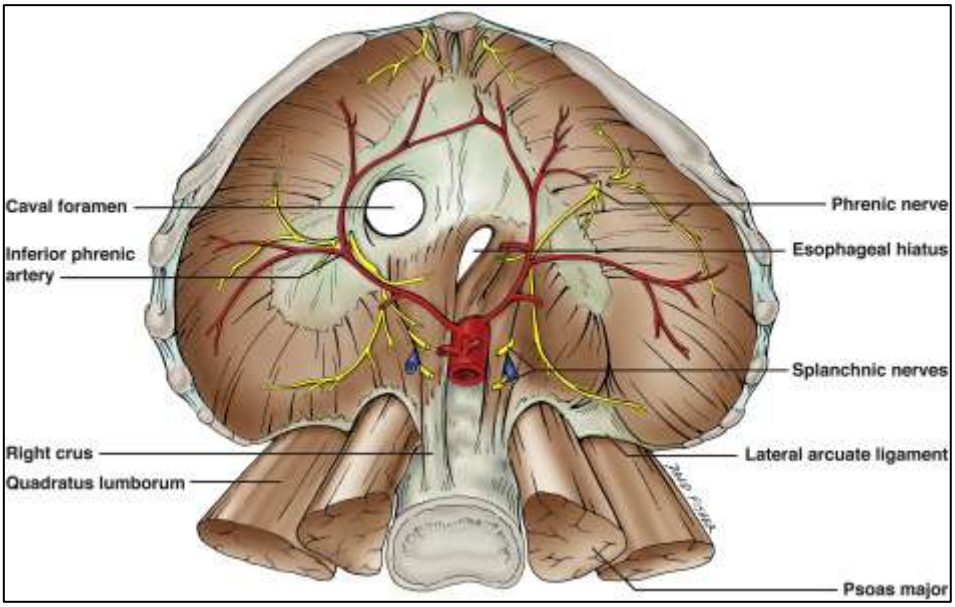
- **Insertion**
- All muscle fibers converge to a central tendon.
- The central tendon is fused with the fibrous pericardium.

- **Blood Supply**

Arterial supply:

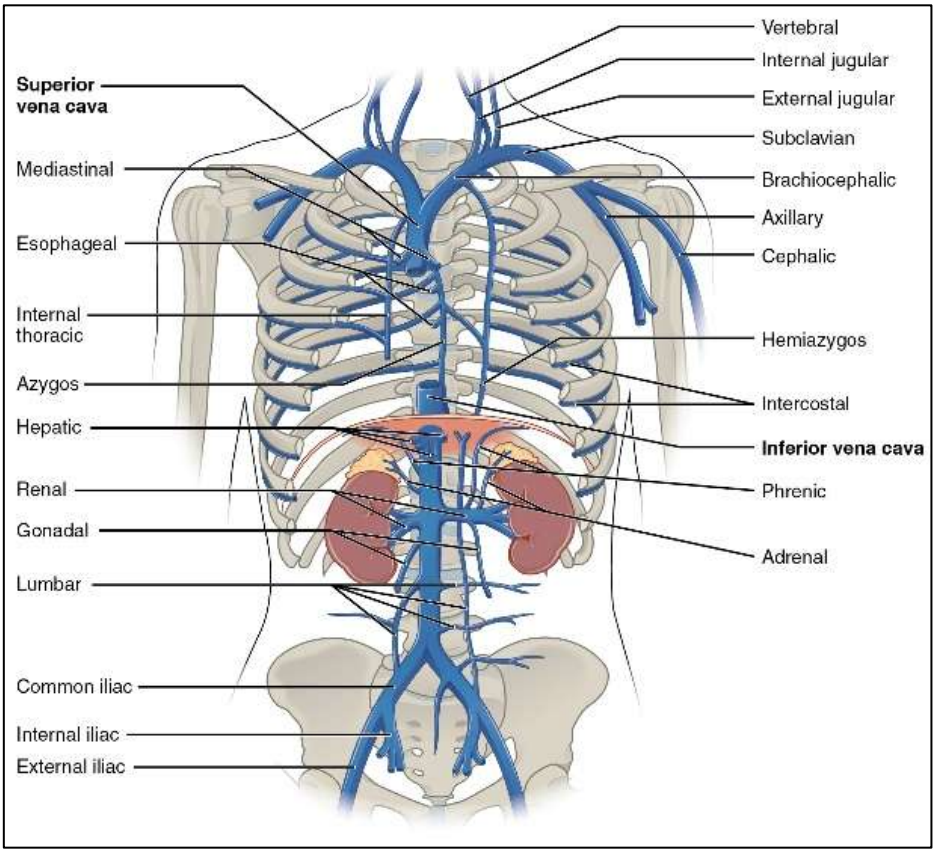
- Pericardiacophrenic artery
- Musculophrenic artery
- Superior phrenic arteries
- Inferior phrenic arteries
- Lower Intercostal & Subcostal Arteries

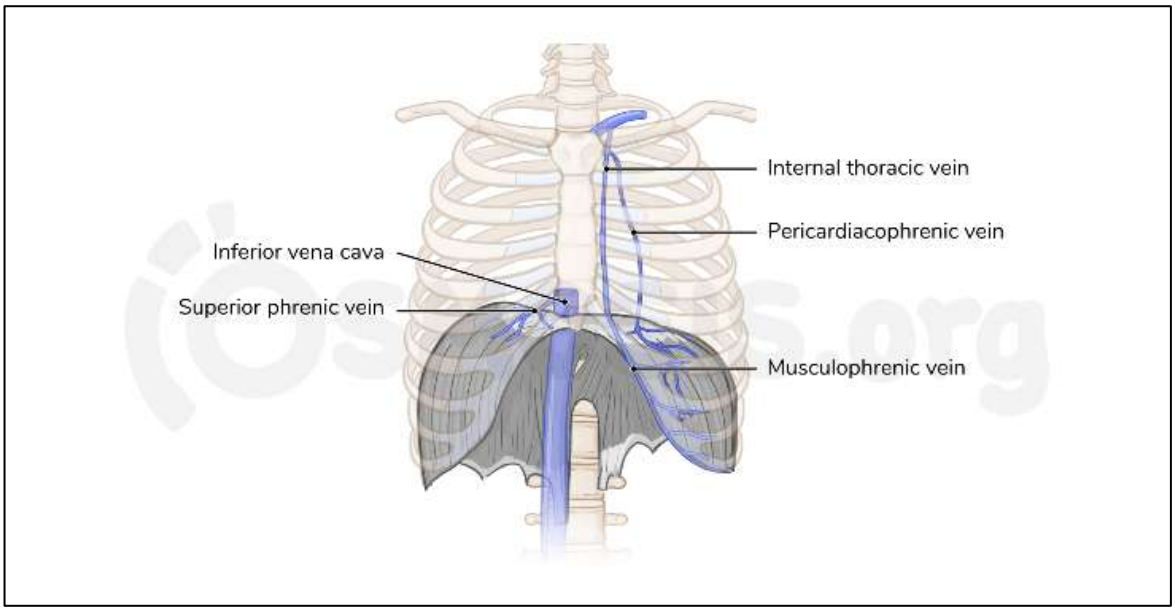




Venous drainage:

- Corresponding veins drain into:
    - Internal thoracic veins
    - Azygos system
    - Inferior vena cava





- **Nerve Supply**

Motor supply

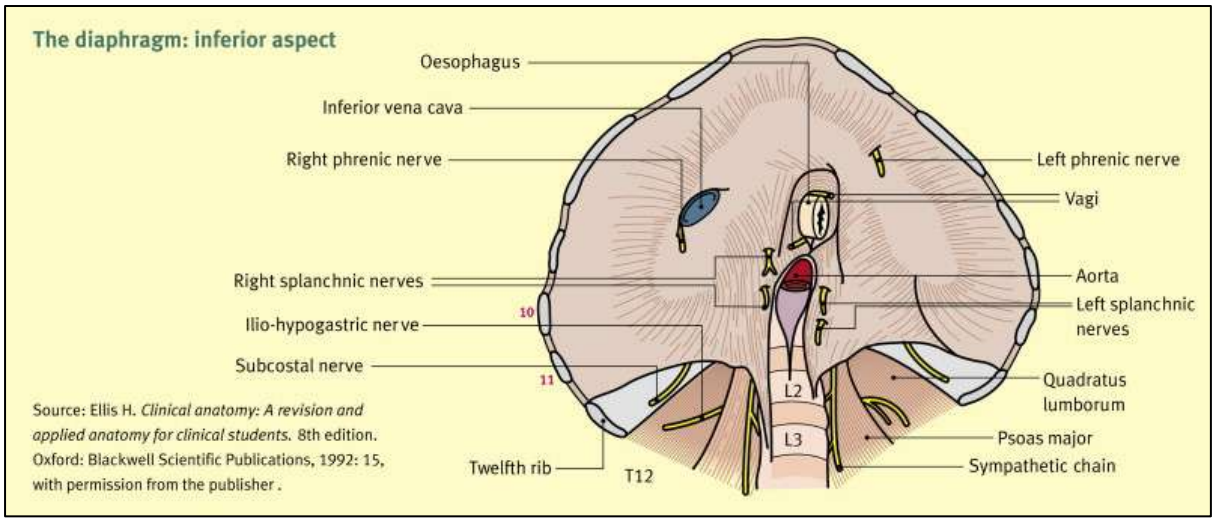
- Phrenic nerve (C3, C4, C5)

Sensory supply

- Central part: phrenic nerve
- Peripheral part: lower intercostal nerves (T7–T12)

The diaphragm is the principal muscle of respiration, supplied mainly by the phrenic nerve and supported by a strong musculotendinous structure.

(2.3) State the openings of the diaphragm and the structures passing through them



The diaphragm has three major openings that allow structures to pass between the thorax and abdomen.

1. **Caval opening (T8 level)**

   Located in the central tendon.

   Structures passing through:

   - Inferior vena cava
   - Terminal branches of right phrenic nerve

2. **Esophageal opening (T10 level)**

   Located in the muscular part (right crus).

   Structures passing through:

   - Esophagus
   - Anterior and posterior vagal trunks
   - Esophageal branches of left gastric vessels

3. Aortic opening (T12 level)

Located posterior to the diaphragm between the crura (under median arcuate ligament).

Structures passing through:

- Aorta
- Thoracic duct
- Azygos vein

Mnemonic

“I 8 10 Eggs At 12”

- IVC → T8
- Esophagus → T10
- Aorta → T12

SGD 04 – Blood Supply of the Lung

(1) A 58-year-old male patient with chronic lung disease is being evaluated before thoracic surgery. During the discussion, the surgeon emphasizes the importance of understanding the vascular supply of the lungs and airways to avoid intraoperative complications.

(1.1) Describe the arterial blood supply of the respiratory system under the following headings. (75 Marks)

(A) Pulmonary circulation.

(B) Bronchial circulation.

(C) Differences between pulmonary and bronchial arteries.

(1.2) Describe the venous drainage of the respiratory system. (25 Marks)

(2)

(2.1) Describe the innervation of the lungs and visceral pleura. (50 Marks)

(2.2) What is the effect of vagus nerve stimulation on the bronchi? (10 Marks)

(2.3) What happens if sympathetic activity increases in the lungs? (10 Marks)

(2.4) Explain the anatomical basis for the use of bronchodilator drugs in bronchial asthma. (30 Marks)

SGD 04 – Blood Supply of the Lung Answers

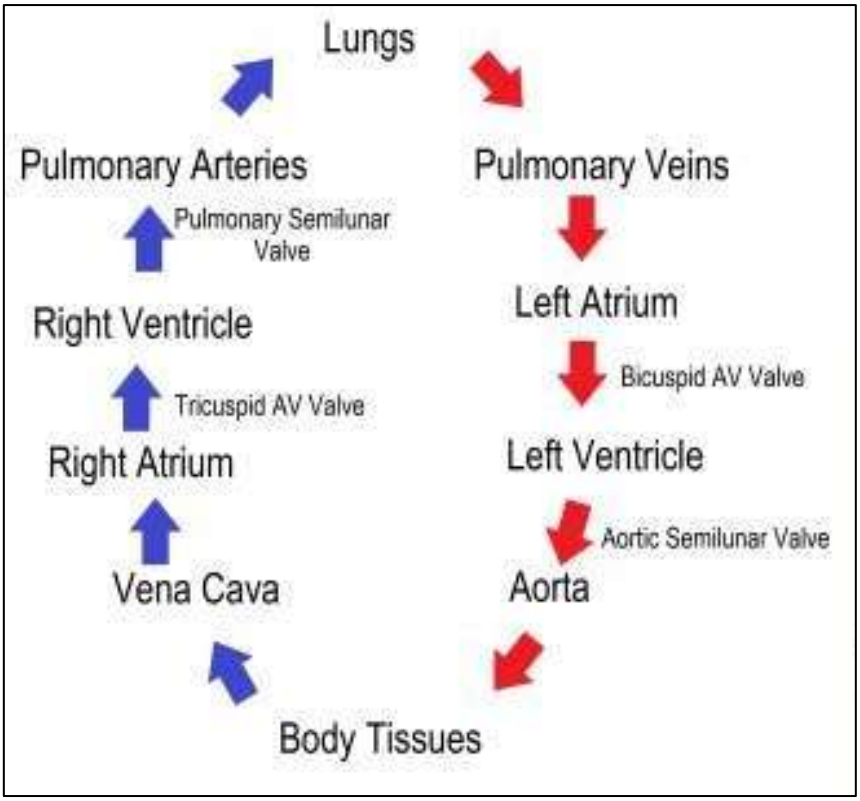
(1)

(1.1) Describe the arterial blood supply of the respiratory system under the following headings.

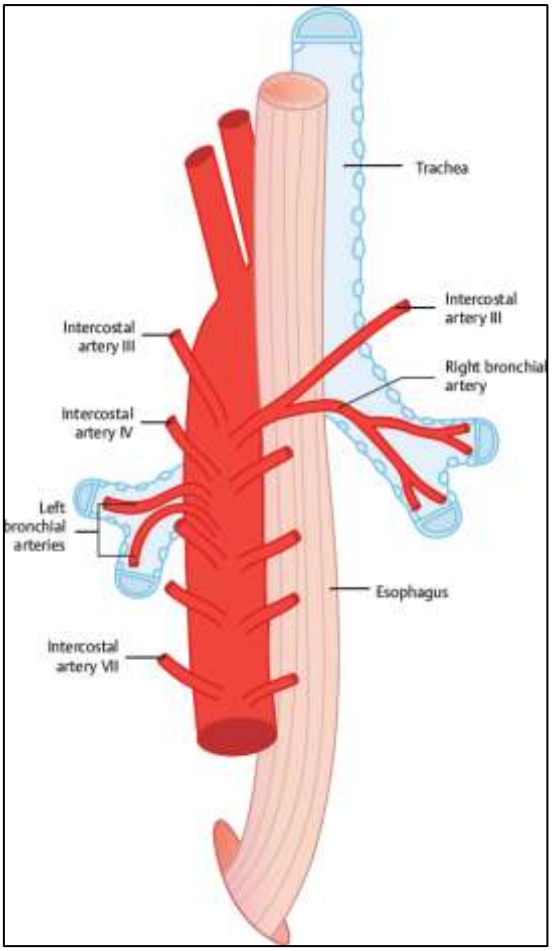
(A) Pulmonary circulation

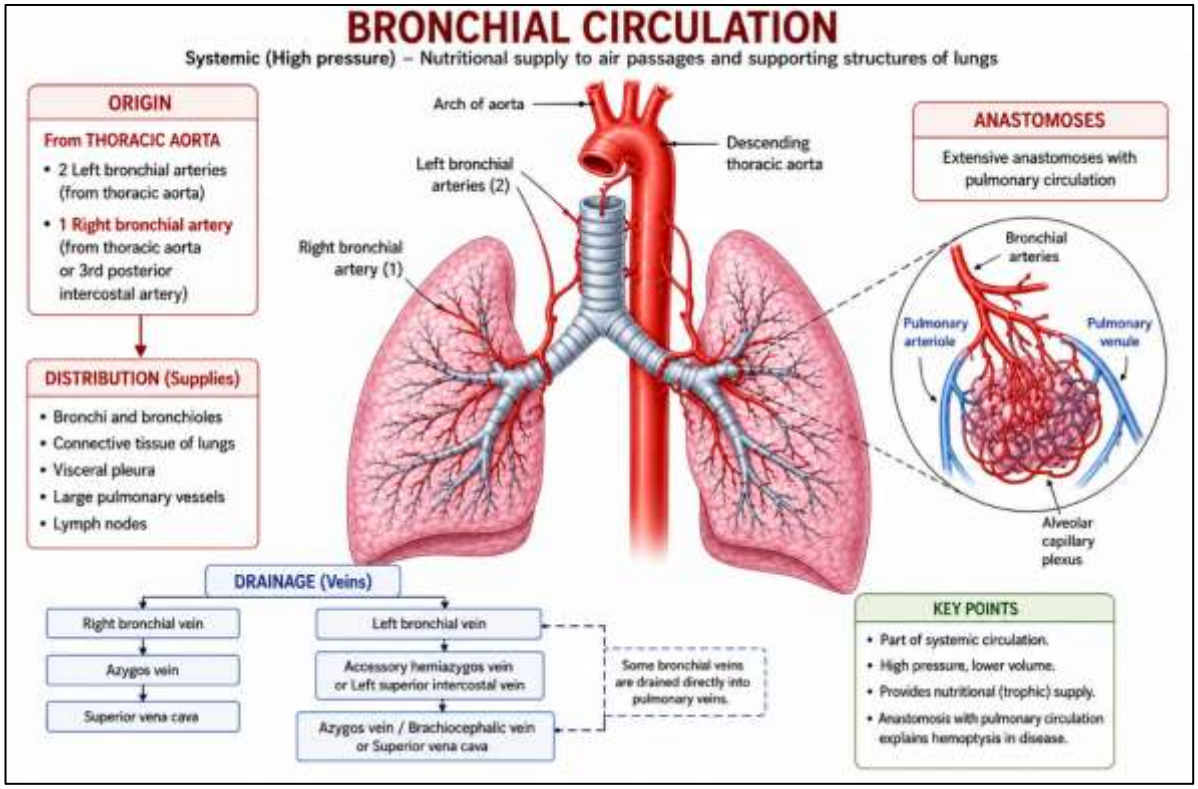
- Pulmonary trunk arises from right ventricle.
- Divides into right and left pulmonary arteries.
- Carry deoxygenated blood to lungs.
- Pulmonary arteries accompany bronchi.
- Form capillary network around alveoli for gas exchange.
- Oxygenated blood returns through pulmonary veins to left atrium.

(B) Bronchial circulation



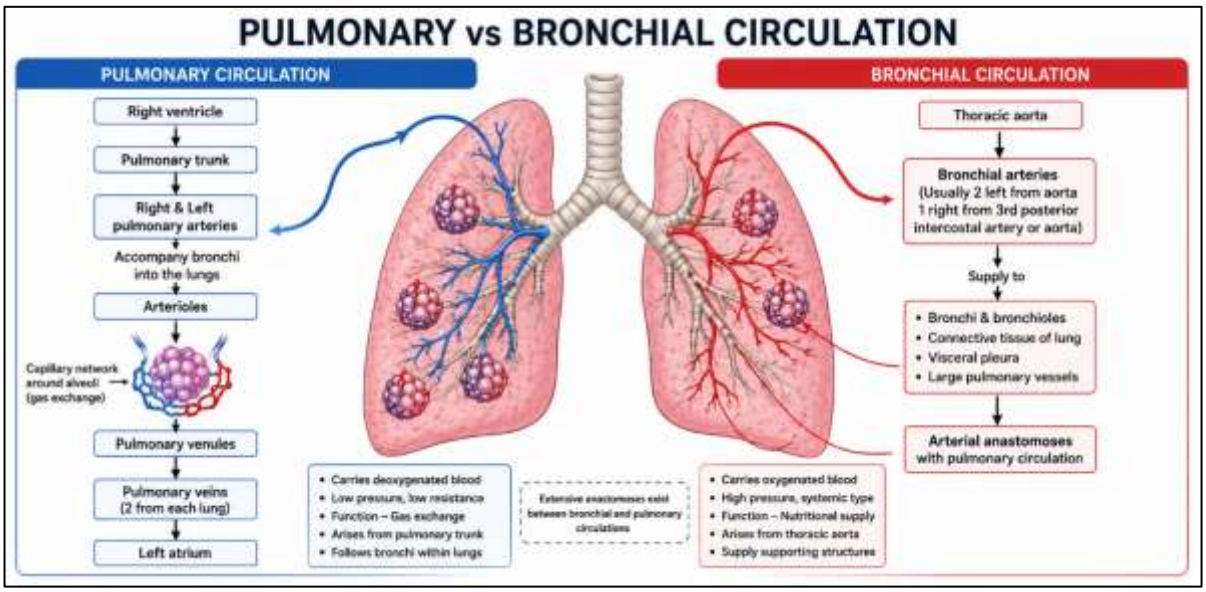
- Part of systemic circulation.
- Bronchial arteries usually arise from thoracic aorta.
- Typically,
  Two left bronchial arteries from thoracic aorta.
  One right bronchial artery from 3rd posterior intercostal artery or aorta.
- Supply,
  Bronchi and bronchioles Connective tissue of lungs Visceral pleura
  Large pulmonary vessels
- Anastomose with pulmonary circulation.


Trachea
Intercostal artery III
Right bronchial artery
Intercostal artery III
Intercostal artery IV
Left bronchial arteries
Esophagus
Intercostal artery VII


BRONCHIAL CIRCULATION
Systemic (High pressure) – Nutritional supply to air passages and supporting structures of lungs
ORIGIN
From THORACIC AORTA
• 2 Left bronchial arteries (from thoracic aorta)
• 1 Right bronchial artery (from thoracic aorta or 3rd posterior intercostal artery)
DISTRIBUTION (Supplies)
• Bronchi and bronchioles
• Connective tissue of lungs
• Visceral pleura
• Large pulmonary vessels
• Lymph nodes
Arch of aorta
Descending thoracic aorta
Left bronchial arteries (2)
Right bronchial artery (1)
ANASTOMOSES
Extensive anastomoses with pulmonary circulation
Bronchial arteries
Pulmonary arteriole
Pulmonary venule
Alveolar capillary plexus
DRAINAGE (Veins)
Right bronchial vein
Azygos vein
Superior vena cava
Left bronchial vein
Accessory hemiazygos vein or Left superior intercostal vein
Azygos vein / Brachiocephalic vein or Superior vena cava
Some bronchial veins are drained directly into pulmonary veins.
KEY POINTS
• Part of systemic circulation.
• High pressure, lower volume.
• Provides nutritional (trophic) supply.
• Anastomosis with pulmonary circulation explains hemoptysis in disease.

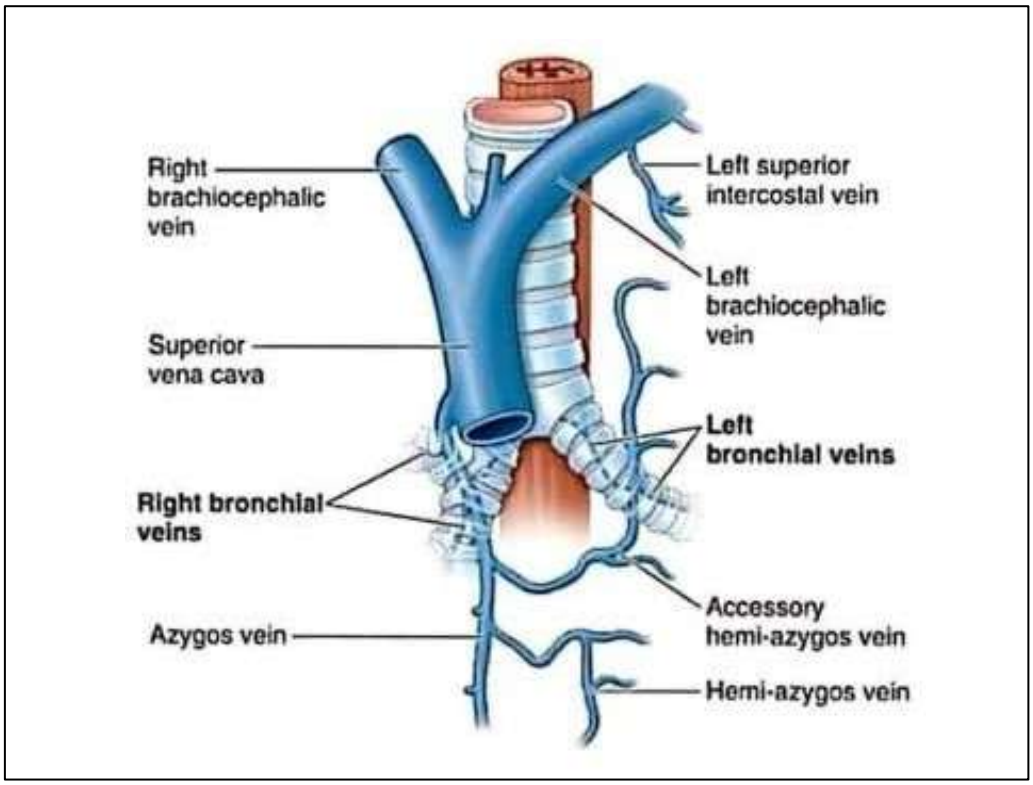
(C) Differences between pulmonary and bronchial arteries.

Pulmonary arteries	Bronchial arteries
Carry deoxygenated blood	Carry oxygenated blood
Function in gas exchange	Nutritional supply
Arise from pulmonary trunk	Arise from thoracic aorta
Low-pressure system	High-pressure system
Follow bronchi closely	Supply supporting tissues



(1.2) Describe the venous drainage of the respiratory system.

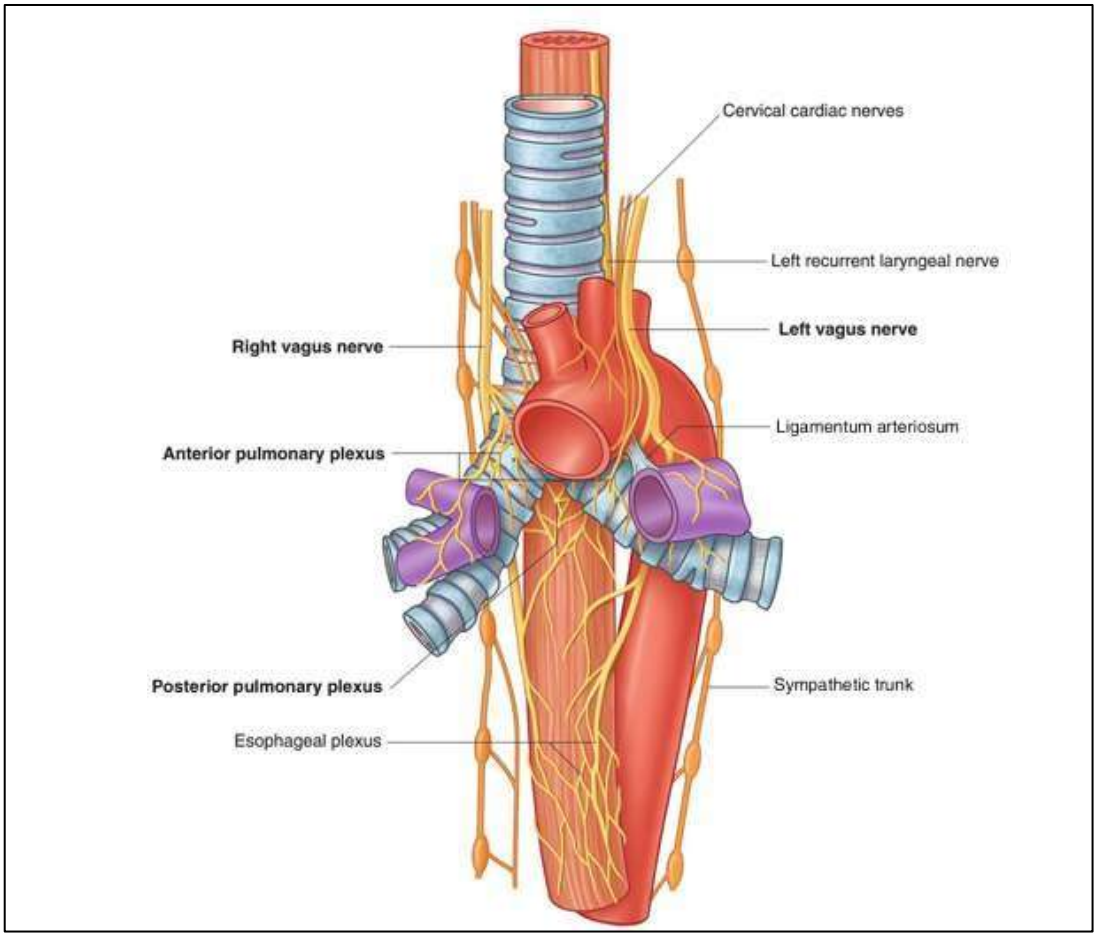
- Pulmonary veins drain oxygenated blood from lungs.
- Usually two pulmonary veins from each lung.
- Drain into left atrium.
- Bronchial veins drain proximal bronchi and supporting tissues.
- Right bronchial vein drains into azygos vein.
- Left bronchial vein drains into accessory hemiazygos or left superior intercostal vein.
- Some bronchial venous blood drains into pulmonary veins.



(2)

(2.1) Describe the innervation of the lungs and visceral pleura.

- Structures of the lung, and the visceral pleura, are supplied by visceral afferents and efferent.
- It is distributed through
    - Anterior pulmonary plexus
    - Posterior pulmonary plexus
- These interconnected plexuses lie anteriorly and posteriorly to the tracheal bifurcation and main bronchi.
- The anterior plexus is much smaller than the posterior plexus.
- Branches of these plexuses originate from the sympathetic trunks and vagus nerves.
- They are distributed along branches of the airway and vessels.
- Visceral efferents from:
    - Vagus nerves constrict the bronchioles.
    - Sympathetic system dilates the bronchioles.
- Visceral afferent fibers transmit reflex sensations such as stretch and contribute to respiratory reflexes.



(2.2) What is the effect of vagus nerve stimulation on the bronchi?

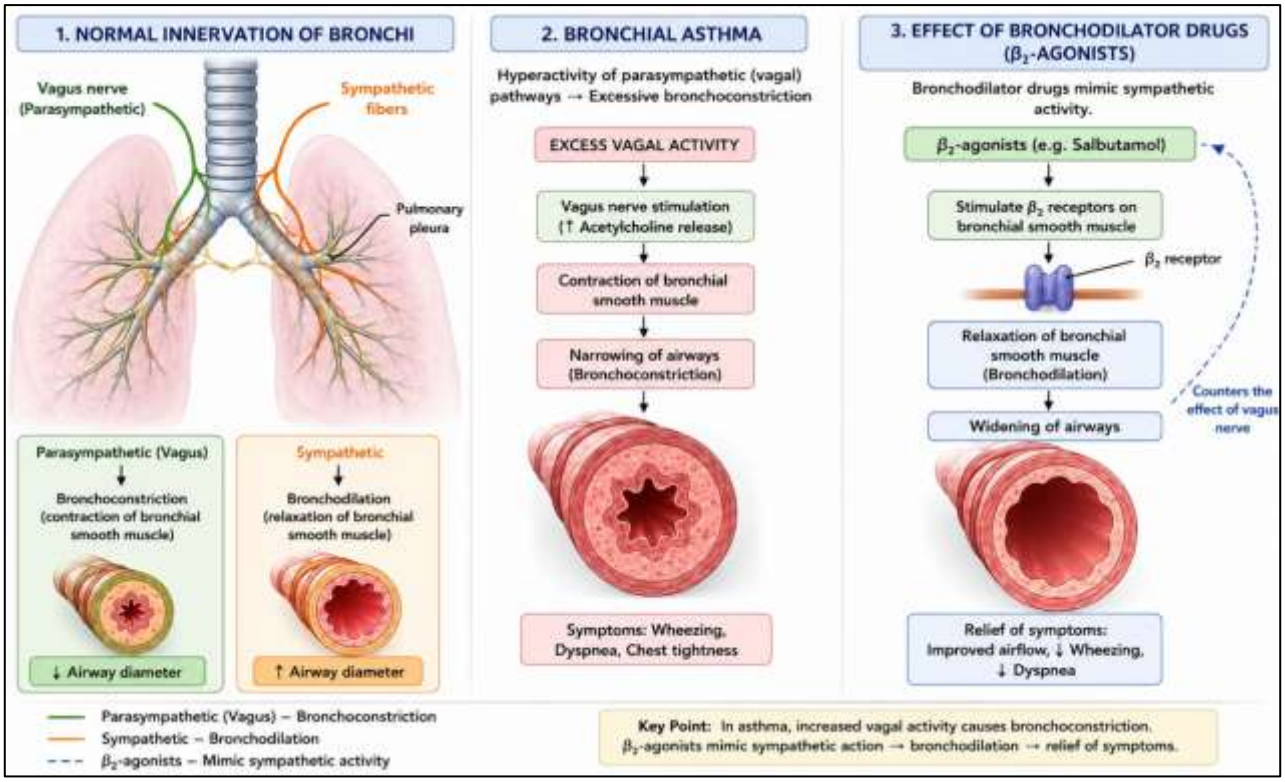
Stimulation of the vagus nerve causes bronchoconstriction, which narrows the airways and may lead to difficulty in breathing.

(2.3) What happens if sympathetic activity increases in the lungs?

It causes bronchodilation, improving airflow.

(2.4) Explain the anatomical basis for the use of bronchodilator drugs in bronchial asthma.

- In bronchial asthma, there is excessive bronchoconstriction.
- It is due to hyperactivity of parasympathetic (vagal) pathways.
- Bronchodilator drugs act by mimicking sympathetic activity
- It leads to relaxation of bronchial smooth muscle (bronchodilation).
- This counteracts the bronchoconstrictor effect of the vagus nerve.
- Thereby improving airflow and relieving symptoms such as wheezing and dyspnea.


1. NORMAL INNERVATION OF BRONCHI
Vagus nerve (Parasympathetic)
Sympathetic fibers
Pulmonary pleura
Parasympathetic (Vagus)
Bronchoconstriction (contraction of bronchial smooth muscle)
↓ Airway diameter
Sympathetic
Bronchodilation (relaxation of bronchial smooth muscle)
↑ Airway diameter
2. BRONCHIAL ASTHMA
Hyperactivity of parasympathetic (vagal) pathways → Excessive bronchoconstriction
EXCESS VAGAL ACTIVITY
Vagus nerve stimulation (↑ Acetylcholine release)
Contraction of bronchial smooth muscle
Narrowing of airways (Bronchoconstriction)
Symptoms: Wheezing, Dyspnea, Chest tightness
3. EFFECT OF BRONCHODILATOR DRUGS (β2-AGONISTS)
Bronchodilator drugs mimic sympathetic activity.
β2-agonists (e.g. Salbutamol)
Stimulate β2 receptors on bronchial smooth muscle
β2 receptor
Relaxation of bronchial smooth muscle (Bronchodilation)
Widening of airways
Counters the effect of vagus nerve
Relief of symptoms: Improved airflow, ↓ Wheezing, ↓ Dyspnea
Parasympathetic (Vagus) – Bronchoconstriction
Sympathetic – Bronchodilation
β2-agonists – Mimic sympathetic activity
Key Point: In asthma, increased vagal activity causes bronchoconstriction. β2-agonists mimic sympathetic action → bronchodilation → relief of symptoms.

BATCH 03 - SEMESTER 01 TUTORIALS WITH ANSWERS

Tutorial 01 - Fertilization & Second Week of Development

(1) Describe the process of fertilization and add a note on its significance.
(20 Marks)

(1) The 2nd week of development is also called as "week of twos". Describe the important developmental events that occur during the second week of development. (20 Marks).

Tutorial 01 - Fertilization & Second Week of Development Answers

(1) Describe the process of fertilization and add a note on its significance.

(20 Marks)

Definition (01 marks)
Fertilization is the fusion of a male gamete (spermatozoon) and a female gamete (secondary oocyte) to form a diploid zygote. It normally occurs in the ampulla of the uterine tube.

Steps of Fertilization (11 marks)

(A) Sperm transport (2 marks)

- Millions deposited in vagina; only 1% enters the cervix and few hundred reach ampulla.
- Assisted by sperm motility (own propulsion: less) and uterine muscular contractions.
- Cervix – oviduct – 30 min (fastest), 6 days (slowest) at the isthmus sperms- less motile.
- At ovulation – become again motile (chemicals produced by cumulus cells of ovum).
- Can't fertilize ovum without 02 process (capacitation and acrosome reaction).

(B) Capacitation (2 marks): period of conditioning (approx. 07 hours)

- Interaction of sperm cell head and epithelium of the tube.
- Removal of glycoprotein coat and seminal plasma proteins from the acrosomal region of the sperm.
- Sperm pass through corona radiata cells.
- Sperm becomes capable of acrosome reaction.

(C) Acrosome reaction (2 marks)

- Binding to zona pellucida (induced by zona proteins through ZP3 receptors).
- Release of enzymes to facilitate the reaction (acrosin, trypsin-like substances: hyaluronidase).
- Once sperm head contact with plasma membrane of oocyte, "cortical and zona reaction" take place and prevent polyspermy.

(D) Fusion of sperm and oocyte membranes (2 marks) via integrin receptors

- Sperm nucleus enters cytoplasm and 03 reaction will take place.

(E) Cortical reaction (2 marks)

- Release of cortical granules.
- Prevents polyspermy.

(F) Resumption of 2nd mitotic division and produced female pronucleus

- Spermatozoa migrate towards the female pronucleus swollen and produce male pronucleus.

(G) Metabolic activation of egg

- Fusion of pronuclei to form diploid zygote.

(H) Significance of Fertilization (08 marks)

- Restoration of diploid chromosome number.
- Determination of genetic sex (XX/XY).
- Genetic variation (mixing of parental genes).
- Initiation of cleavage and embryonic development.

Reference for you: https://youtu.be/IDdfTrx8UMQ?si=BAN03SCCBtsa60K7
(Fertilization by Dr. Najeeb)

(2) The 2nd week of development is also called as "week of twos". Describe the important developmental events that occur during the second week of development. (20 Marks).

- Second week is known as the "Week of Twos".
- At 8th day of development blastocyst partially embedded in the endometrial stroma.
- Blastocyst has 02 parts (embryoblast (embryo) and trophoblast (placenta).
- Development of Trophoblast. (4 marks)
- Differentiation into cytotrophoblast (mono-cellular) and syncytiotrophoblast (multicellular).

(A) Formation of Bilaminar Germ Disc from the inner cell mass of the embryoblast. (4 marks)

- Epiblast (small cuboidal cells) and hypoblast formation (columnar cells).

(B) Formation of Amniotic Cavity. (3 marks)

- Develops within epiblast.
- Lined by amnioblasts.

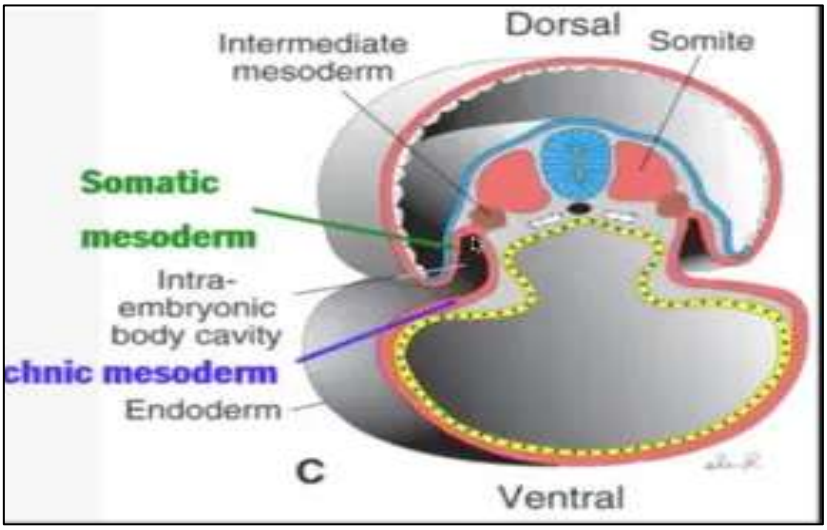
(C) Formation of Yolk Sac (3 marks) a layer of cells lining the blastocyst cavity.

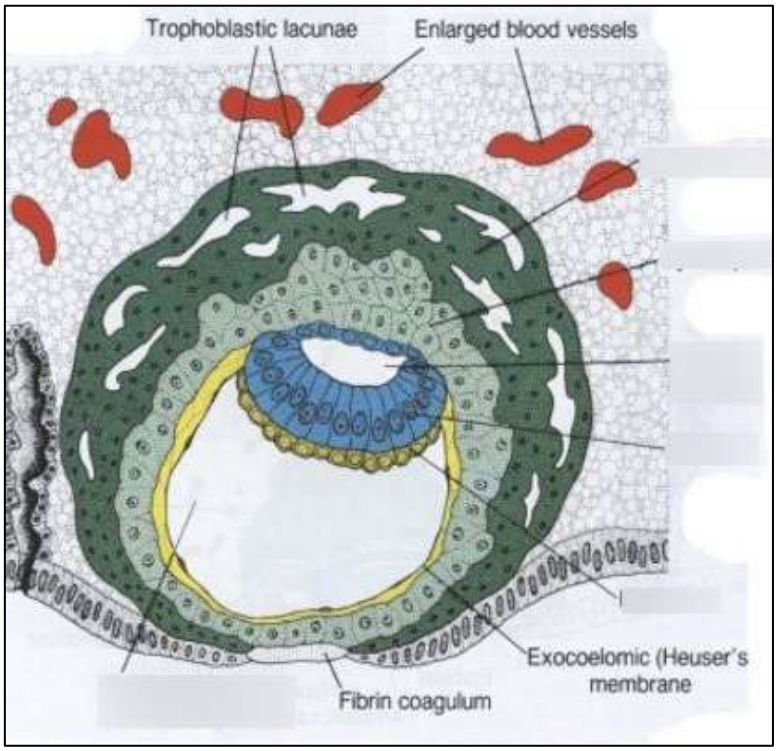
- Primary yolk sac formation.
- Replacement by secondary yolk sac.

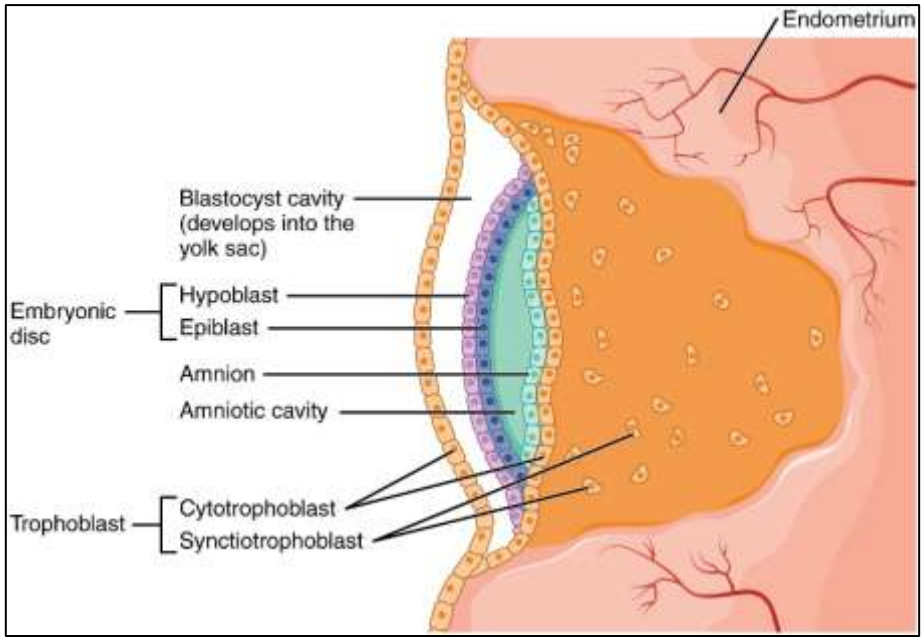
(D) Formation of Extraembryonic Mesoderm (2 marks)

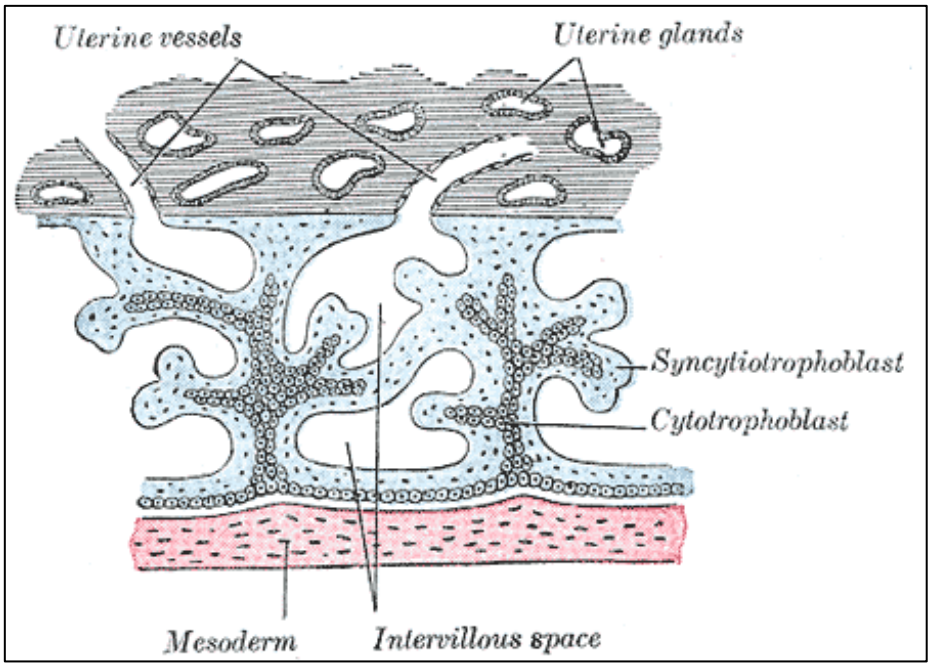
- Develops between trophoblast and yolk sac. (08 marks)

Structure	**Pair Formed**
Embryoblast	Epiblast & Hypoblast
Trophoblast	Cytotrophoblast & Syncytiotrophoblast
Cavities	Amniotic cavity & Yolk sac
Extraembryonic mesoderm	Somatic & Splanchnic **layers**
Yolk sac	Primary & Secondary






Endometrium
Blastocyst cavity
(develops into the
yolk sac)
Embryonic
disc
Hypoblast
Epiblast
Amnion
Amniotic cavity
Trophoblast
Cytotrophoblast
Synctiotrophoblast


Uterine vessels
Uterine glands
Syncytiotrophoblast
Cytotrophoblast
Mesoderm
Intervillous space

Tutorial 02 - Anatomy of Thoracic Wall

(1) A 24-year-old man is brought to the emergency department after a stab injury to the right side of the chest in the midaxillary line. He complains of severe pain during breathing and difficulty in respiration. On examination, there is tenderness over the ribs and reduced chest expansion on the affected side.

(1.1) Describe the typical intercostal space under the following headings. (60 marks)

- Muscles and their arrangement.
- Neurovascular bundle and its relations.
- Functions of the intercostal muscles.

(1.2) Explain the anatomical basis of pain and respiratory difficulty in this patient. Include the following in your answer. (40 marks)

- Nerve supply of the thoracic wall.
- Mechanism of movement of the ribs during respiration.
- Clinical importance of the intercostal neurovascular bundle during thoracic procedures.

Tutorial 02 - Anatomy of Thoracic Wall Answers

(1)

(1.1) Describe the typical intercostal space under the following headings.

Typical Intercostal Space

A typical intercostal space lies between two adjacent ribs and contains muscles, vessels, and nerves.

Muscles of the Intercostal Space

There are three layers of intercostal muscles.

(A) **External intercostal muscles**

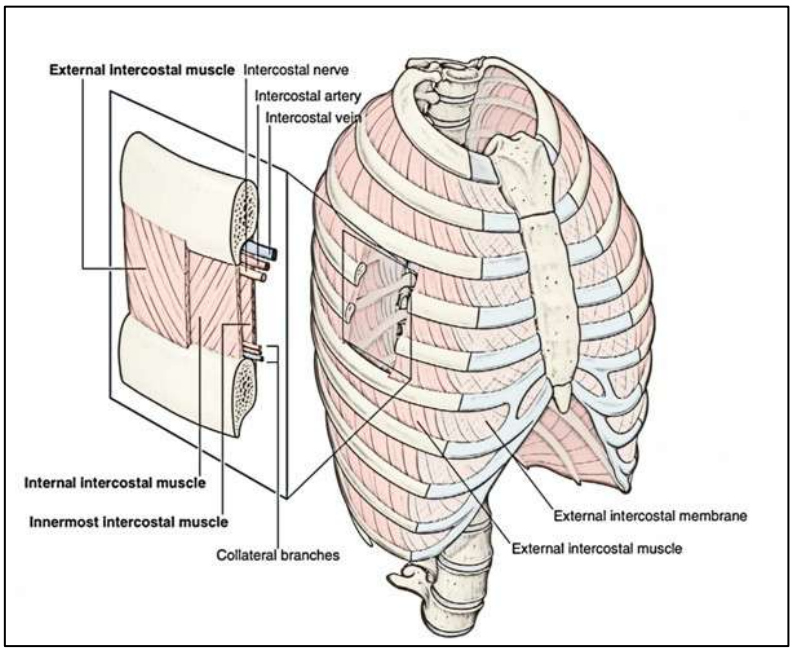
- Fibers run downward and forward.
- Extend from the tubercle of the rib posteriorly to the costochondral junction anteriorly.
- Anteriorly replaced by the external intercostal membrane.
- Elevate the ribs during inspiration.

(B) **Internal intercostal muscles**

- Fibers run downward and backward.
- Extend from the sternum to the angle of the rib.
- Posteriorly replaced by the internal intercostal membrane.
- Mainly assist forced expiration.

(C) **Innermost intercostal muscles**

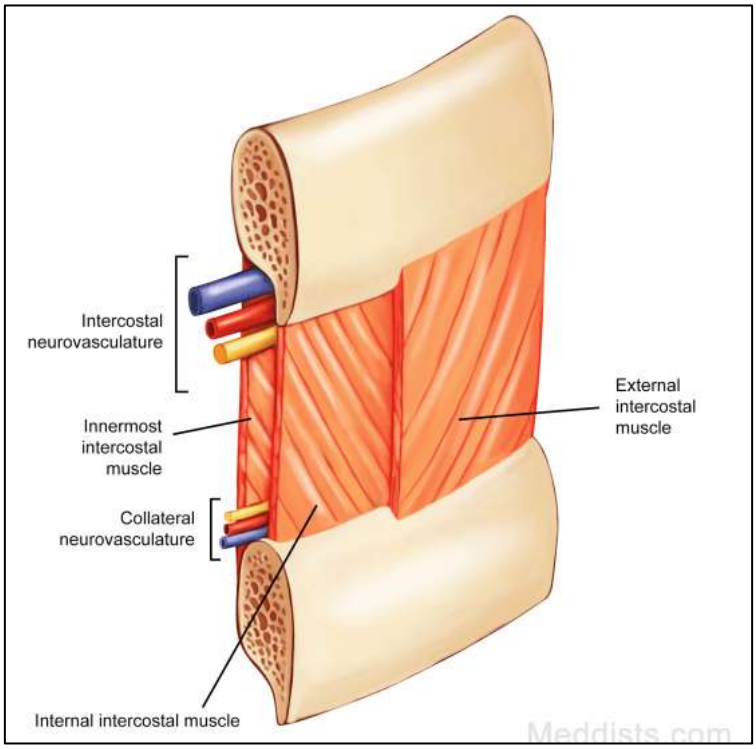
- Deepest incomplete layer.
- Separated from internal intercostals by the neurovascular bundle.
- Assist internal intercostals in respiration.



Neurovascular Bundle

The intercostal vein, artery, and nerve are located in the costal groove along the inferior border of the upper rib in the arrangement, **Vein – Artery – Nerve (VAN)** from superior to inferior.

Collateral branches run along the superior border of the rib below.



Functions of Intercostal Muscles

- Maintain rigidity of intercostal spaces.
- Assist respiration.
- External intercostals elevate ribs during inspiration.
- Internal and innermost intercostals depress ribs during forced expiration.

(1.2) Anatomical Basis of Clinical Features

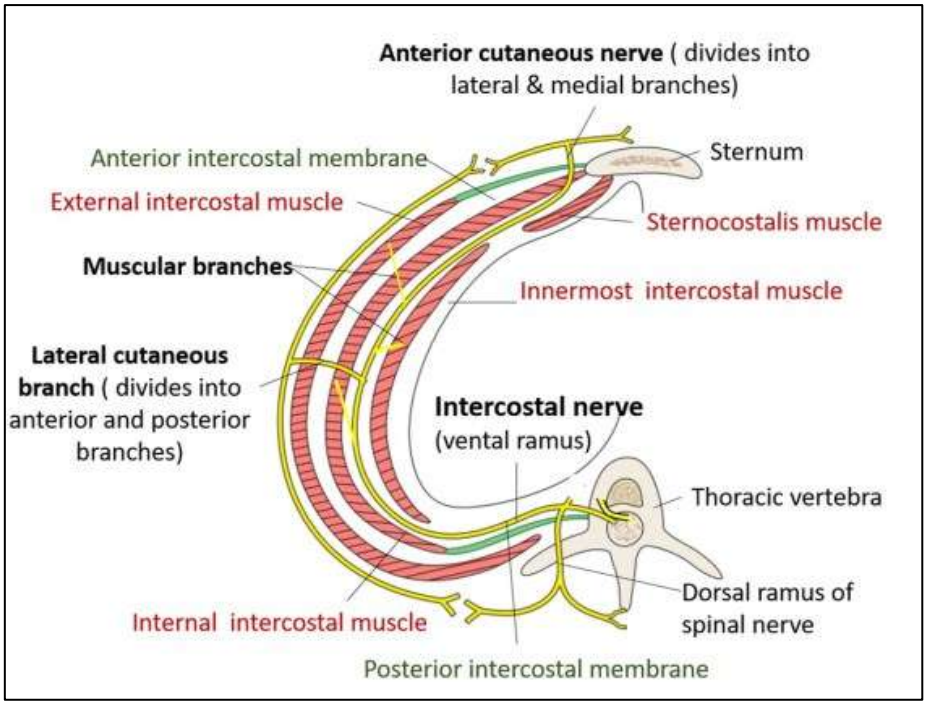
Nerve Supply of the Thoracic Wall

The thoracic wall is supplied mainly by the intercostal nerves, which are anterior rami of thoracic spinal nerves T1–T11.

They supply,

- Intercostal muscles
- Skin of thoracic wall
- Parietal pleura

Injury to these nerves causes severe pain, especially during respiratory movements.



Movements of the Ribs During Respiration

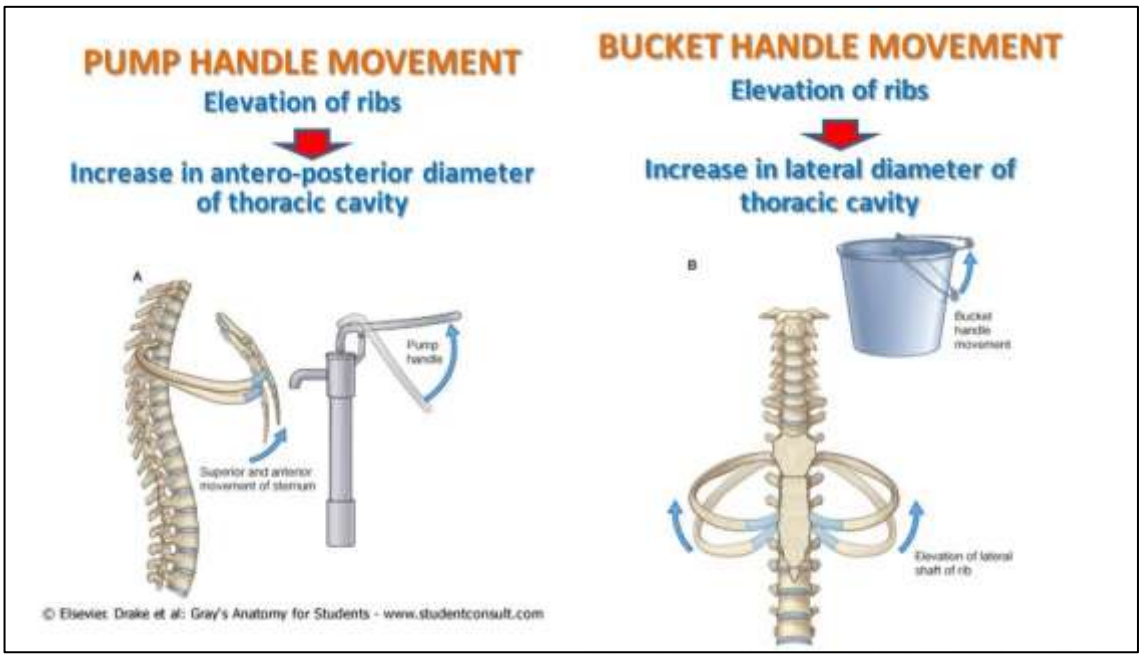
(A) Pump-handle movement

- Mainly upper ribs.
- Increases anteroposterior diameter of thorax.

(B) Bucket-handle movement

- Mainly lower ribs.
- Increases transverse diameter of thorax.

Pain from rib or muscle injury restricts these movements, causing difficulty in breathing.

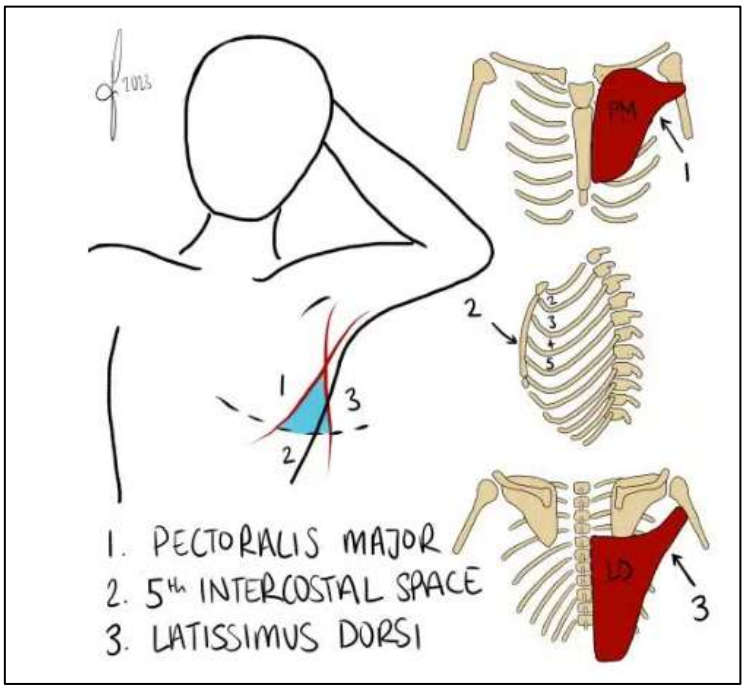


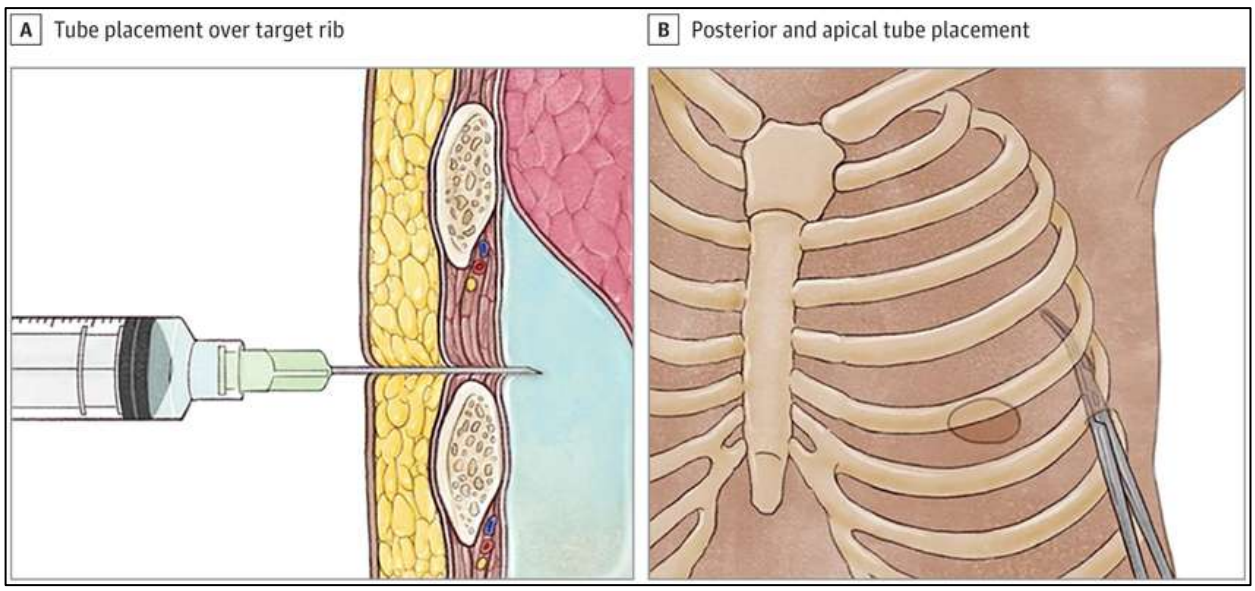
Clinical Importance of the Intercostal Neurovascular Bundle

During procedures such as thoracocentesis or chest tube insertion.

- The needle is inserted close to the superior border of the rib below.
- This avoids injury to the main intercostal neurovascular bundle located in the costal groove of the rib above.

Damage to the intercostal vessels may cause bleeding, while injury to the nerve causes severe pain and muscle weakness.





Tutorial 03 – Anatomy of the Heart

(1)

(1.1) Draw a label line diagram to illustrate the coronary arterial blood supply of the heart. (40 marks)

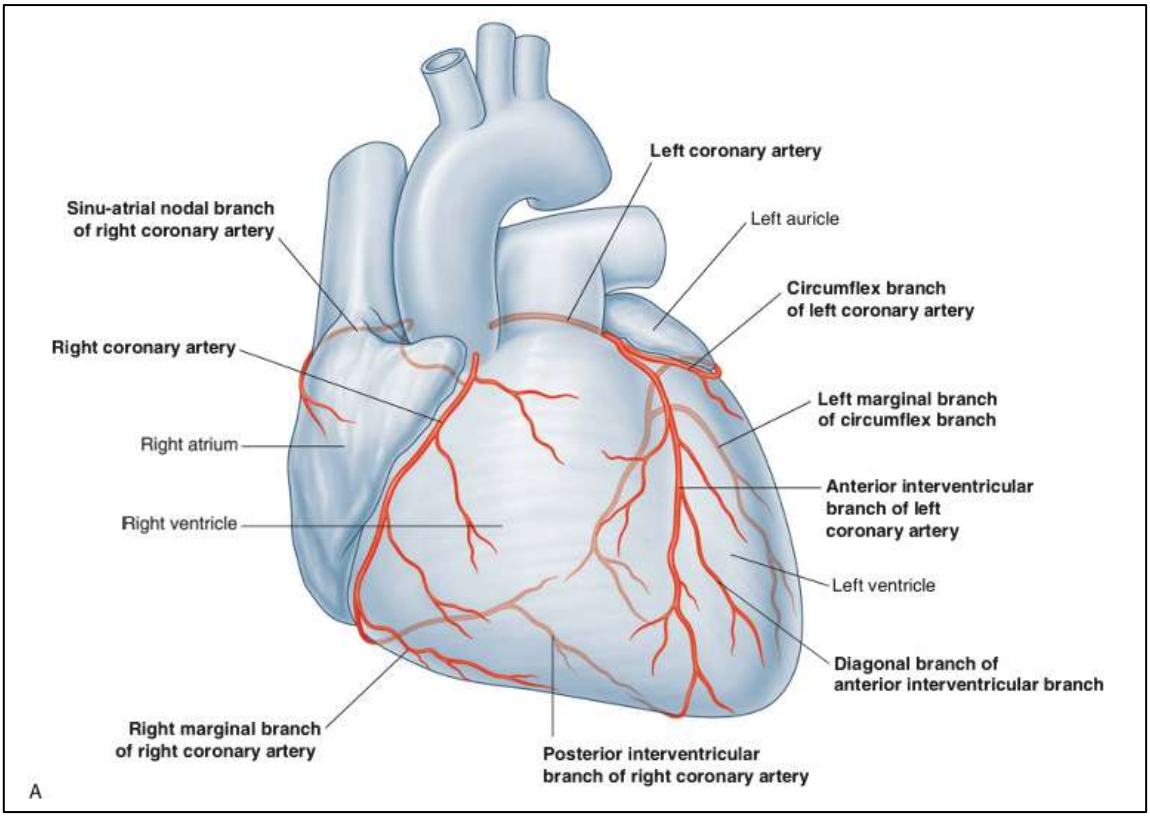
(1.2) Describe the conduction system of the heart. (40 marks)

(1.3) List four congenital malformations of the heart. (20 marks)

Tutorial 03 – Anatomy of the Heart Answers

(1)

(1.1) Draw a label line diagram to illustrate the coronary arterial blood supply of the heart.



(1.2) Describe the conduction system of the heart.

- Conducting system of heart is responsible for **generation of rhythmic electrical impulses** and for the spread of those throughout the heart.
- It includes **sinoatrial node/SA node, atrioventricular node/AV node, bundle of His/atrioventricular bundle, right & left branches of the bundle & purkinje fibres.**
- This conducting system is made up of specialized cardiac muscle fibre type & it is located **subendocardially,** within the myocardium.
- **SA node** is the **pacemaker** of the heart & it is located just **inferior & lateral to the opening of superior vena cava to the right atrium** (superoposterior wall of right atrium – at the top of sulcus terminalis)
- SA node is situated **subepicardially.**
- AV node is located **subendocardially** in the **posterior wall of the right atrium & on the interstitial septum, above the attachment of septal cusp of tricuspid valve**, to the left of opening of the coronary sinus.
- There are **internodal pathways** in between these 2 nodes (anterior, middle & posterior) & an anterior interatrial band called Bachmann's bundle.

- From the AV node, **bundle of His** arises & goes along the **interventricular septum**.
- This **divides into right & left branches**.
- Right bundle branch goes through the septum & continues through the moderator band (septomarginal trabecula).
- It reaches the anterior wall of right ventricle and spreads out as **purkinje fibres**.
- Left bundle branch also goes through the septum & subendocardially divides into **purkinje fibres** over the ventricular wall.

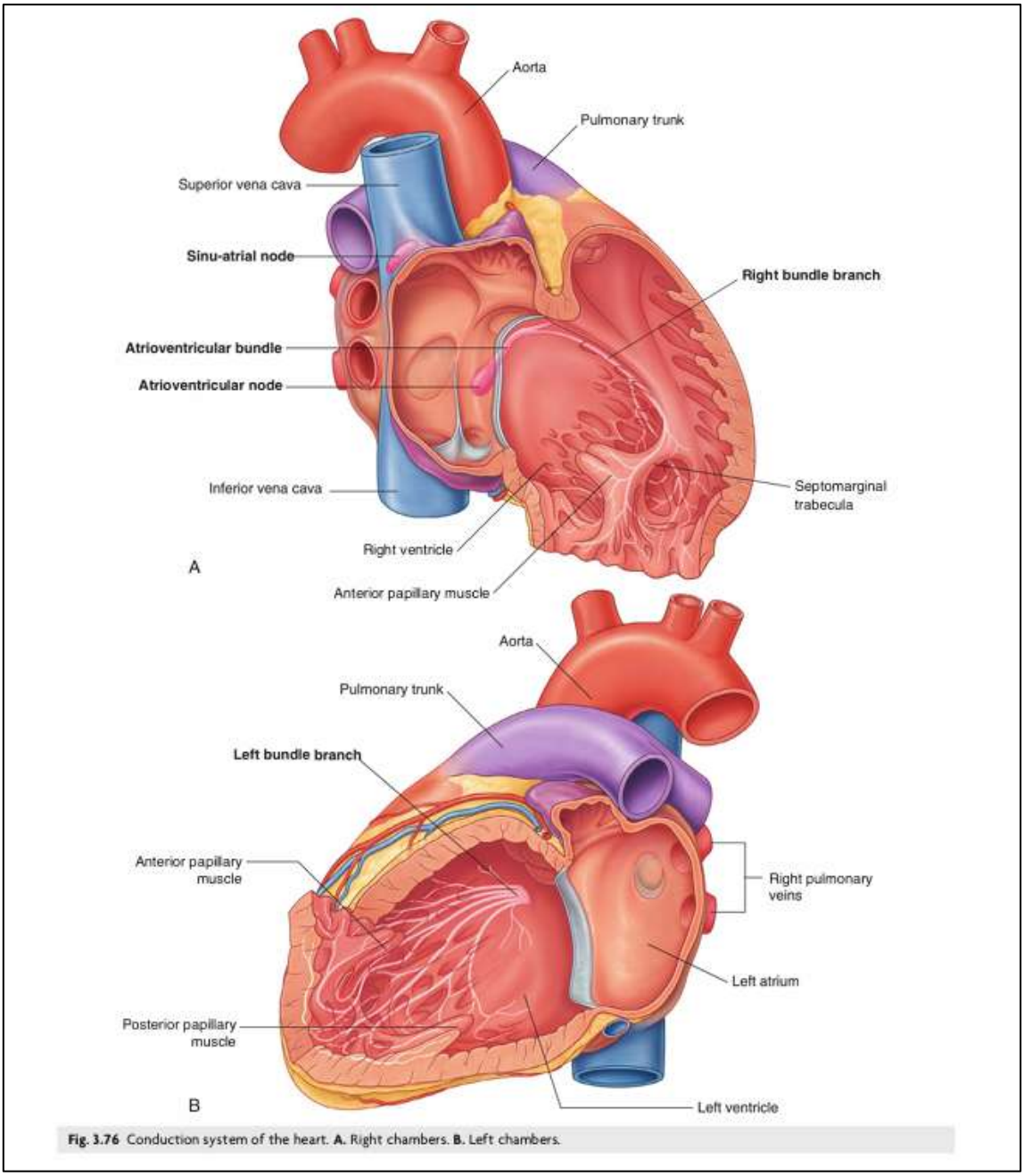


Fig. 3.76 Conduction system of the heart. **A.** Right chambers. **B.** Left chambers.

(1.3) List four congenital malformations of the heart.

Atrial septal defects
Ventricular septal defects
Fallot's tetralogy
Dextrocardia

Tutorial 04 - Spine & Back of the Thorax

(1) A 52-year-old man presents with severe pain in the mid-thoracic region following a road traffic accident. On examination, there is localized tenderness over the thoracic vertebrae and pain increases during movements of the vertebral column. Radiological investigations reveal injury involving the thoracic vertebrae and adjacent joints.

(1.1) Describe the typical thoracic vertebra. (30 Marks)

(1.2) What are the features of an atypical thoracic vertebra. (30 Marks)

(1.3) Briefly discuss the anatomical basis of the following. (40 Marks)

a) Movements of the thoracic vertebral column.

b) Clinical importance of thoracic intervertebral disc prolapse.

(2)

(2.1) Name the major muscle groups of the thoracic back. (20 Marks)

(2.2) Describe the attachments, nerve supply, and actions of the trapezius, rhomboids, and erector spinae muscles. (40 Marks)

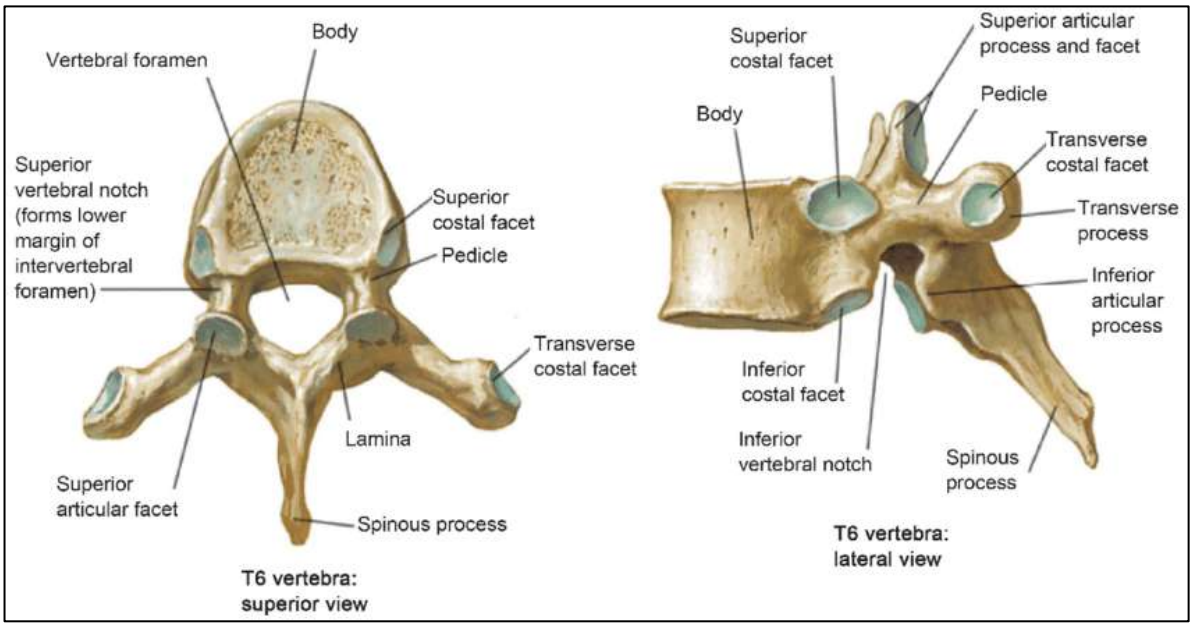
(2.3) A patient presents with abnormal positioning of the scapula following a neck injury. On examination, the scapula on the affected side is displaced laterally away from the vertebral column. Based on this finding, discuss the anatomical basis of the condition. (40 Marks)

Tutorial 04 - Spine & Back of the Thorax Answers

(1)

(1.1) Describe the typical thoracic vertebra.

Typical Thoracic Vertebra



- A typical thoracic vertebra is represented by vertebrae T2–T8.

Identifying Features

- Heart-shaped vertebral body.
- Circular vertebral foramen.
- Long spinous process directed downward.
- Two costal demifacests on the sides of vertebral bodies for articulation with heads of ribs.
- Transverse costal facets on transverse processes for articulation with tubercles of ribs.

- A typical thoracic vertebra articulates with,
  1. Adjacent vertebrae through intervertebral discs.
  2. Head of corresponding rib by superior and inferior costal facets.
  3. Tubercle of rib by transverse costal facet.

(1.2) What are the features of an atypical thoracic vertebra.

First Thoracic Vertebra (T1)

- Has a complete superior costal facet for the 1st rib.
- Has an inferior demi-facet for the 2nd rib.
- Body resembles a cervical vertebra.
- Vertebral foramen is relatively large.
- Spinous process is long and nearly horizontal.

Ninth Thoracic Vertebra (T9)

- Usually has a superior demi-facet only.
- Inferior demi-facet may be absent.

Tenth Thoracic Vertebra (T10)

- Has a single complete costal facet on each side for the 10th rib.
- Facet partly extends onto the pedicle.
- Transverse process usually has a facet for the tubercle of the 10th rib.

Eleventh Thoracic Vertebra (T11)

- Has a single complete costal facet on the pedicle for the 11th rib.
- No transverse costal facet because the 11th rib has no tubercle.
- Body and transverse processes resemble lumbar vertebrae.

Twelfth Thoracic Vertebra (T12)

- Has a single complete costal facet for the 12th rib.
- No transverse costal facet.
- Inferior articular facets are lumbar type and face laterally.
- Superior articular facets are thoracic type and face posteriorly.
- Transitional vertebra between thoracic and lumbar regions.

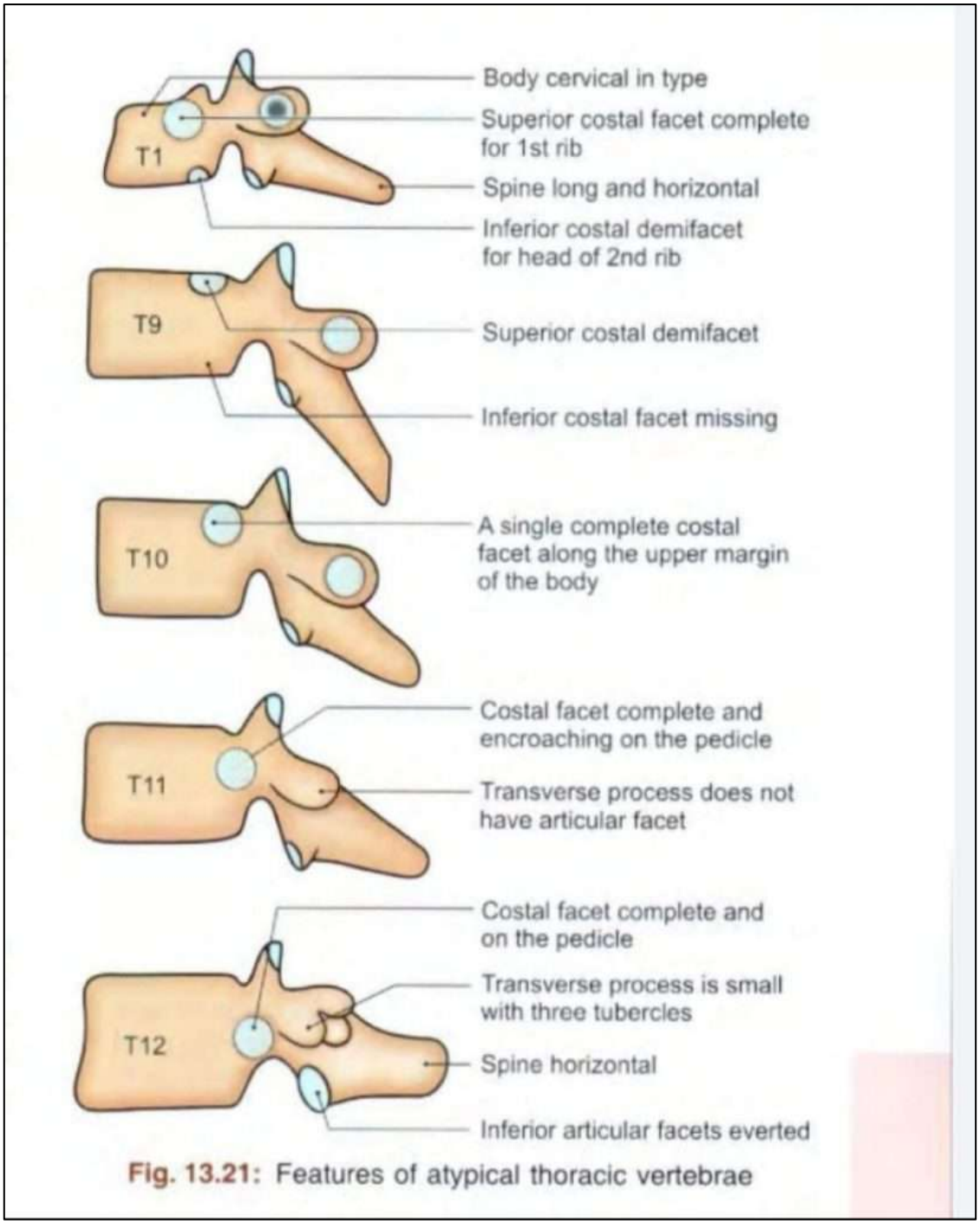


Fig. 13.21: Features of atypical thoracic vertebrae

(1.3) Briefly discuss the anatomical basis of the following.

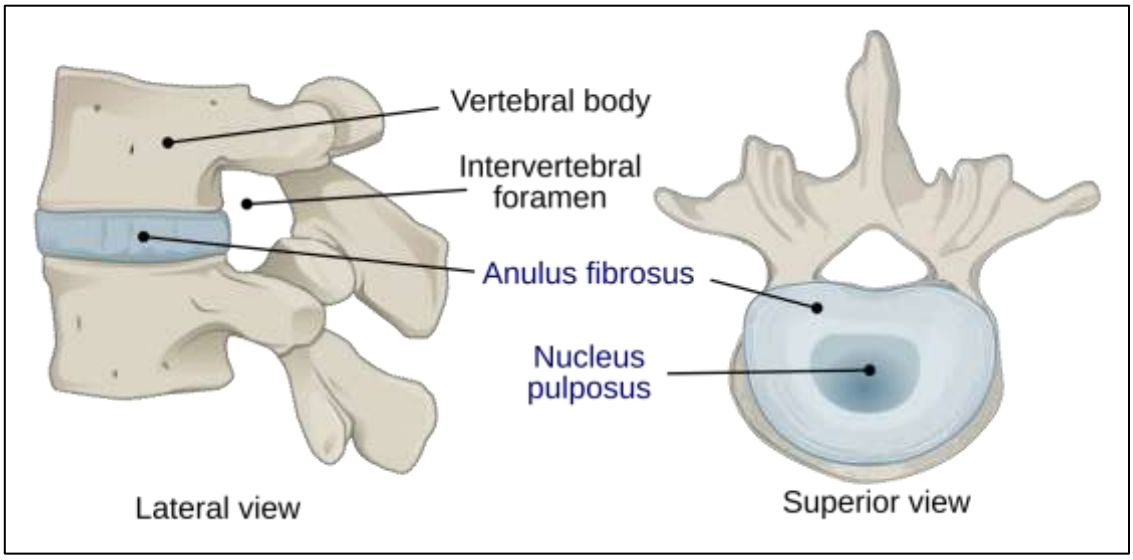
(A) Movements of the Thoracic Vertebral Column

Movements include,

- Flexion
- Extension
- Lateral flexion
- Rotation

Rotation is relatively well developed in the thoracic region because the articular facets are oriented in the coronal plane. Flexion and extension are limited due to the thoracic cage and overlapping spinous processes.

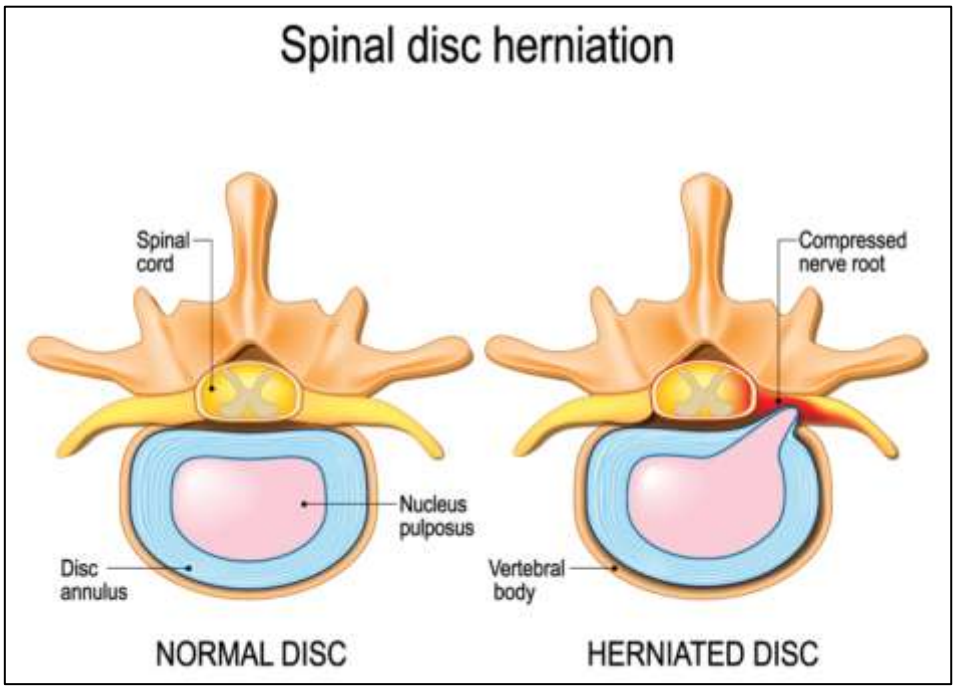
(B) Thoracic Intervertebral Disc Prolapse



Intervertebral discs consist of,

- Annulus fibrosus
- Nucleus pulposus

Degeneration or trauma may cause prolapse of the nucleus pulposus through the annulus fibrosus.



Clinical Features

- Compression of spinal nerve roots.
- Back pain radiating along thoracic dermatomes.
- Muscle weakness or sensory loss in severe cases.

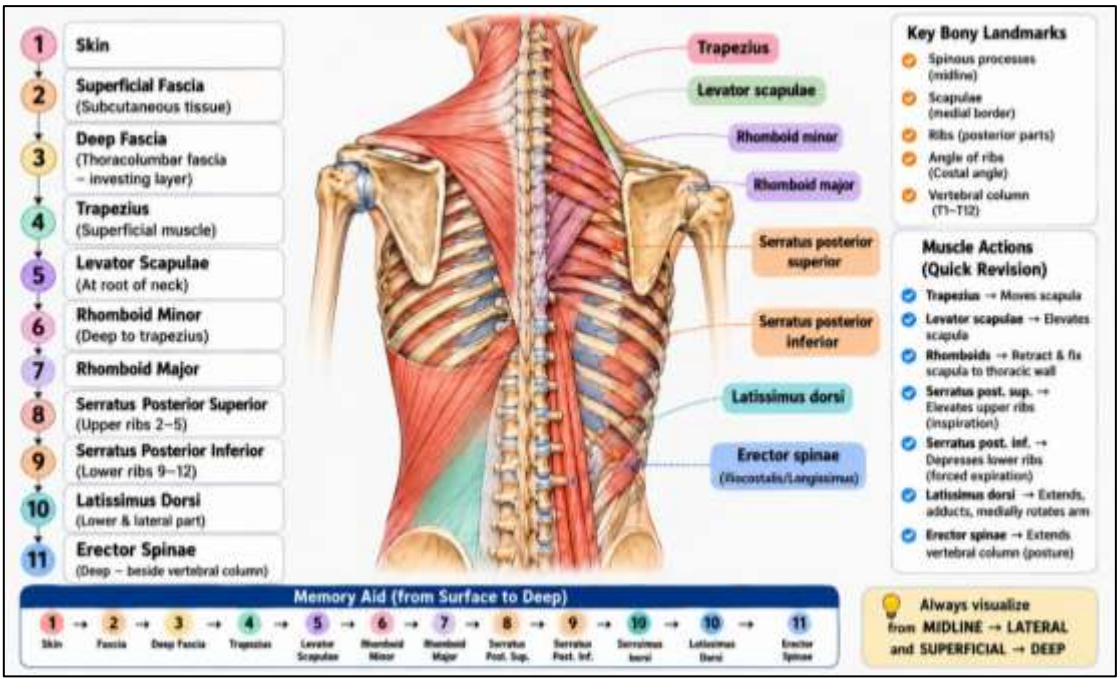
Posterolateral prolapse is more common because the posterior longitudinal ligament is relatively narrow.

(2)

(2.1) Name the major muscle groups of the thoracic back.

- The thoracic back consists of superficial muscles such as trapezius, intermediate muscles like rhomboid major and minor.
- And deep intrinsic muscles, including the erector spinae group.
- These muscles are arranged in layers.
- And function collectively to support the vertebral column and upper limb movements.





(2.2) Describe the attachments, nerve supply, and actions of the trapezius, rhomboids, and erector spinae muscles.

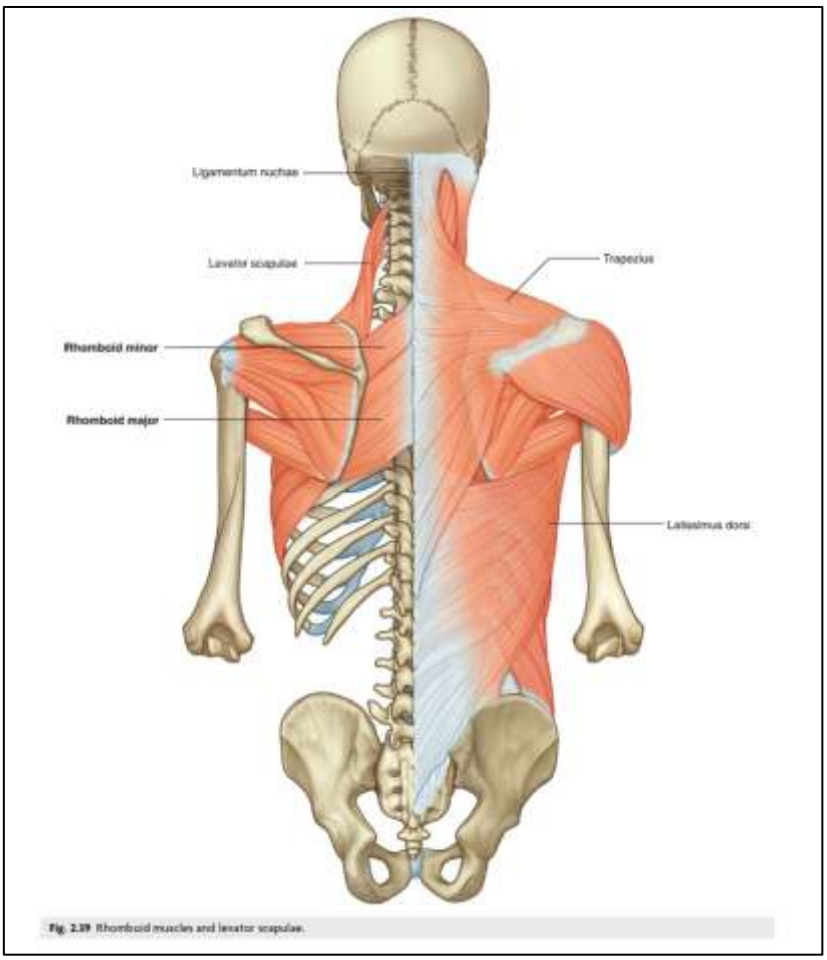


Fig. 2.39 Rhomboid muscles and levator scapulae.

Muscle	Origin	Insertion	Innervation	Function
Trapezius	Superior nuchal line, external occipital protuberance, medial margin of the ligamentum nuchae, spinous processes of CVII to TXII and the related supraspinous ligaments	Superior edge of the crest of the spine of the scapula, acromion, posterior border of lateral one-third of clavicle	Motor spinal part of accessory nerve (XI). Sensory (proprioception) anterior rami of C3 and C4	Powerful elevator of the scapula; rotates the scapula during abduction of humerus above horizontal; middle fibers retract scapula; lower fibers depress scapula
Deltoid	Inferior edge of the crest of the spine of the scapula, lateral margin of the acromion, anterior border of lateral one-third of clavicle	Deltoid tuberosity of humerus	Axillary nerve (**C5**, C6)	Major abductor of arm (abducts arm beyond initial 15° done by supraspinatus); clavicular fibers assist in flexing the arm; posterior fibers assist in extending the arm
Levator scapulae	Transverse processes of CI and CII vertebrae and posterior tubercles of transverse processes of CIII and CIV vertebrae	Posterior surface of medial border of scapula from superior angle to root of spine of the scapula	Branches directly from anterior rami of **C3** and **C4** spinal nerves and by branches (**C5**) from the dorsal scapular nerve	Elevates the scapula
Rhomboid minor	Lower end of ligamentum nuchae and spinous processes of CVII and TI vertebrae	Posterior surface of medial border of scapula at the root of the spine of the scapula	Dorsal scapular nerve (C4, C5)	Elevates and retracts the scapula
Rhomboid major	Spinous processes of TII–TV vertebrae and intervening supraspinous ligaments	Posterior surface of medial border of scapula from the root of the spine of the scapula to the inferior angle	Dorsal scapular nerve (**C4, C5**)	Elevates and retracts the scapula

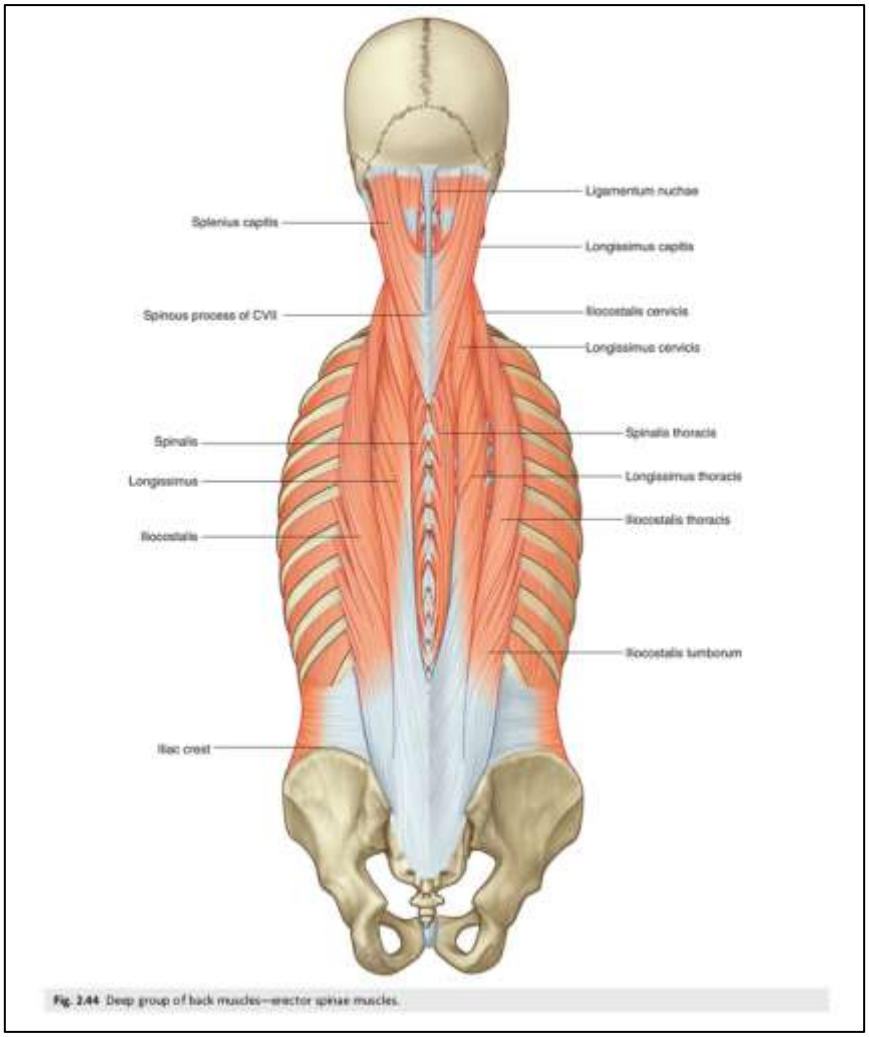


Fig. 2.44 Deep group of back muscles—erector spinae muscles.

Muscle	Origin	Insertion
Iliocostalis lumborum	Sacrum, spinous processes of lumbar and lower two thoracic vertebrae and their supraspinous ligaments, and the iliac crest	Angles of the lower six or seven ribs
Iliocostalis thoracis	Angles of the lower six ribs	Angles of the upper six ribs and the transverse process of CVII
Iliocostalis cervicis	Angles of ribs III to VI	Transverse processes of CIV to CVI
Longissimus thoracis	Blends with iliocostalis in lumbar region and is attached to transverse processes of lumbar vertebrae	Transverse processes of all thoracic vertebrae and just lateral to the tubercles of the lower nine or ten ribs
Longissimus cervicis	Transverse processes of upper four or five thoracic vertebrae	Transverse processes of CII to CVI
Longissimus capitis	Transverse processes of upper four or five thoracic vertebrae and articular processes of lower three or four cervical vertebrae	Posterior margin of the mastoid process
Spinalis thoracis	Spinous processes of TX or TXI to LII	Spinous processes of TI to TVIII (varies)
Spinalis cervicis	Lower part of ligamentum nuchae and spinous process of CVII (sometimes TI to TII)	Spinous process of CII (axis)
Spinalis capitis	Usually blends with semispinalis capitis	With semispinalis capitis

- The mass arises from a broad, thick tendon attached to the sacrum, the spinous processes of the lumbar and lower thoracic vertebrae, and the iliac crest (Fig. 2.44 and Table 2.4).
- It divides in the upper lumbar region into three vertical columns of muscle, each of which is further subdivided regionally (lumborum, thoracis, cervicis, and capitis), depending on where the muscles attach superiorly.
- The muscles in the erector spinae group are the primary extensors of the vertebral column and head.
- Acting bilaterally, they straighten the back, returning it to the upright position from a flexed position, and pull the head posteriorly.
- They also participate in controlling vertebral column flexion by contracting and relaxing in a coordinated fashion.
- Acting unilaterally, they bend the vertebral column laterally. In addition, unilateral contractions of muscles attached to the head turn the head to the actively contracting side.

(2.3) A patient presents with abnormal positioning of the scapula following a neck injury. On examination, the scapula on the affected side is displaced laterally away from the vertebral column. Based on this finding, discuss the anatomical basis of the condition.

- In this condition, the dorsal scapular nerve is injured, which supplies the rhomboid major and minor muscles.
- These muscles normally act to retract and stabilize the scapula by holding it close to the vertebral column.
- When the nerve is damaged, the rhomboids become weak or paralyzed, leading to loss of scapular retraction.
- As a result, the scapula is pulled laterally by the unopposed action of antagonistic muscles, particularly the serratus anterior.
- This produces a lateral displacement of the scapula and affects its stability during upper limb movements.





BATCH 03
CAT 01
MOCK EXAM

Batch 3 - CAT 1 - Mock MCQ Paper

MULTIPLE CHOICE QUESTIONS **(01 Hour)**

This paper consists of 10 True or False type questions and 10 Single Best Answer type questions.

(1) True or False regarding the fertilization?

(F) Less than 1% sperms deposited at the vagina contribute to fertilization.
(G) Fertilization only occurs when sperm is deposited at the time of ovulation.
(H) Capacitation is a prerequisite for fertilization.
(I) Penetration of the corona radiata by the first sperm prevents the entry of other sperms.
(J) Acrosomal reaction releases a trypsin-like substance.

(2) What are the events occur during the 3rd week of embryogenesis?

(A) Initiation of cleavage.
(B) Appearance of primitive steak.
(C) Notocode appearance.
(D) Gastrulation.
(E) Formation of allantoic diverticulum.

(3) Which of the following have stratified squamous non-keratinizing epithelium?

(F) Lining cells of the tonsils
(G) Thick skin
(H) Oesophagus
(I) Vagina
(J) Rectum

(4) True or False regarding the radius?

(A) Annular ligament surrounds the neck of the radius.
(B) Lateral part of inferior articular surface is in contact with trapezium.
(C) Cannot be palpated.
(D) Brachialis is attached to the tubercle.
(E) The articular disk of the inferior radio-ulnar joint is attached to the lower margin of the ulnar notch.

(5) True or False regarding the skeletal tissue?

(A) Osteocytes are located within lacunae and communicate through canaliculi.
(B) Haversian canals contain blood vessels and nerve fibers.
(C) Hyaline cartilage is vascular and receives nutrition directly from blood vessels within the matrix.
(D) Osteoclasts are multinucleated cells responsible for bone resorption.
(E) Type II collagen is the principal collagen found in hyaline cartilage.

(6) True or False regarding the intercostal muscles?

(A) External intercostals elevate ribs during inspiration.
(B) Internal intercostals (interosseous part) depress ribs.
(C) External intercostals extend from sternum to vertebrae.
(D) Internal intercostals extend from sternum to angle of rib.
(E) Innermost intercostals are continuous throughout all intercostal spaces.

(7) True or False regarding the gastrulation?

(A) Epiblast cells migrate.
(B) The amniotic cavity is formed.
(C) Hypoblast becomes endoderm.
(D) Mesoderm is formed.
(E) Nutrients are supplied by the yolk sac.

(8) True or False regarding bronchopulmonary segment?

(A) Each segment is supplied by a segmental bronchus.
(B) Each segment has its own segmental artery.
(C) Pulmonary veins run in the intersegmental planes.
(D) Segments are surgically resectable units.
(E) Right lung has 8 segments.

(9) True or False regarding the diaphragm?

(A) The diaphragm is the principal muscle of inspiration.
(B) The caval opening of the diaphragm transmits the esophagus.
(C) The phrenic nerve provides the motor supply to the diaphragm.
(D) The esophageal hiatus is located at the level of T10 vertebra.
(E) Injury to one phrenic nerve may cause paralysis of one half of the diaphragm.

(10) True or False regarding the heart?

(A) The right atrium contains musculi pectinati.
(B) The fossa ovalis is located in the interatrial septum of the right atrium.
(C) Chordae tendineae attach directly to the walls of the ventricles.
(D) Papillary muscles help prevent prolapse of atrioventricular valves during ventricular contraction.
(E) Trabeculae carneae are found on the internal surface of the ventricles.

Single Best Type Questions.

(11) A 6-year-old child is brought to the clinic with short stature and a webbed neck. On examination, there is a broad chest with widely spaced nipples. Karyotyping shows monosomy of the X chromosome (45, X).
What is the most likely diagnosis?
(A) Down syndrome
(B) Noonan syndrome
(C) Turner syndrome
(D) Klinefelter syndrome
(E) Edwards syndrome

(12) A patient with carcinoma of the breast develops peau d'orange appearance.
What is the most likely underlying cause?
(A) Obstruction of superficial veins.
(B) Infiltration of lactiferous ducts.
(C) Blockage of cutaneous lymphatics.
(D) Fibrosis of Cooper's ligaments.
(E) Invasion of pectoralis major muscle.

(13) A newborn presents with the arm adducted, medially rotated, extended at the elbow, and pronated ("waiter's tip").
Which part of the brachial plexus is most likely injured?
(A) Lower trunk
(B) Upper trunk
(C) Posterior cord
(D) Medial cord
(E) Lateral cord

(14) There is neurovascular plane in the thoracic wall.
Which of the following structures bound the neurovascular plane of the thoracic wall?
(A) Between external and internal intercostal muscles.
(B) Between internal and innermost intercostal muscles.
(C) Between skin and superficial fascia.
(D) Between pleura and lung.
(E) Between diaphragm and pericardium.

(15) What is the most likely site of termination of thoracic duct?
(A) Right subclavian and right internal jugular veins.
(B) Left subclavian and left internal jugular veins.
(C) Superior vena cava and azygos vein.
(D) Right brachiocephalic vein and SVC.
(E) Inferior vena cava and left atrium.

(16) A 58-year-old woman presents with progressive shortness of breath and right-sided chest discomfort. A chest X-ray is performed.
Which of the following chest X-ray findings is the most characteristic of pleural effusion?
(A) Air-fluid level in the pleural space.
(B) Hyperlucent hemithorax with mediastinal shift away.
(C) Blunting of the costophrenic angle with a meniscus sign.
(D) Central perihilar "bat-wing" shadowing.
(E) Cavitating lesion in the upper lobe.

(17) A 20-year-old student is studying a cell under a microscope. She observes that the chromosomes are aligned along the equatorial plate, and each chromosome is attached to spindle fibres at its centromere. The sister chromatids have not yet separated.
What is the most likely stage of cell division?
(A) Prophase
(B) Metaphase
(C) Anaphase
(D) Telophase
(E) Interphase

(18) A patient cannot extend fingers but wrist extension is preserved (with radial deviation).
What is the most likely damaged nerve?
(A) Radial nerve (proximal)
(B) Posterior interosseous nerve
(C) Median nerve
(D) Ulnar nerve
(E) Axillary nerve

(19) Which of the following statements regarding the lungs is correct?
(A) The left lung has three lobes separated by two fissures.
(B) The right main bronchus is longer, narrower, and more vertical than the left.
(C) The cardiac notch is a feature of the right lung.
(D) The right middle lobe is bounded by the horizontal and oblique fissures.
(E) The lingula is a part of the right upper lobe.

(20) A 50-year-old diabetic patient was admitted to a cardiac unit with chest pain. ECG revealed an infarction in the posterior interventricular septum.
What is the most likely artery involved?
(A) Marginal branch of the right coronary artery
(B) Anterior interventricular artery
(C) Posterior interventricular artery
(D) Circumflex artery
(E) Left coronary artery

Batch 3 - CAT 1- Mock MCQ Answers

(1)

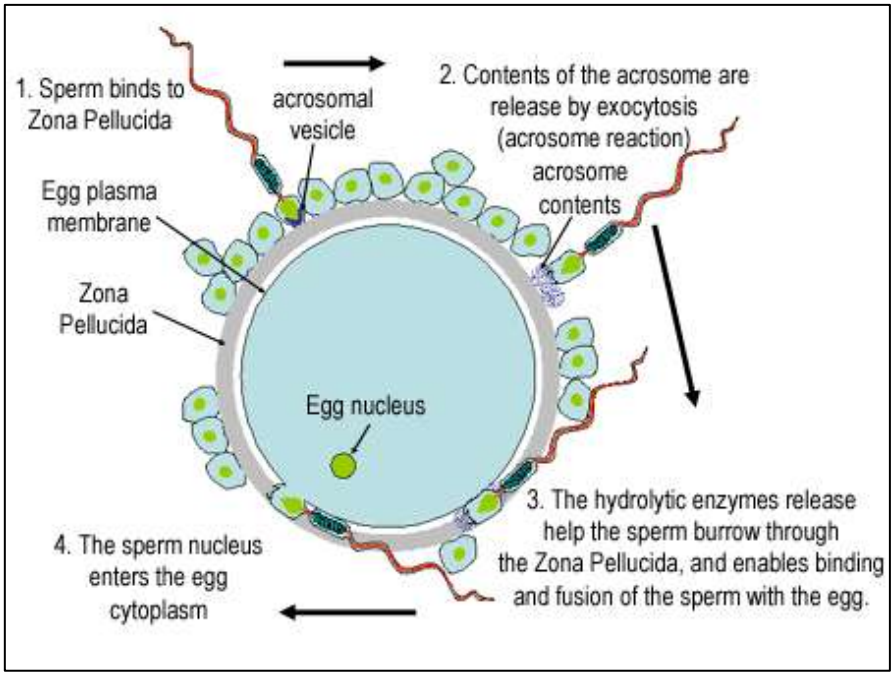
(F) **T** - Number of sperm per ejaculation- 0.5 billion
Number of Sperms reaching Ovum- 100
Only one sperm fertilizes

(G) **F**- 4 to 5 days before ovulation and 1 day after ovulation

(H) **T**- Capacitation and Acrosomal Reaction

(I) **F**- Zona Pellucida

(J) **T**- Trypsin-like Substance and Acrosin



(2)

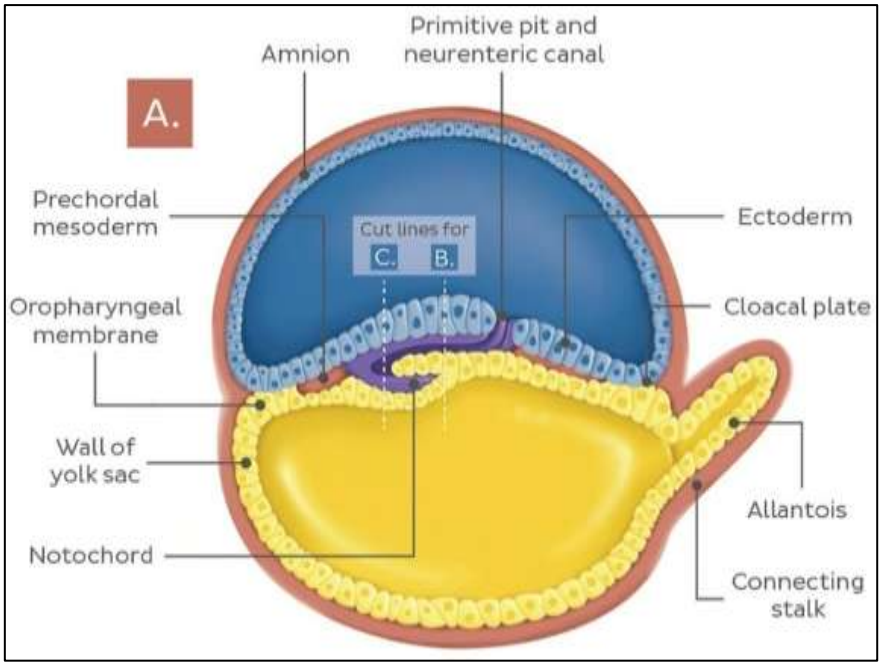
(A) **F** - Cleavage begins in the 1st week, soon after fertilization.

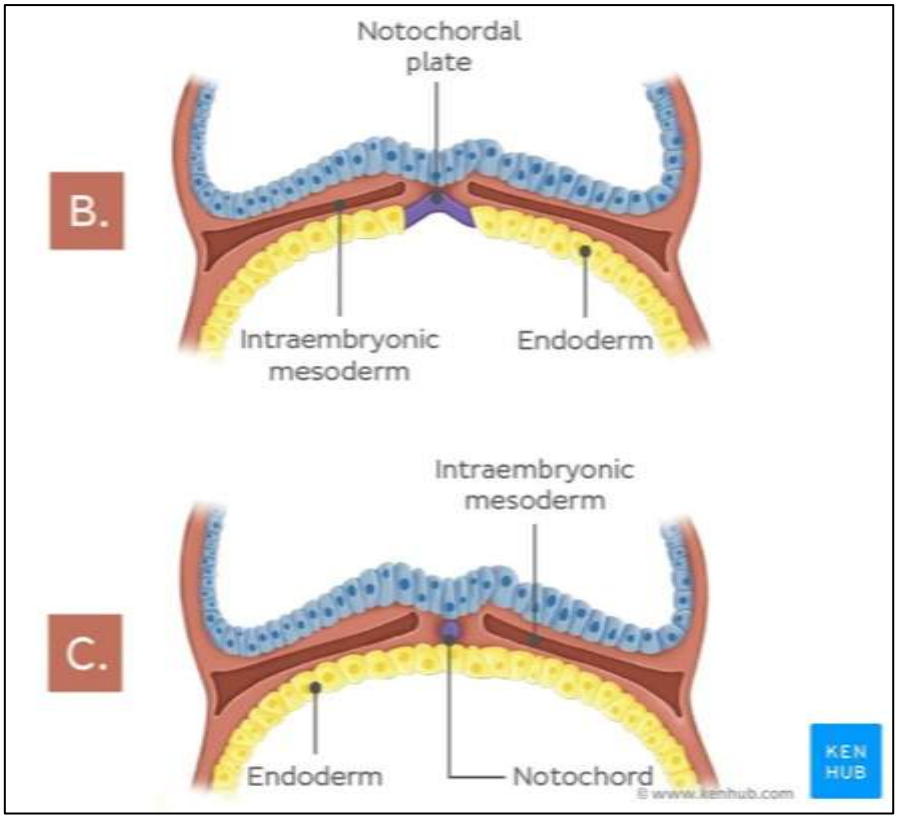
(B) **T** - Primitive streak appears around day 15, marking the beginning of the 3rd week.

(C) **T** - The notochordal process forms in the 3rd week from mesoderm migrating through the primitive node, later forming the definitive notochord.

(D) **T** - Major event of the 3rd week - formation of ectoderm, mesoderm, and endoderm.

(E) **T** - Appears around day 16 as an endodermal outpouching of the yolk sac.


A.
Amnion
Primitive pit and neurenteric canal
Prechordal mesoderm
Cut lines for
C.
B.
Ectoderm
Oropharyngeal membrane
Cloacal plate
Wall of yolk sac
Allantois
Notochord
Connecting stalk


B.
Notochordal plate
Intraembryonic mesoderm
Endoderm
C.
Intraembryonic mesoderm
Endoderm
Notochord
KEN HUB

(3)

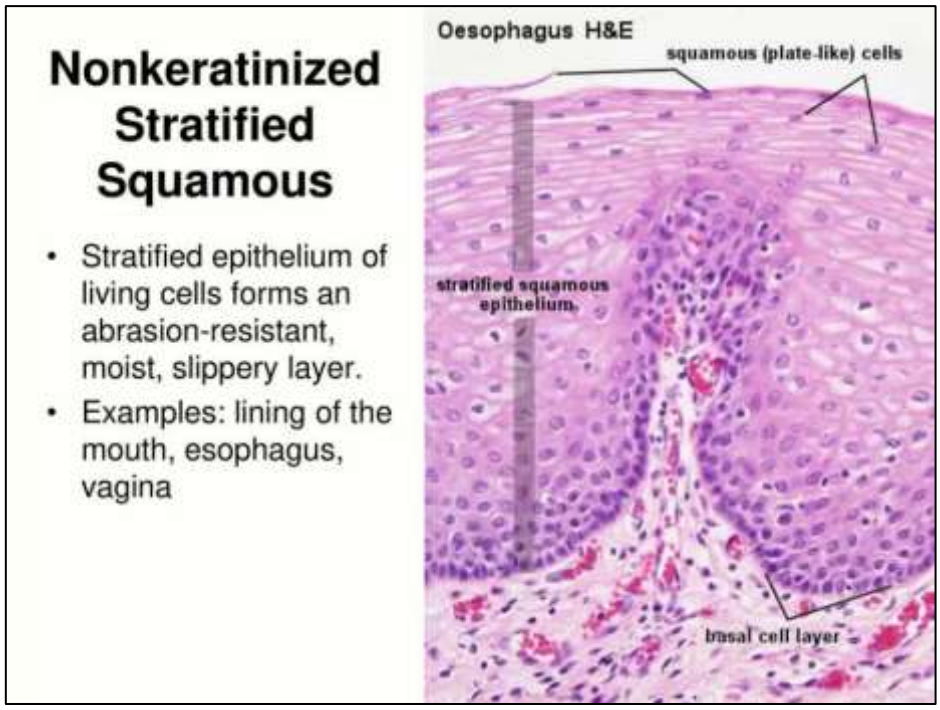
(F) **T**

(G) **F** - Stratified squamous keratinized epithelium.

(H) **T**

(I) **T**

(J) **F** - Rectum is mainly simple columnar epithelium. Stratified squamous epithelium appears only in the anal canal distal part, not the rectum.



(4)

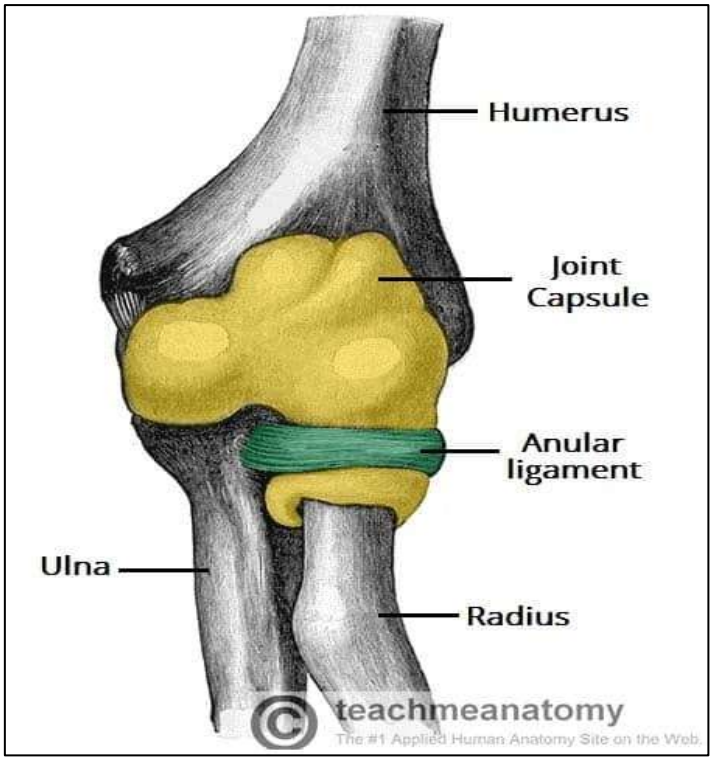
(A) **T** - Annular ligament encircles the head/neck of radius.

(B) **F** - Distal radius articulates with scaphoid & lunate, not trapezium.

(C) **F** - Radius can be palpated (especially distally).

(D) **F** - Brachialis inserts to ulnar tuberosity, not radius.

(E) **F** - Articular disc attaches to inferior margin of ulnar notch of radius, not “ulnar notch margin” as stated here.



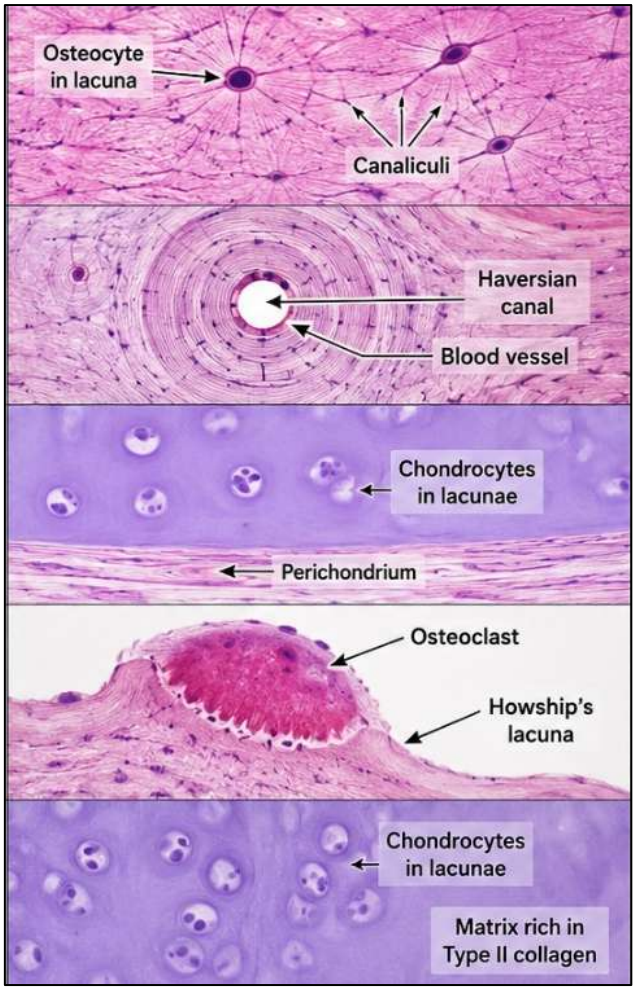
(5)

(A) **T**
(B) **T**
(C) **F**
(D) **T**
(E) **T**

Skeletal tissue consists mainly of cartilage and bone.

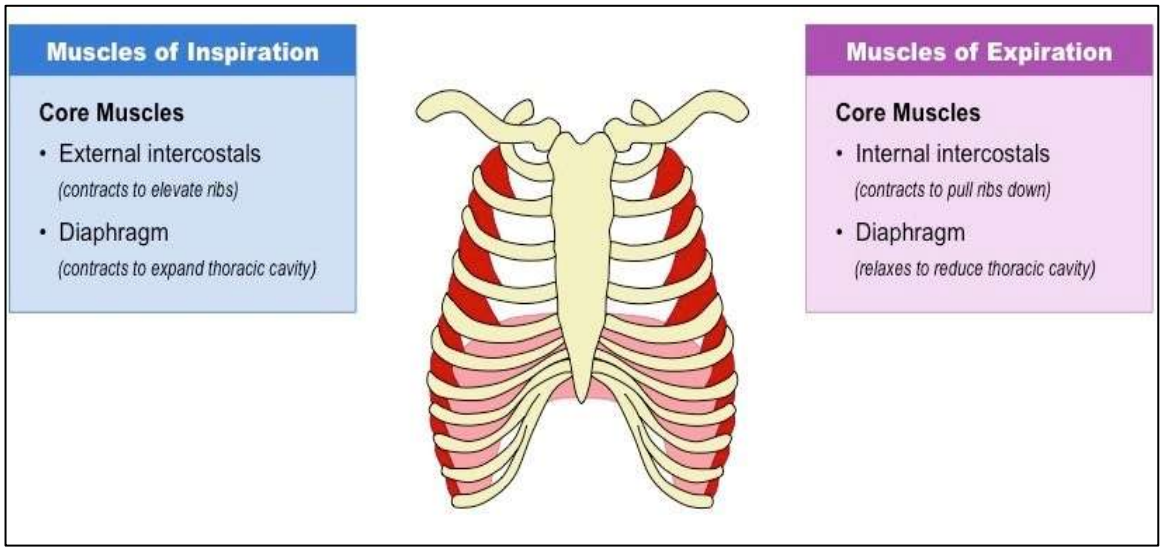
Bone is a specialized connective tissue made of cells and calcified matrix. Its main cells are osteoblasts, osteocytes, and osteoclasts. Compact bone is organized into osteons with Haversian canals containing blood vessels and nerves. Osteocytes communicate through canaliculi.

Cartilage is an avascular connective tissue made of chondrocytes within an extracellular matrix. Hyaline cartilage contains mainly Type II collagen and is found in the trachea, costal cartilages, and articular surfaces.



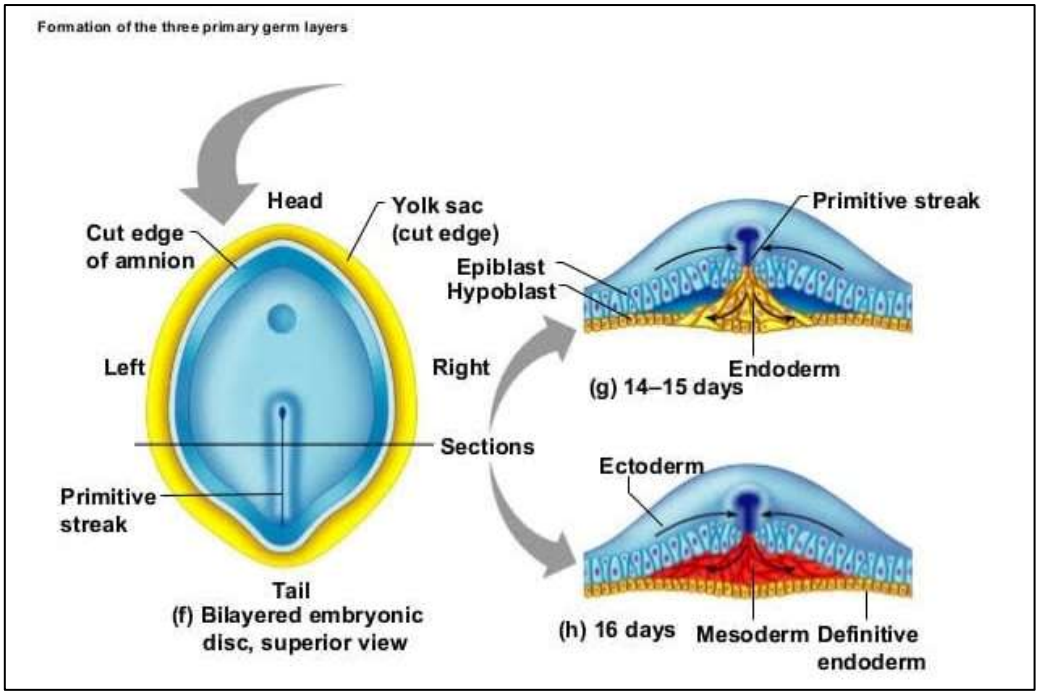
(6)

(A) **T** - External intercostals elevate ribs.
(B) **T** - Internal (interosseous part) depress ribs.
(C) **F** - External intercostals do NOT reach sternum (replaced by membrane anteriorly).
(D) **T** - Internal intercostals extend sternum → angle of rib.
(E) **F** - Innermost layer is incomplete.



(7)

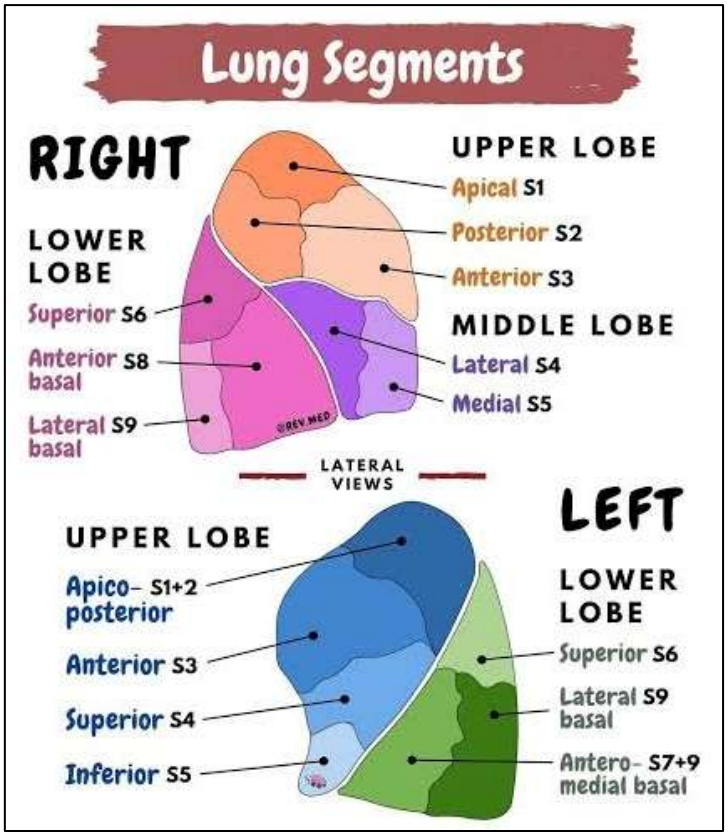
(F) **T -** Epiblast cells move toward the primitive streak. They invaginate and migrate to form: endoderm, mesoderm & remaining epiblast → ectoderm.
(G) **F -** Amniotic cavity forms in the 2nd week.
(H) **F -** From epiblast.
(I) **T**
(J) **F -** Not a process of gastrulation.



(8)

(A) **T**
(B) **T**
(C) **T**
(D) **T**
(E) **F**

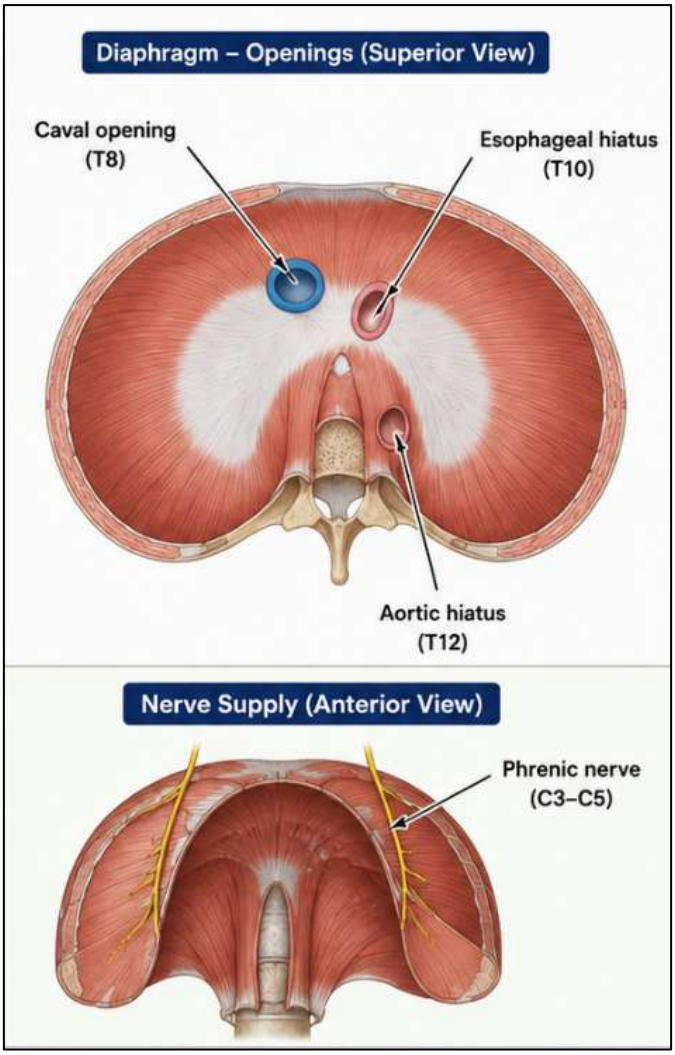
Segments are independent units (bronchus + artery), veins are intersegmental, allowing segmentectomy. Right lung has 10 segments.



(9)

(A) **T**
(B) **F**
(C) **T**
(D) **T**
(E) **T**

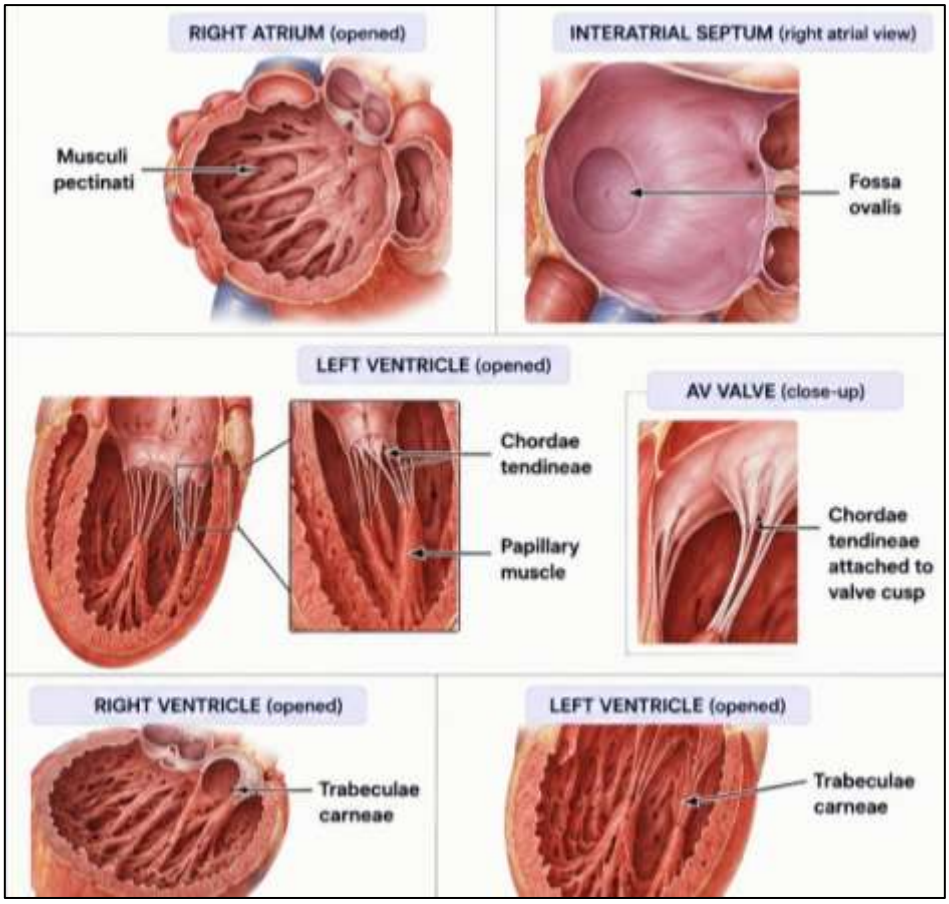
The diaphragm is a dome-shaped musculotendinous partition separating the thoracic and abdominal cavities. It is the main muscle of respiration and is supplied by the phrenic nerve. Major openings include the caval opening (T8), esophageal hiatus (T10), and aortic hiatus (T12).



(10)

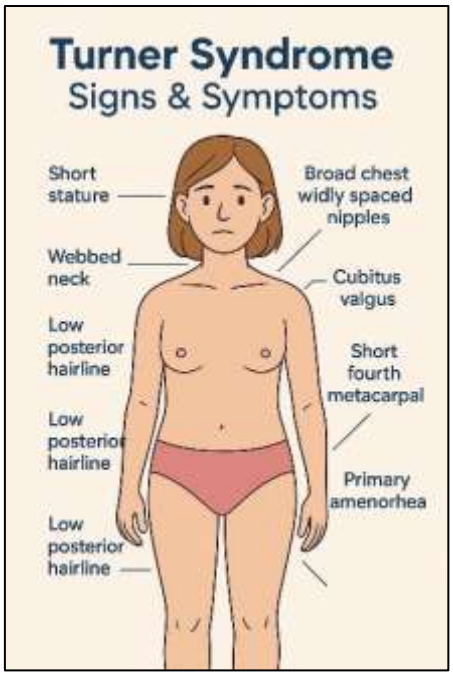
(A) **T**
(B) **T**
(C) **F**
(D) **T**
(E) **T**

The internal surface of the heart shows specialized structures in each chamber. The atria contain musculi pectinati, while the ventricles contain trabeculae carneae and papillary muscles. Chordae tendineae connect papillary muscles to the cusps of atrioventricular valves. The fossa ovalis is a depression in the interatrial septum of the right atrium.



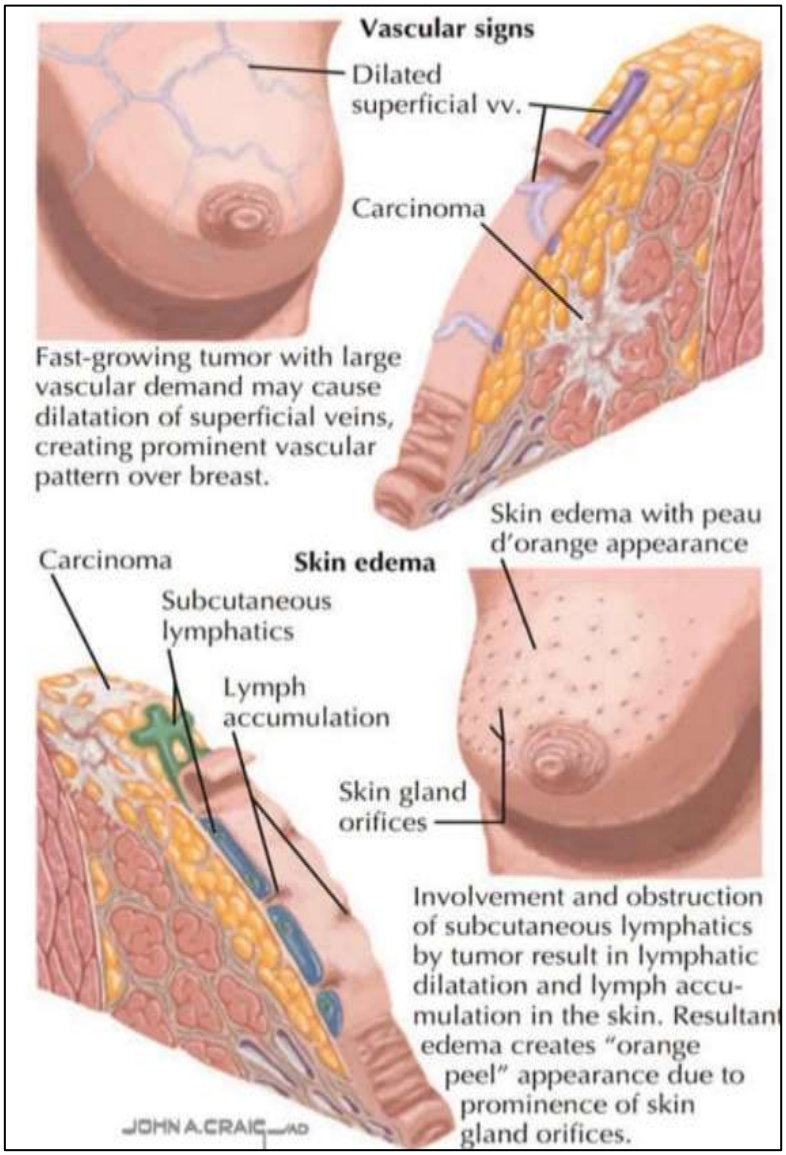
Single Best Questions.

(11) C



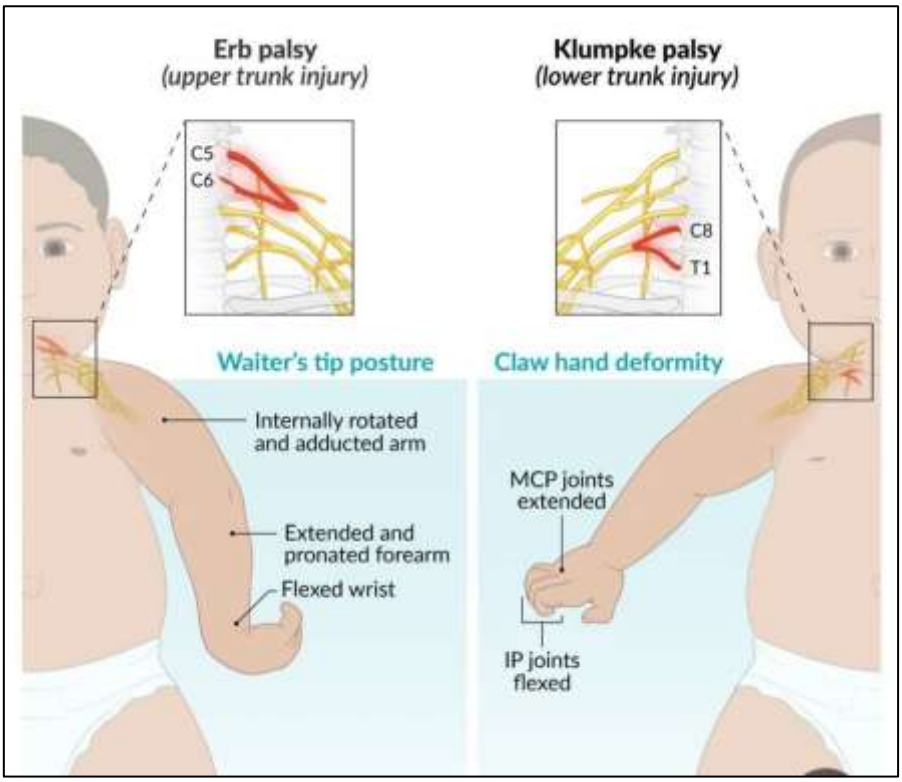
(12) C

Tumor blocks dermal lymphatics → skin edema
Hair follicles tethered → "orange peel" appearance



(13) B

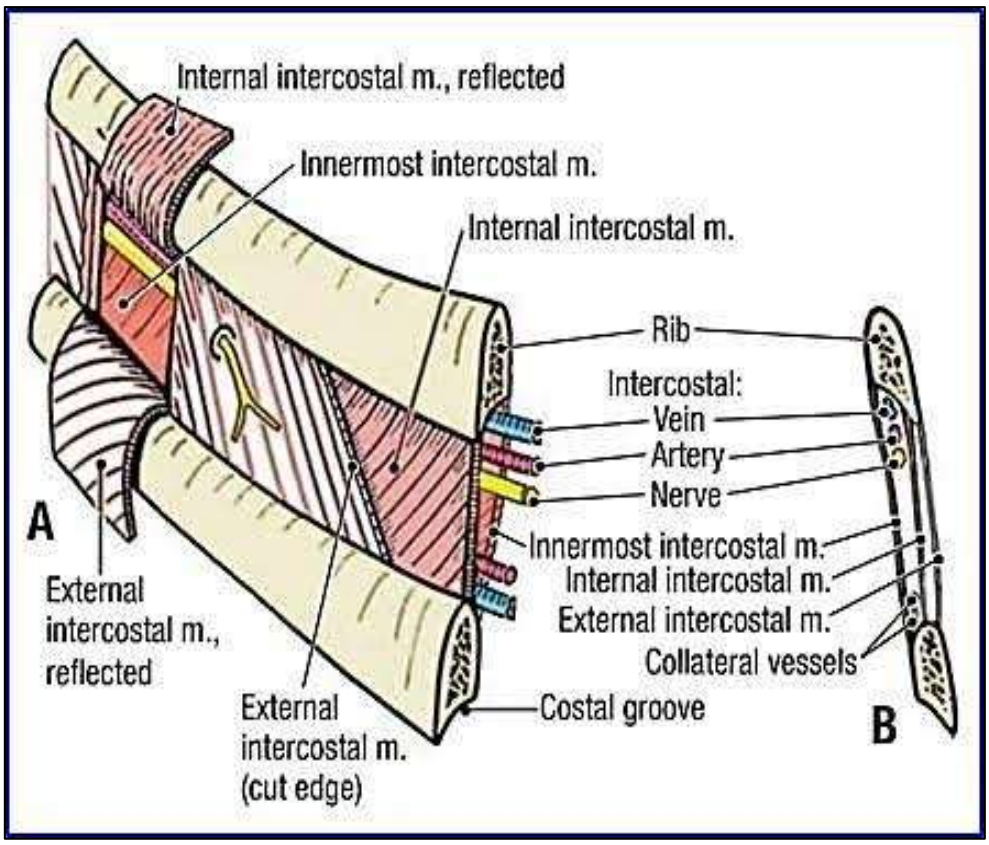
Injury to the upper trunk (C5–C6) leads to Erb's palsy, affecting shoulder abduction and lateral rotation.



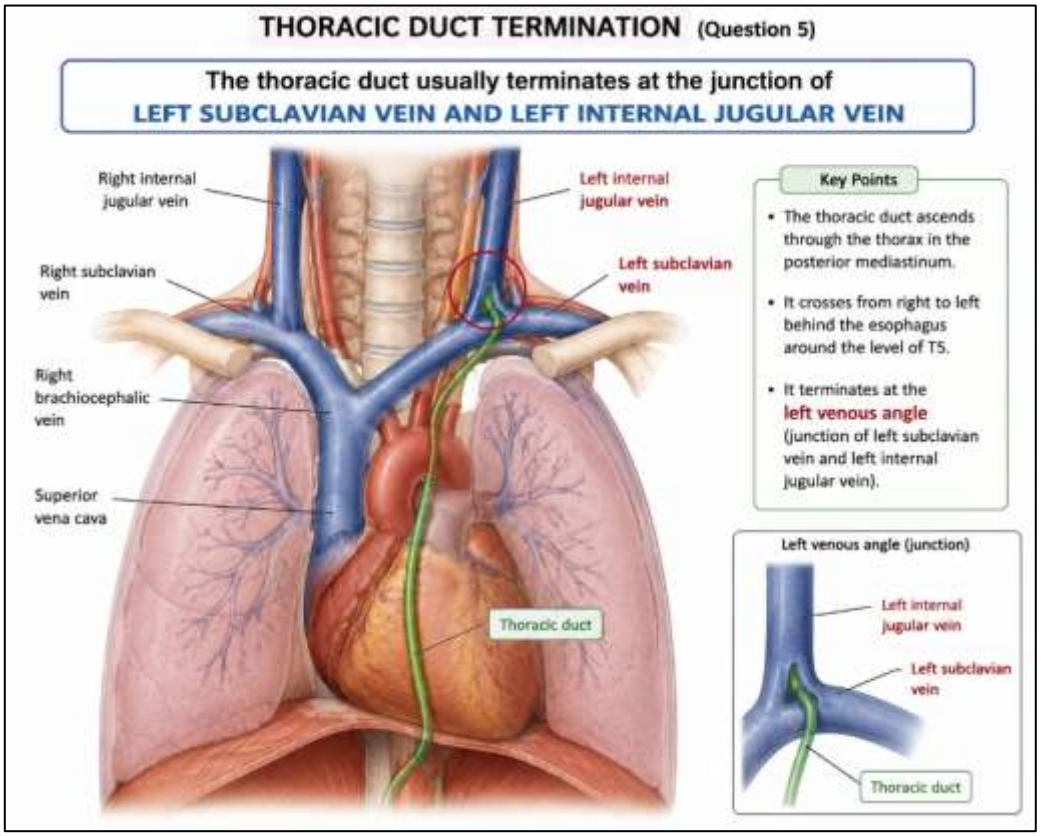
(14) B

The intercostal vein, artery, and nerve (VAN) run in this plane in the order:
Vein – Artery – Nerve (VAN) from superior to inferior.
This is a very important surgical plane to avoid injury during chest procedures like:

- Chest tube insertion
- Thoracentesis
- Intercostal nerve block.

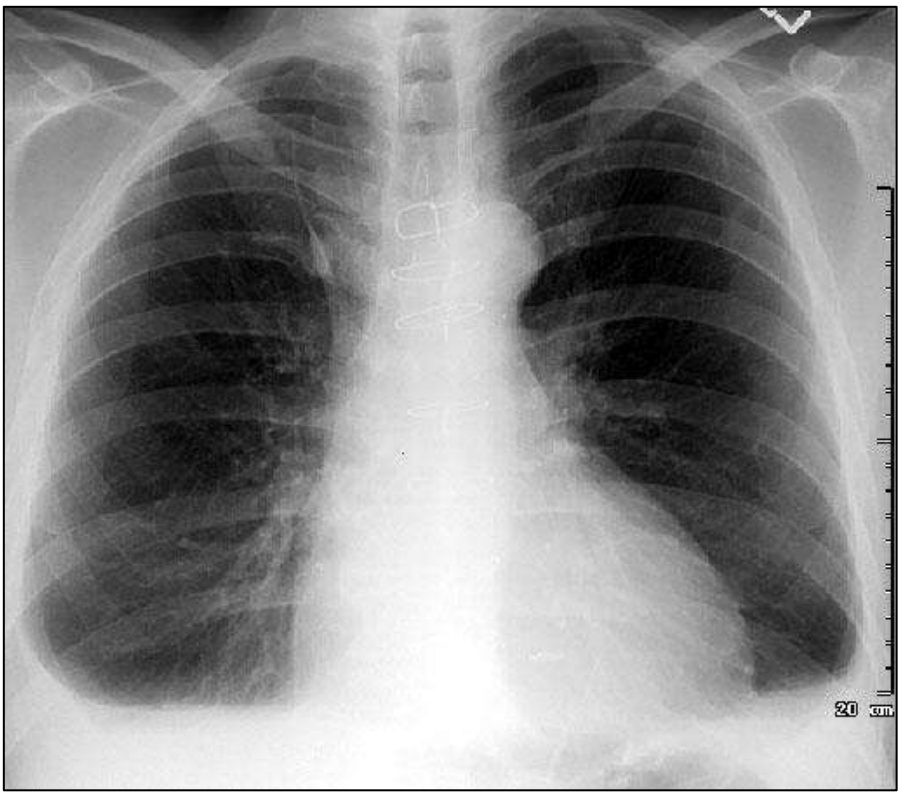

Internal intercostal m., reflected
Innermost intercostal m.
Internal intercostal m.
Rib
Intercostal:
Vein
Artery
Nerve
A
Innermost intercostal m.
Internal intercostal m.
External intercostal m.
Collateral vessels
External intercostal m., reflected
External intercostal m. (cut edge)
Costal groove
B

(15) B


THORACIC DUCT TERMINATION (Question 5)
The thoracic duct usually terminates at the junction of
LEFT SUBCLAVIAN VEIN AND LEFT INTERNAL JUGULAR VEIN
Right internal jugular vein
Left internal jugular vein
Right subclavian vein
Left subclavian vein
Right brachiocephalic vein
Superior vena cava
Thoracic duct
Key Points
• The thoracic duct ascends through the thorax in the posterior mediastinum.
• It crosses from right to left behind the esophagus around the level of T5.
• It terminates at the left venous angle (junction of left subclavian vein and left internal jugular vein).
Left venous angle (junction)
Left internal jugular vein
Left subclavian vein
Thoracic duct

(16) C

In pleural effusion, fluid accumulates in the pleural space, first causing blunting of the costophrenic angle on upright chest X-ray. As the volume increases, a curved upper border (meniscus sign) becomes visible. Large effusions may cause homogenous opacity ("white-out") of the hemithorax with mediastinal shift away.



(17) B

In metaphase of mitosis, chromosomes align at the metaphase (equatorial) plate, and spindle fibres attach to the centromeres. Sister chromatids remain joined until anaphase begins.

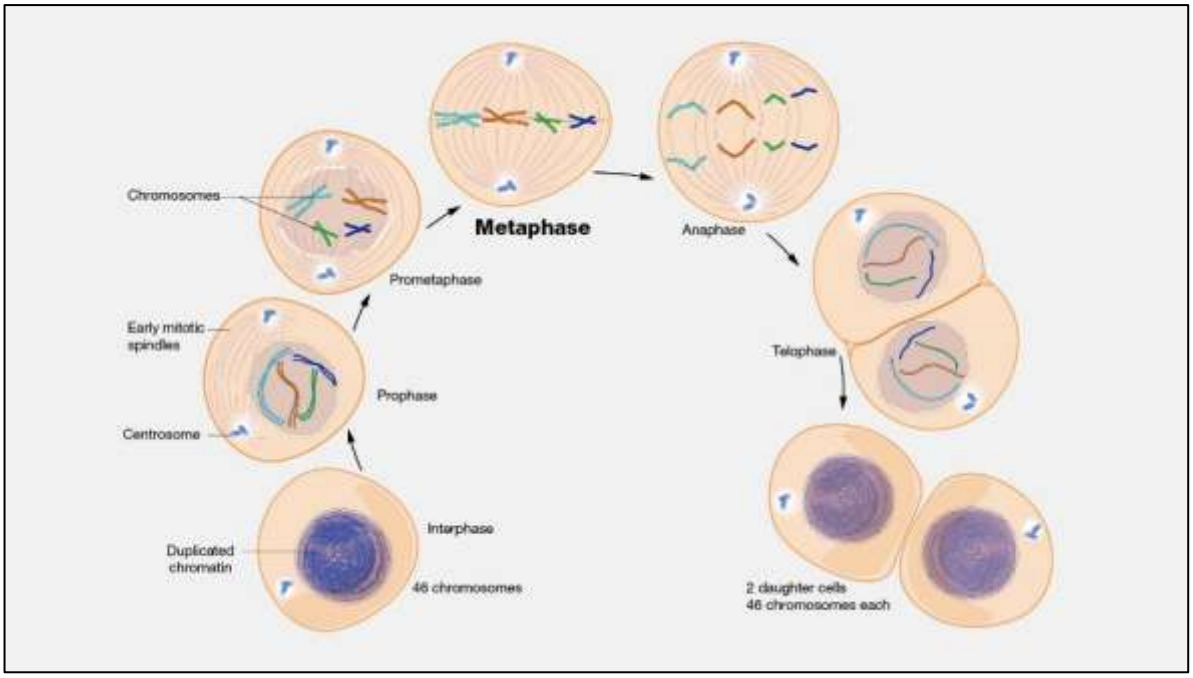
Prophase → chromosome condensation, nuclear membrane breaks down

Metaphase → alignment at equator

Anaphase → sister chromatids separate

Telophase → nuclear membranes reform

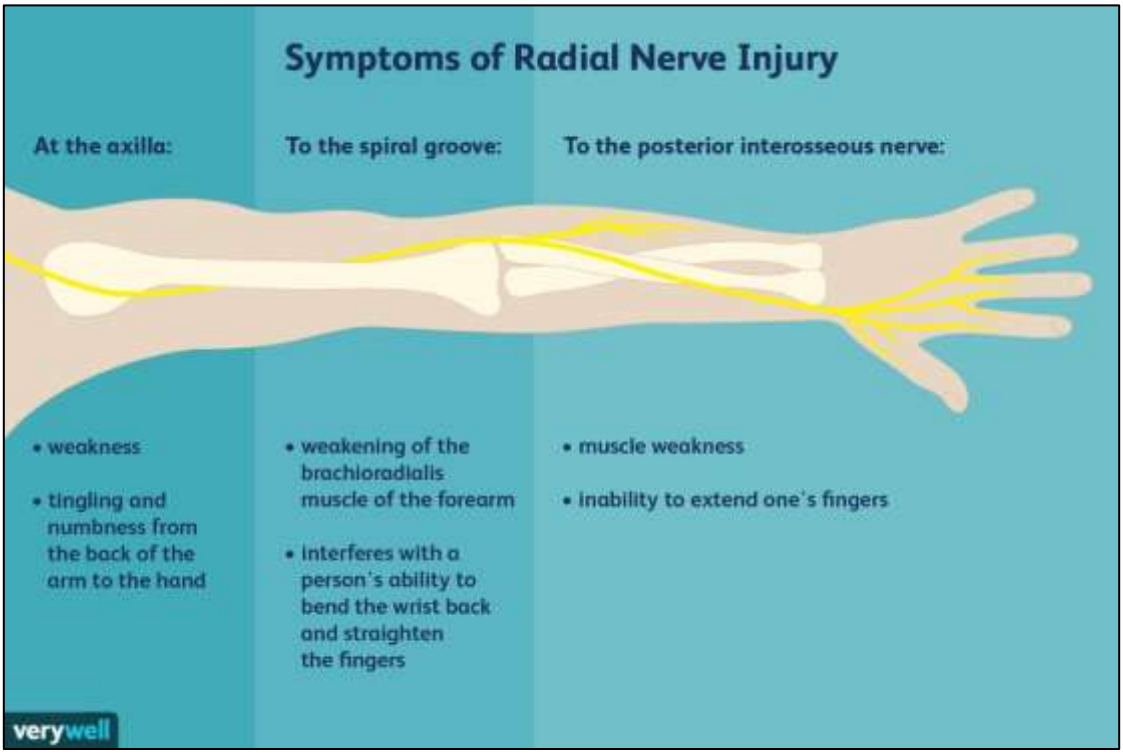
Interphase → DNA replication and cell growth



(18) B

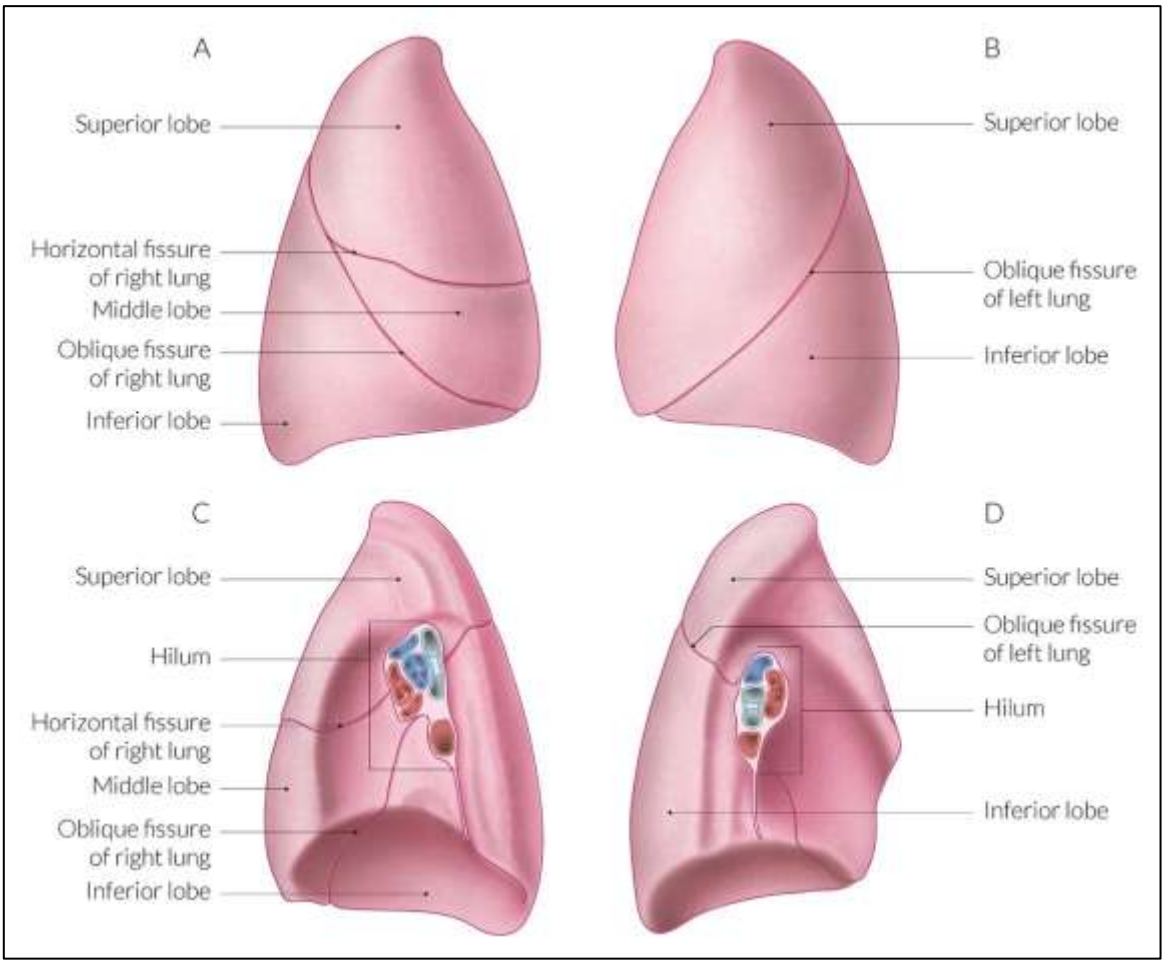
Posterior interosseous nerve

PIN lesion → finger drop but wrist extension preserved via ECRL.



(19) C

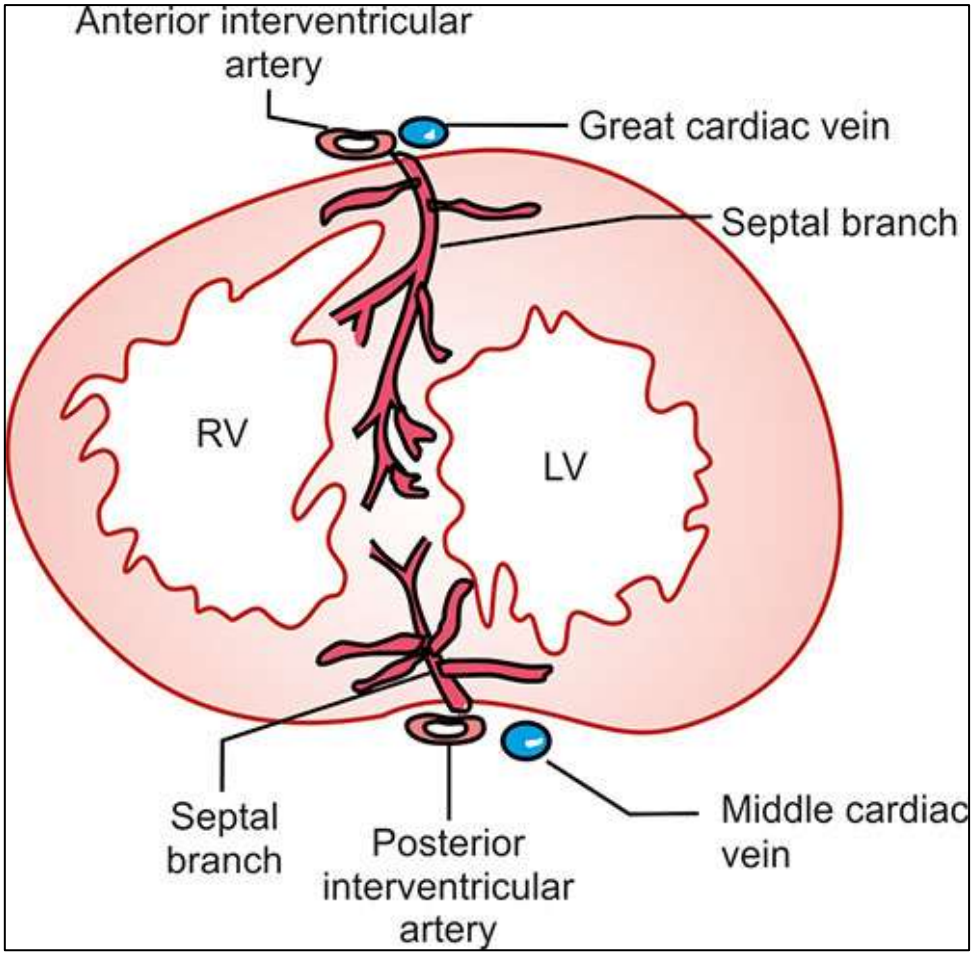
The left lung has a lingula, which is a tongue-like projection of its upper lobe. The apex of the lung extends about 2–3 cm above the medial third of the clavicle. Both lungs contain an oblique fissure, and the hilum is situated on the mediastinal surface. The cardiac impression is more prominent on the left lung due to the position of the heart.



(20) C

The posterior interventricular septum is mainly supplied by the posterior interventricular artery (posterior descending artery), which usually arises from the right coronary artery in right-dominant circulation. It runs in the posterior interventricular sulcus and supplies the posterior one-third of the interventricular septum.

The anterior interventricular artery (LAD) supplies the anterior two-thirds of the septum, while the circumflex artery mainly supplies the lateral and posterior walls of the left ventricle. The marginal branch of the right coronary artery supplies the right ventricle, not the septum.

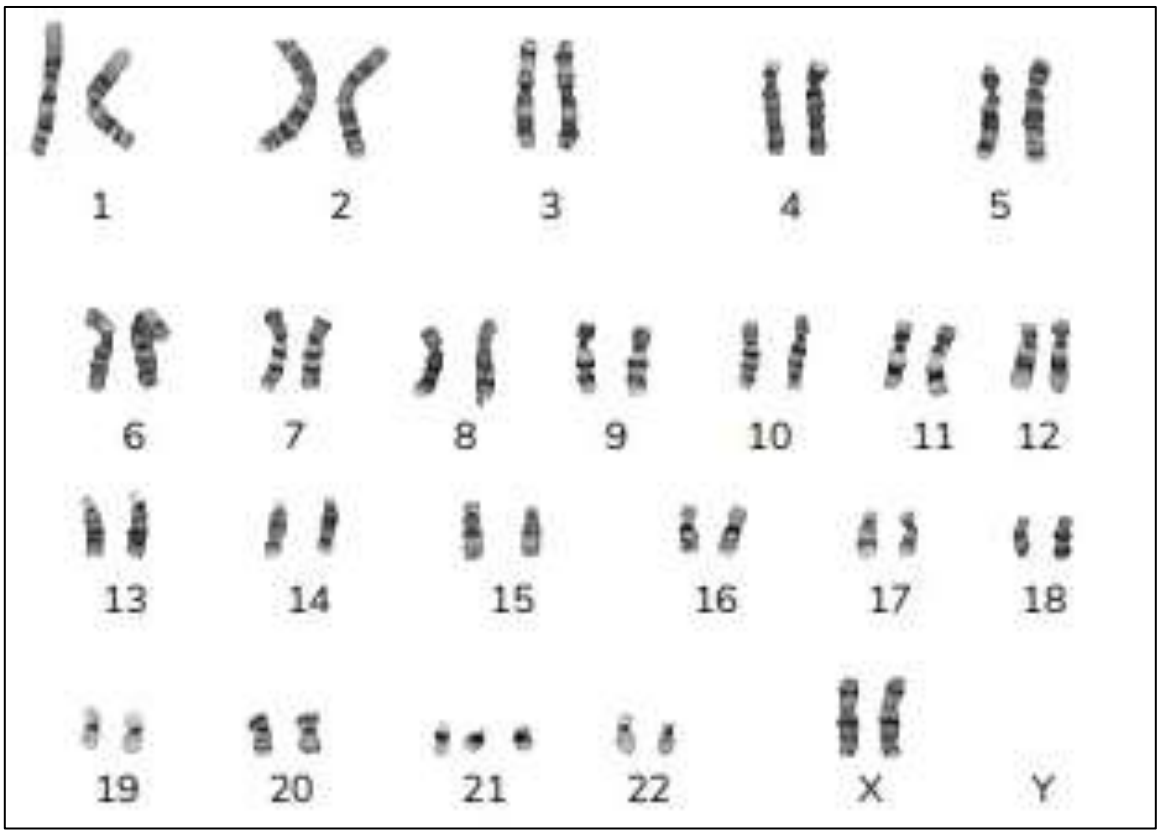

Anterior interventricular artery
Great cardiac vein
Septal branch
RV
LV
Septal branch
Posterior interventricular artery
Middle cardiac vein

Batch 3 - CAT 1 - Mock OSPE

(1)

(A) Identify the chromosomal abnormality shown in the karyotype.

(B) Mention two clinical features commonly seen in this syndrome.



(2) A 50-year-old male patient is undergoing coronary artery bypass surgery. The surgeon demonstrated the indicated space during surgery with green coloured thread.
(A) Identify the space indicated by the thread.
(B) Name the structures separated by that space.



(3) A 47-year-old female patient is undergoing carpal tunnel decompression. The surgeon wants to avoid injury to this indicated structure (black arrow head) during surgery.
(A) Identify the structure pierced by the arrow head.
(B) Name 2 structures that lies lateral to this.



(4) A 28-year-old man was brought to the emergency department after a road traffic accident. Examination reveals tenderness and deformity at the middle part of the arm. The X ray of his arm is shown below.

(A) What is the most likely structure to be damaged.

(B) Name a specific clinical sign in this patient.



(5)

(A) Identify the structure indicated by the black arrow head.

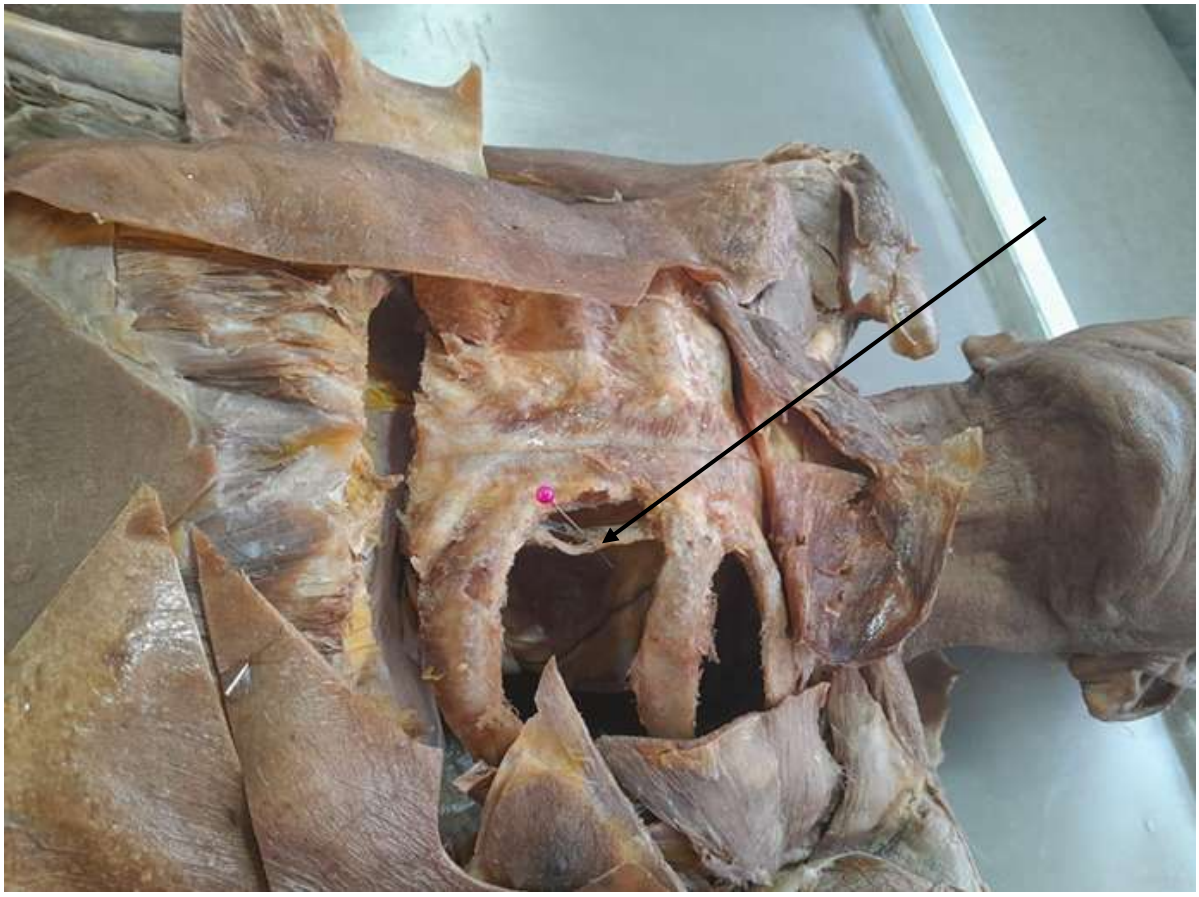
(B) What is its nerve supply.



(6)

(A) Identify the structure indicated by the black arrow head.

(B) Name its origin.



(7)

(A) Identify the organ and the side.

(B) What structure makes the impression marked by pin?

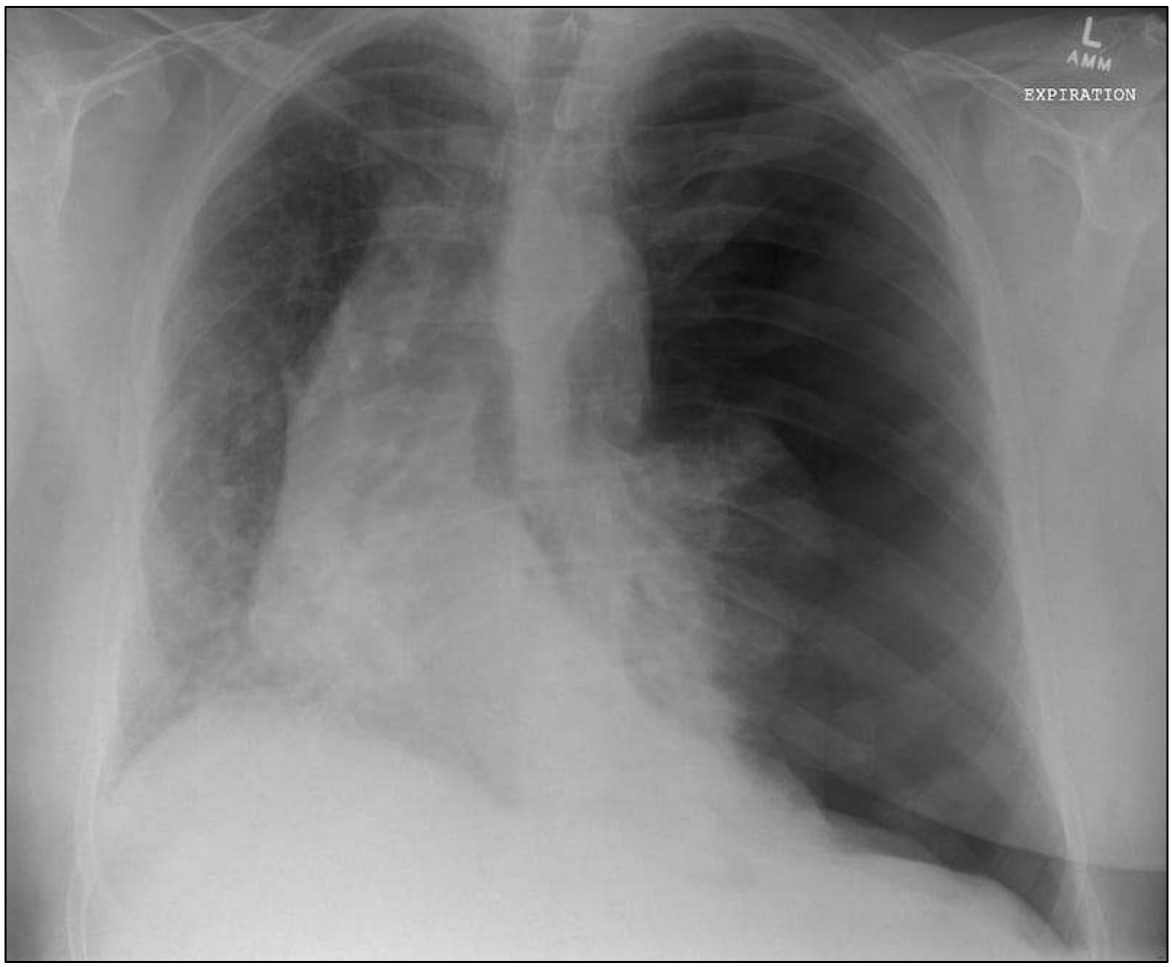
(C) Name one feature which helps to differentiate the side.



(8) A 24-year-old man was brought to the emergency department after a stab injury to the chest. He complains of severe shortness of breath and chest pain. His chest X-ray is shown below.

(A) Identify the condition shown in the chest X-ray.

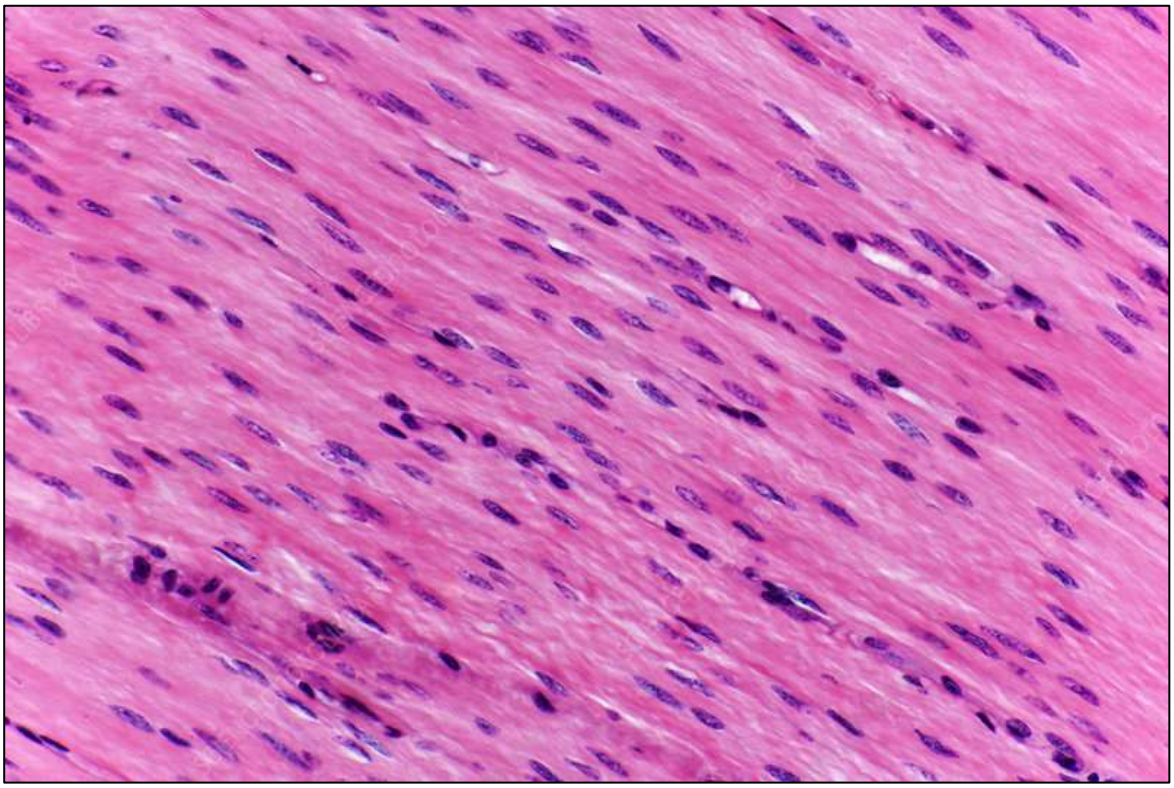
(B) What is the first step in the management?



(9)

(A) Identify the tissue type shown in the slide.

(B) Name one characteristic feature of that tissue.

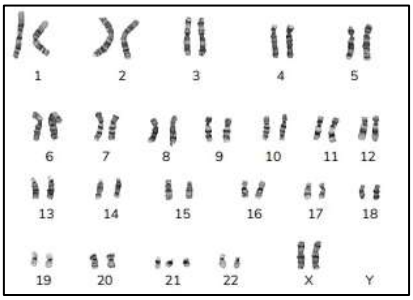


(10) The tissue shown in the slide is a gland. Name the type of epithelium pointed.



Batch 3 – CAT 1 - MOCK OSPE Answers

(1)



(A) Trisomy 21

(B) Epicanthic folds
Upward slanting eyes
Protruding tongue
Single transverse palmar crease
Congenital heart defects
Short stature
Wide gap between first and second toes

(2)



(A) Transverse pericardial sinus

(B) Posteriorly – Superior Vena Cava
Anteriorly – Ascending aorta, Pulmonary trunk

(3)



(A) Ulnar artery

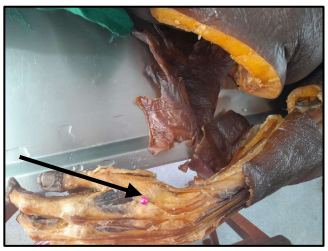
(B) Ulnar nerve
Pisiform bone

(4)



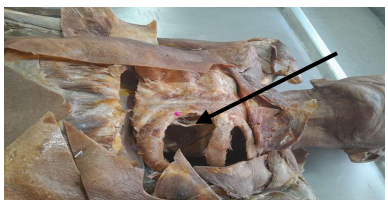
(A) Radial nerve
(B) Wrist drop

(5)



(A) Extensor Policis Longus Tendon/ Extensor Policis longus
(B) Posterior Interosseous Nerve

(6)



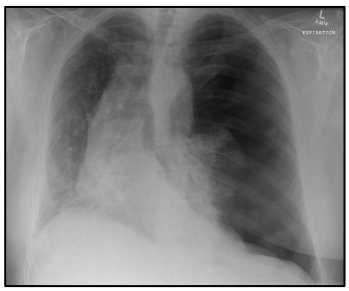
(A) Internal Thoracic Artery
(B) Subclavian artery/ First part of subclavian Artery

(7)



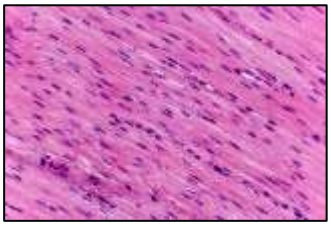
(A) Right Lung
(B) Azygous arch/ Azygous Vein
(C) Three lobes/ Branched principal bronchi at the hilum/ Branched pulmonary artery at the hilum/ Presence of epaterial and hyperpaarterial bronchi

(8)



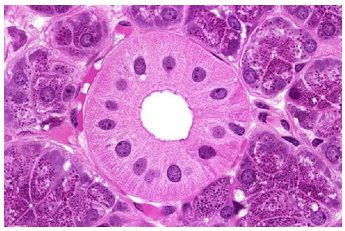
(A) Left-sided tension pneumothorax.
(B) Needle Thoracostomy at safe triangle.

(9)



(A) Smooth muscle tissue
(B) spindle shape muscle fibres/oval shape nucleus/Absence of striae/Unbranched

(10)



Simple cuboidal epithelium

CONTINOUS ASSESSMENT 01 PAPERS WITH ANSWERS

(1) BATCH 02
(2) BATCH 03

Batch 02 – CAT 01 – MCQ Paper

UVA WELLASSA UNIVERSITY OF SRI LANKA
FACULTY OF MEDICINE
Continuous Assessment 01
2023/2024 (2nd) Batch Anatomy
Multiple Choice Questions (MCQ) Paper

Time 10.00 am – 11.00 am (01 hour) Date of the exam

Please do not attempt or promote copying. No textbooks, notes, mobile phones, smart watches, or any other electronic communication devices are allowed.

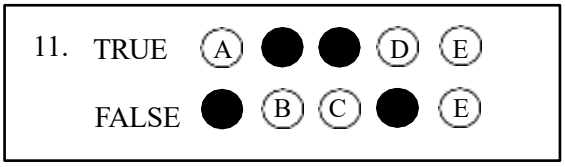
Please read the following instructions before marking responses on your answer sheets

1. Check that your question paper has a total of **06 pages,** including the front page.
2. **A single answer sheet is provided**. Please write your index number in the given space.
3. Read each question carefully before answering.
4. Mark the correct response as a **heavy black mark, filling the relevant circle completely**, using a **black lead pencil (6B or above grade).**
5. Do not make stray marks on the answer sheet. In case of an error, erase cleanly.
6. Your final answer should be a densely coloured circle through which the underlying letter is not visible.
7. Marking using any other method (e.g., mark the circle with a cross) is not valid.

Ten (10) True/False Type Questions (Questions 1-10/Page 2-3)

1. Mark whether each response is true or false.
2. Given below is an example of how to mark a true/false type question.

Q 11. A woman has
- A. One ovary.
- B. One nose.
- C. Two ears.
- D. One eye.
- E. Two hairs.

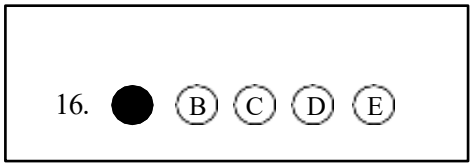


A correct response will get = +1 mark
An incorrect response will get = -1 mark
No response will get = 0 (zero) mark
Negative marks will not be carried over to the next question

Ten (10) Single Best Response (SBR) Type Questions (Questions 11-20/ Page 4-6)

1. Mark the best response. Only one response per question should be marked.
2. If you mark the correct response, you will get the full marks for the question.
3. If you mark an incorrect response, fail to mark any response, select more than one response, or mark your response unclearly, you will not receive any marks for that question.
4. Given below is an example of how to mark a single best response type question.

Q 16. Speaking is a unique ability observed in humans. Which of the following body parts is primarily used for speech production?
- A. Tongue
- B. Hands
- C. Feet
- D. Ears
- E. Nose



T/F MCQs 1-10

(1) True/False regarding the median nerve?
   A. It supplies the lateral two lumbricals.
   B. It passes superficial to the flexor retinaculum at the wrist.
   C. The anterior interosseous nerve is a purely motor branch of the median nerve.
   D. Injury at the wrist spares forearm flexor muscles.
   E. The palmar cutaneous branch of the median nerve passes through the carpal tunnel.

(2) True/False regarding fertilization?
   A. Fertilization with donor sperms is a treatment modality for male infertility.
   B. It determines the sex of the individual.
   C. It requires capacitated spermatozoa.
   D. It restores the diploid number of chromosomes.
   E. It takes place in the ampullary region of the fallopian tube.

(3) True/False regarding the development of somites?
   A. Commences towards the end of 3rd week of embryo development.
   B. Correlates with the age of the embryo in days.
   C. Is segmental along the primitive streak.
   D. Occurs as a differentiation of the paraxial mesoderm.
   E. Takes place approximately two pairs a day.

(4) True/False regarding the neurulation of a developing embryo?
   A. Cranial neuropore closes approximately on the 25th day.
   B. Fusion of neural folds initiates at the cephalic end.
   C. Neural crest cells give rise to alveolar macrophages.
   D. Notochord has an inductive effect on ectoblasts.
   E. Spina bifida occulta is a neurulation defect.

(5) True/False regarding the shoulder (glenohumeral) joint?
   A. It is a ball-and-socket synovial joint.
   B. Both mobility and stability of the joint are maintained by the rotator cuff muscles.
   C. It is most commonly dislocated anteriorly.
   D. The glenoid labrum deepens the articular surface of the glenoid cavity.
   E. The coracoacromial arch directly articulates with the humeral head.

(6) True/False regarding the small (intrinsic) muscles of the hand?
   A. The lumbrical muscles flex the metacarpophalangeal joints and extend the interphalangeal joints.
   B The palmar interossei muscles abduct the fingers away from the midline.
   C Most of them are innervated by the ulnar nerve.
   D. The thenar muscles are primarily supplied by the recurrent branch of the median nerve.
   E. The hypothenar muscles include the opponent digiti minimi.

7. True/False regarding chromosomal abnormalities?
   A. A pericentric inversion involves the inversion of a segment that includes the centromere.
   B. A Robertsonian translocation involves the fusion of two metacentric chromosomes.
   C. Isochromosomes are formed due to the longitudinal division of the centromere.
   D. Mitotic nondisjunction occurring in the early zygote leads to mosaicism.
   E. Trisomy 21 is caused by nondisjunction during meiosis.

8. True/False regarding patterns of inheritance?
   A. Autosomal dominant disorders affect both sexes equally.
   B. Autosomal recessive disorders are more likely to occur in consanguineous families.
   C. X-linked dominant disorders are transmitted from an affected father to his sons.
   D. Mitochondrial inheritance is patrilineal
   E. X-linked recessive disorders are transmitted from a carrier mother to all her daughters.

9. True/False regarding the normal development and developmental anomalies of the respiratory system?
   A. The respiratory system develops from the endoderm of the foregut.
   B. The laryngotracheal diverticulum appears during the 8th w e e k of embryonic development.
   C. Tracheoesophageal fistula is a common congenital anomaly of the respiratory tract.
   D. Lung development is completed before birth.
   E. Pulmonary hypoplasia leads to congenital diaphragmatic hernia.

10. True/False regarding the anatomy of heart and pericardium?
   A. The fibrous pericardium is innervated by the phrenic nerve.
   B. The apex of the heart is formed by the right ventricle.
   C. The pericardial cavity lies between the parietal and visceral layers of the serous pericardium.
   D. The transverse pericardial sinus is located between the superior vena cava and the aorta.
   E. The base of the heart is formed mainly by the left atrium.

SBA 11-20

11. A 16-year-old girl was counselled on genetic inheritance as part of a school health education program. During the discussion, the counsellor explained how gametes (eggs and sperm) have half the number of chromosomes of normal body cells, due to the process of meiosis.

    Which of the following events ls unique to meiosis and contributes to genetic diversity?

    A. Alignment of chromosomes at the metaphase plate.
    B. DNA replication during S phase.
    C. Formation of the mitotic spindle.
    D. Pairing of homologous chromosomes and crossing over.
    E. Separation of sister chromatids during anaphase.

12. A 70-year-old man with stroke, lying supine on bed, aspirated one of his tablets in to his lung while swallowing.

    What is the most likely segmental bronchus obstructed by the tablet?

    A. Anterior segmental bronchus of right upper lobe.
    B. Apical segmental bronchus of right lower lobe.
    C. Inferior segmental bronchus of lingula.
    D. Medial basal segmental bronchus of left lower lobe.
    E. Medial segmental bronchus of right middle lobe.

13. A 68-year-old male presented with exertional dyspnoea and syncope. On examination, a harsh systolic murmur is heard at the right 2nd intercostal space, radiating to the carotids. Echocardiography confirmed aortic stenosis.

    Which of the following anatomical statements best explains the site and radiation of this murmur?

    A. Auscultation of the aortic valve corresponds to the right 2"^{d} intercostal space.
    B. The aortic valve lies between the left atrium and left ventricle.
    C. The aortic valve is located posterior to the sternum at the level of the 5th intercostal space
    D. The murmur radiates to the carotids due to turbulent flow across the pulmonary valve.
    E. The aortic valve is innervated by the phrenic nerve, causing referred symptoms to the neck.

14. A 45-year-old woman presented to the breast clinic with a painless lump in the upper outer quadrant of her right breast. On examination, a firm, mobile mass is palpated, and a few enlarged, non-tender lymph nodes are found in the right axilla. A mammogram confirms a suspicious lesion. A sentinel lymph node biopsy is planned.

    Which of the following lymph node groups is the first and most likely site of metastasis from this region of the breast?

    A. Parasternal (internal thoracic) nodes
    B. Apical axillary nodes
    C. Central axillary nodes
    D. Lateral axillary (humeral) nodes
    E. Pectoral (anterior) axillary nodes

15. A 58-year-old man presents to the emergency department with sudden-onset chest pain radiating to his left arm. ECG shows ST-segment elevation in leads II, III, and aVF. He was diagnosed with an inferior ST-elevation myocardial infarction (STEMI). Cardiac catheterization confirmed an occlusion of the right coronary artery.

    Which of the following structures is most likely to be affected due to its usual supply by the right coronary artery?

    A. Anterior wall of the left ventricle
    B. Apex of the heart
    C. Interventricular septum
    D. Lateral wall of the left ventricle
    E. Sinoatrial (SA) node

16. A 32-year-old man presented with shortness of breath after sustaining a stab wound to the chest. Examination and imaging confirmed a left-sided pneumothorax. A chest tube was inserted in the 5th intercostal space, anterior to the midaxillary line, within the safe triangle.

    Which of the following muscles is the first to be pierced during the chest tube insertion at this site?

    A. External intercostal muscle
    B. Internal intercostal muscle
    C. Latissimus dorsi
    D. Pectoralis major
    E. Serratus anterior

17. A 38-year-old man presented to the emergency department after a motorbike accident. He is conscious but complains of neck pain and tingling in both hands. A CT scan of the cervical spine revealed a fracture of the posterior arch of the atlas (Cl vertebra) without displacement.

    Which of the following best describes the unique anatomical features of the Cl vertebra that helps to explain this injury?

    A. It contains a bifid spinous process used for muscle attachment.
    B. It contains the odontoid process (dens), which articulates with the skull base.
    C. It has no vertebral body and consists of anterior and posterior arches.
    D. It has the largest vertebral body in the cervical spine.
    E. It lacks a vertebral foramen and has no articulation with the skull.

18. A 62-year-old man presents with progressive dysphagia, initially to solids and later to liquids. He also reports weight loss over the past two months. Barium swallow confirms narrowing of the oesophagus. A CT scan of the chest reveals a mass arising from the oesophagus in the posterior mediastinum infiltrating a related structure which makes the tumour inoperable.
    Which of the following structures most likely infiltrated by the tumour in this case?

    A. Descending aorta
    B. Hemiazygos vein
    C. Sympathetic trunk
    D. Thoracic duct
    E. Vagus nerve

19. A 3-year-old child presents with cyanosis, difficulty feeding, and shortness of breath during exertion. A heart murmur is detected, and an echocardiogram confirms the diagnosis of Tetralogy of Fallot.

    Which of the following anatomical abnormalities is most characteristic of Tetralogy of Fallot and contributes to the cyanosis seen in this child?

    A. Overriding aorta
    B. Pulmonary stenosis
    C. Left-to-right shunt through a ventricular septal defect (VSD)
    D. Atrial septal defect (ASD)
    E. Mitral valve prolapse

20. Which of the following statements best describes the fibrous pericardium?
    A. It forms the visceral layer of the serous pericardium.
    B. It is fused with the tunica adventitia of the great vessels.
    C. It lines the inner surface of the heart chambers.
    D. It receives parasympathetic innervation from the phrenic nerve.
    E. It secretes pericardial fluid into the pericardial cavity.

Batch 02 – CAT 01 – MCQ Answers

(1) T F T T F

(2) T T T T T

(3) T T F T F

(4) T T F T T

(5) T T T T F

(6) T F T T T

(7) T F F T T

(8) T T F F F

(9) T F T F T

(10) T F T F T

(11) D

(12) B

(13) A

(14) E

(15) E

(16) A

(17) C

(18) A

(19) A

(20) B

Batch 02 – CAT 01 – OSPE

(1)

(A) Identify the structure/area indicated by yellow pin

(B) Name the congenital abnormality if (A) is not formed during embryological development



(2)

(A) Identify the surface coloured

(B) Name the joint (A) is involved in



(3) A 60-year-old male patient was admitted following a fall on shoulder

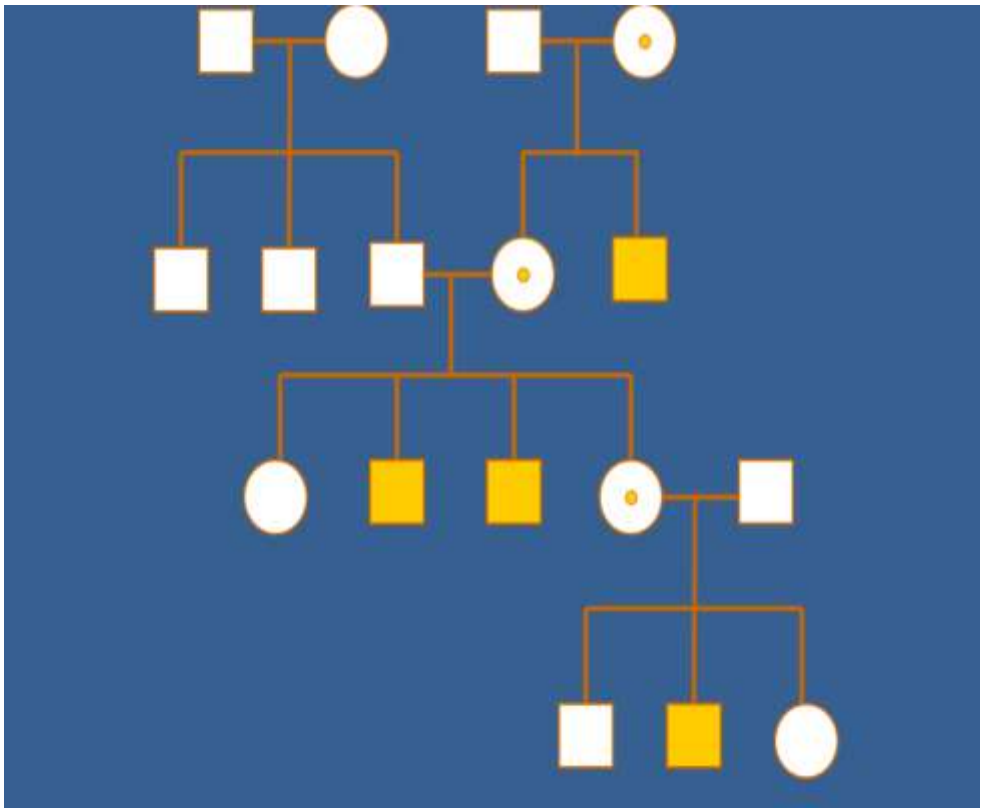
(A) Identify the abnormality indicated by the arrow

(B) What is the closely related neurological structure which may be damaged in this injury



(4) 14-year-old boy presented with haemarthrosis (bleeding into a joint) of right knee joint following minor injury. Some uncles of his mother's family have the same condition.

(A) Identify the inheritance pattern of his following pedigree



(5)

(A) Identify the structure indicated by pin

(B) Name a clinical deformity if the structure is damaged here



(6)

(A) Identify the structure indicated by

(B) What is its nerve supply -Posterior interosseous Nerve



(7)

(A) Identify the structure indicated by pin

(B) Name its origin



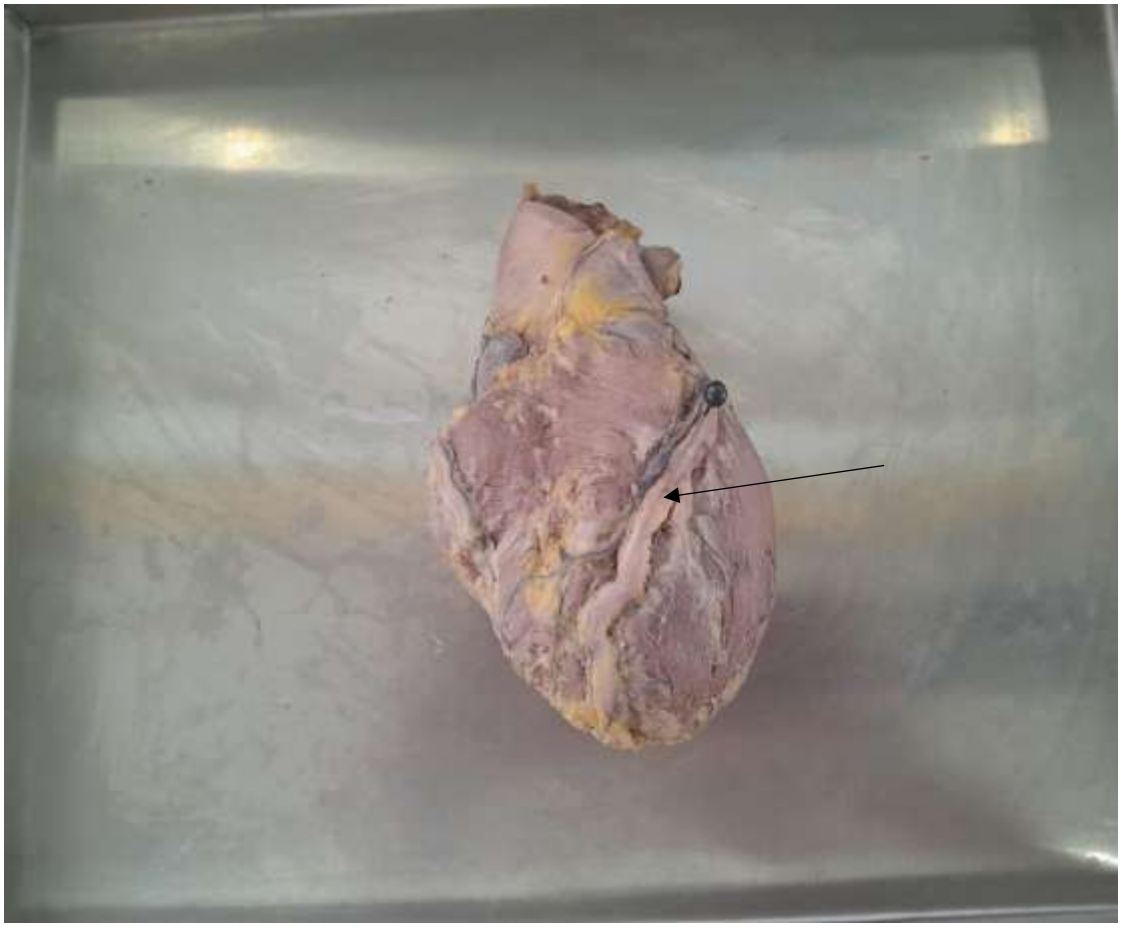
(8) A 30-year-old male presented with Respiratory arrest after a neck injury due to a road traffic accident. The structure pieced by the pin was damaged at its origin.

(A) Identify the structure pieced by the pin



(9) A 55-year-old male patient with diabetes and hypertension was presented with sudden onset chest pain with associated sweating, nausea and vomiting. His ECG shows anterolateral myocardial infarction. The structure marked by pin was completely occluded.

(A) Name the structure marked by pin



(10)

(A) Name the structure marked by the pin

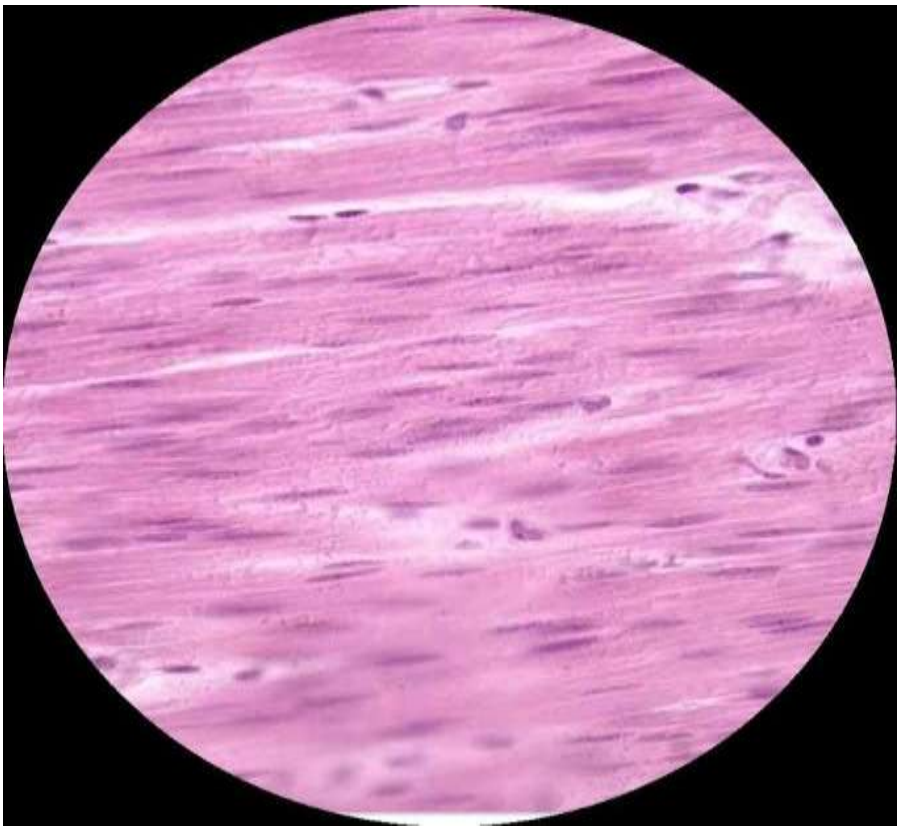
(B) What is the important vascular injury that occurs if it is deeply penetrated by a needle?



(11)

(A) Identify the tissue type shown in the slide

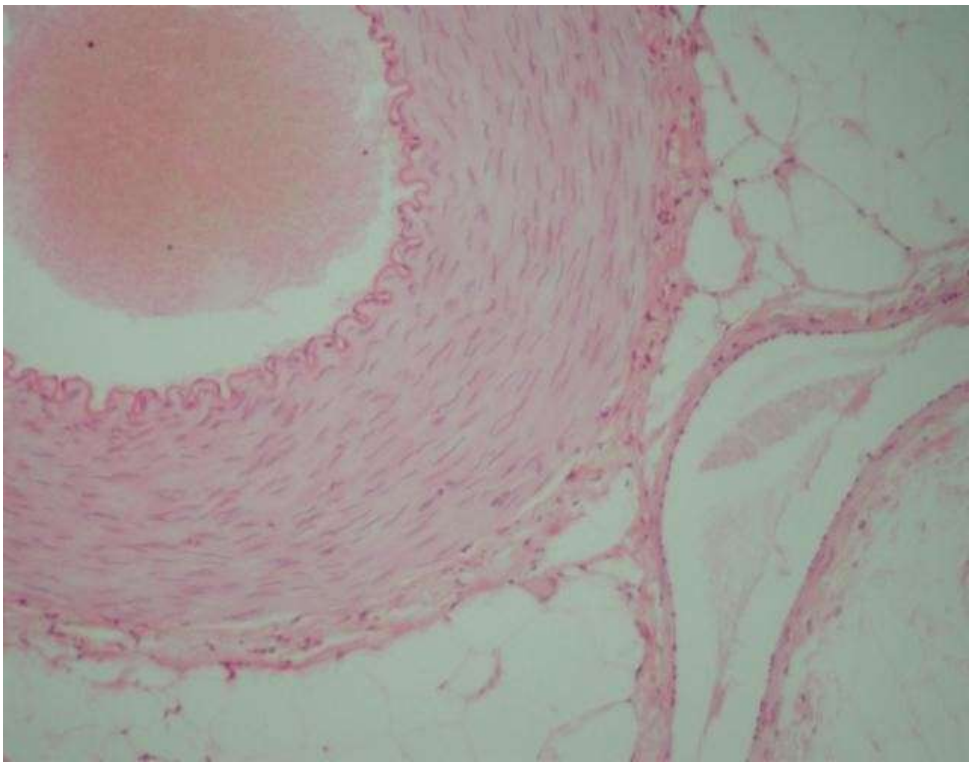
(B) Name one characteristic feature of that tissue



(12)

(A) Identify the structure

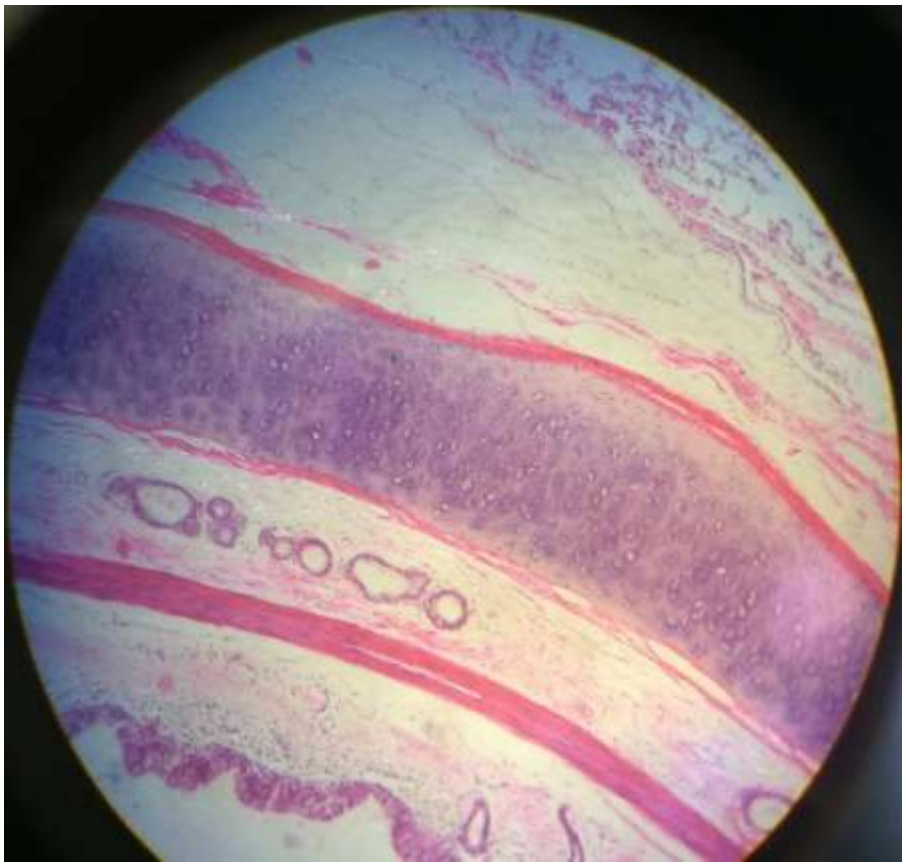
(B) Name the inner most layer



(13)

(A) Identify the tissue type shown in microscope

(B) What is the complication occurred when outermost layer is damaged?



(14)

(A) Identify the organ and the side

(B) What structure makes the impression marked by pin

(C) Name one feature which helps to differentiate the side



(15) The tissue shown in the slide is a gland.
(A) Name the type of epithelium pointed.



Batch 02 - CAT 01 – OSPE Answers

(1)



(A) Fossa ovalis
(B) ASD/ Patent Foramen Ovale

(2)



(A) Costal facet / Demifacet / Facet for head of the rib
(B) Costovertebral Joint/ Vertebrocostal Joint

(3)

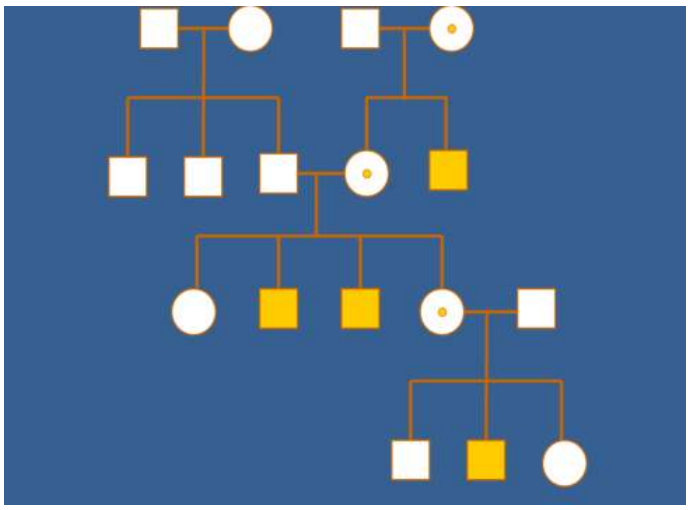


(A) Fracture neck of the humerus/Surgical Neck Fracture

(Marks not given for Dislocation)

(B) Axillary Nerve

(4)



(A) X Linked Recessive

(5)



(A) Ulnar nerve
(B) Ulnar Claw Hand

(6)



(A) Extensor Policis Longus Tendon/ Extensor Policis longus
(B) Posterior Interosseous Nerve

(7)



(A) Internal Thoracic Artery
(B) Subclavian artery/ First part of subclavian Artery

(8)



(A) Phrenic nerve/Left phrenic nerve

(9)



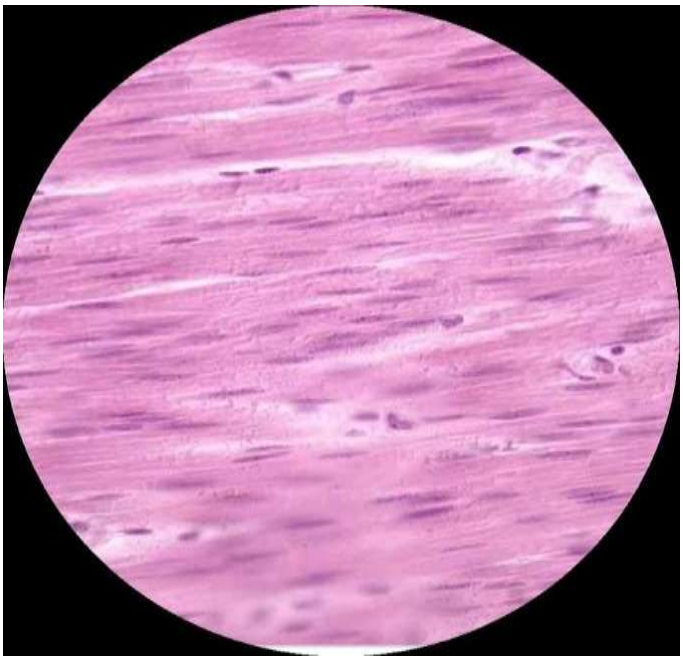
(A) Left anterior descending/ Anterior inter ventricular artery

(10)



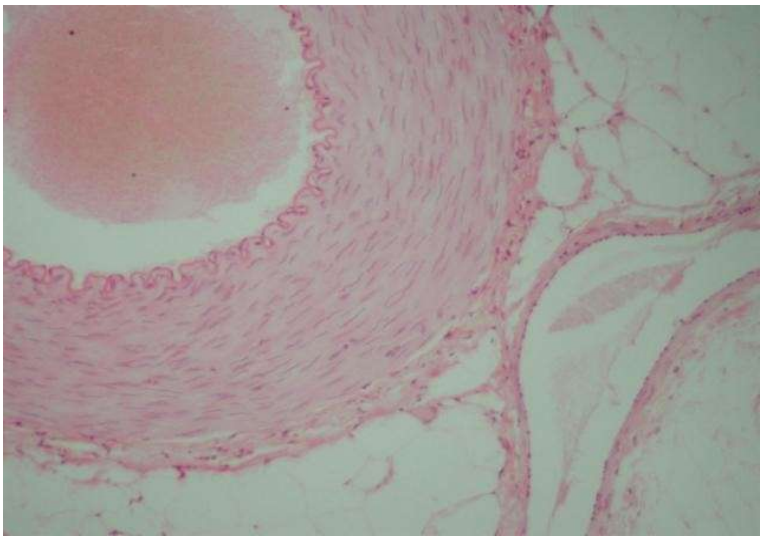
(A) Median cubital vein
(B) Damaged Brachial Artery

(11)



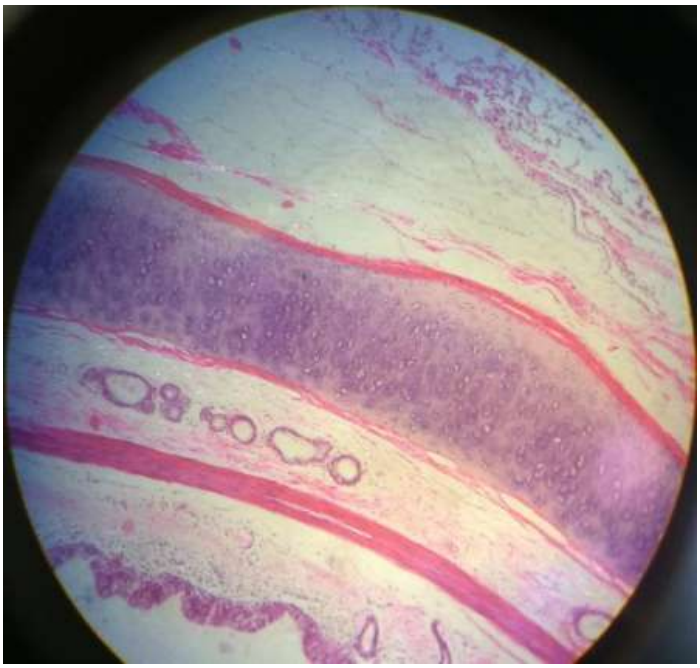
(A) Smooth muscle tissue
(B) Spindle shape muscle fibres/oval shape nucleus/Absence of striae/Unbranched

(12)



(A) Muscular Artery/ Artery
(B) Endothelium/Tunica intima/simple squamous layer

(13)



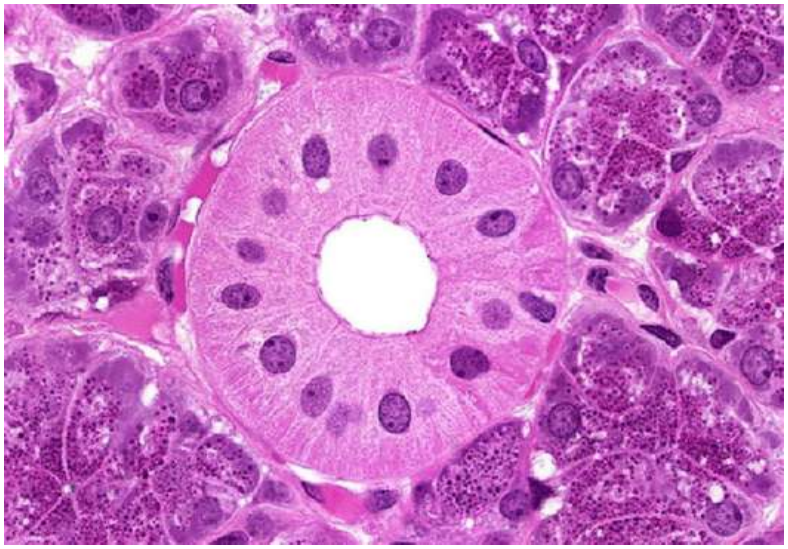
(A) Hyaline Cartilage/ Cartilage
(B) Avascular necrosis

(14)



(A) Right Lung
(B) Azygous arch/ Azygous Vein
(C) Three lobes/Brached principal bronchi at the hilum/Branched pulmonary artery at the hilum/Presence of epaterial and hyperpaarterial bronchi

(15)



(A) Simple cuboidal epithelium

Batch 03 – CAT 01 – MCQ Paper

UVA WELLASSA UNIVERSITY OF SRI LANKA
FACULTY OF MEDICINE
Continuous Assessment 01
2024/2025 (3rd) Batch Anatomy
Multiple Choice Questions (MCQ) Paper

Time 10.00 am – 11.00 am (01 hour) Date of the exam

Please do not attempt or promote copying. No textbooks, notes, mobile phones, smart watches, or any other electronic communication devices are allowed.

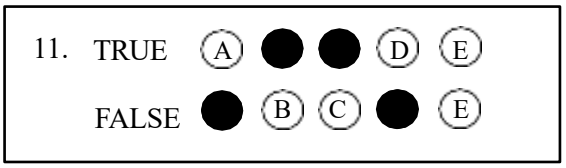
Please read the following instructions before marking responses on your answer sheets

8. Check that your question paper has a total of **06 pages,** including the front page.
9. **A single answer sheet is provided**. Please write your index number in the given space.
10. Read each question carefully before answering.
11. Mark the correct response as a **heavy black mark, filling the relevant circle completely**, using a **black lead pencil (6B or above grade).**
12. Do not make stray marks on the answer sheet. In case of an error, erase cleanly.
13. Your final answer should be a densely coloured circle through which the underlying letter is not visible.
14. Marking using any other method (e.g., mark the circle with a cross) is not valid.

Ten (10) True/False Type Questions (Questions 1-10/Page 2-3)

3. Mark whether each response is true or false.
4. Given below is an example of how to mark a true/false type question.

Q 11. A woman has
- A. One ovary.
- B. One nose.
- C. Two ears.
- D. One eye.
- E. Two hairs.

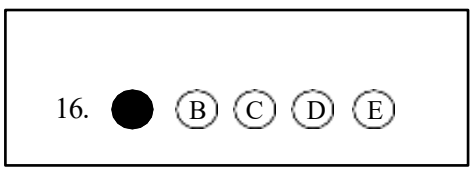


A correct response will get = +1 mark
An incorrect response will get = -1 mark
No response will get = 0 (zero) mark
Negative marks will not be carried over to the next question

Ten (10) Single Best Response (SBR) Type Questions (Questions 11-20/ Page 4-6)

5. Mark the best response. Only one response per question should be marked.
6. If you mark the correct response, you will get the full marks for the question.
7. If you mark an incorrect response, fail to mark any response, select more than one response, or mark your response unclearly, you will not receive any marks for that question.
8. Given below is an example of how to mark a single best response type question.

Q 16. Speaking is a unique ability observed in humans. Which of the following body parts is primarily used for speech production?
- A. Tongue
- B. Hands
- C. Feet
- D. Ears
- E. Nose



Question No. 1-10 are True or False type questions. Mark your answer for each of the five responses. (A to E)

(1) True or False regarding the connective tissues?
(A) Collagen fibers are the most abundant type of fiber.
(B) Perichondrium is a vascular tissue.
(C) Skeletal tissues are specialized forms of connective tissue.
(D) Skin consists of dense regular connective tissues.
(E) Capsules of organs are made up of dense irregular connective tissue.

(2) True or False regarding cell division and gametogenesis?
(A) Failure of meiotic division of gametes can lead to conditions such as trisomy.
(B) The reduction in chromosome number occurs during meiosis II.
(C) Ovarian reserve in females is established before birth.
(D) Spermatogenesis continues throughout the reproductive life of males.
(E) Fertilization triggers completion of meiosis II in the oocyte.

(3) True or False regarding organogenesis and morphogenesis?
(A) Gastrulation is the process by which the three germ layers are formed.
(B) The mesoderm contributes to the formation of muscles and bones.
(C) Organogenesis is completed entirely within the first 4 weeks of gestation.
(D) The inner cell mass develops into both the embryo and the placenta.
(E) Fetal lungs are fully developed by the end of the second trimester.

(4) True or False regarding congenital anomalies and assisted reproductive techniques (ART)?
(A) Congenital anomalies can be diagnosed during the antenatal period.
(B) Exposure to alcohol during pregnancy can cause intellectual disability in the fetus.
(C) Pre-conception folic acid supplementation primarily prevents congenital heart disease.
(D) Some congenital anomalies can be corrected by fetal (in utero) surgery.
(E) ART are associated with an increased risk of congenital anomalies.

(5) True or False regarding the shoulder Joint?
(A) It is a hinge joint.
(B) Glenoid labrum deepens socket.
(C) Stability depends mainly on ligaments.
(D) Rotator cuff stabilizes the joint.
(E) Axillary nerve is related inferiorly.

6) True or False regarding the supports of the breast?
(A) The Cooper's ligaments extend from the skin to the deep fascia.
(B) The pectoral fascia provides a major structural support to the breast.
(C) The retromammary space contributes to fixation of the breast to underlying structures.
(D) The skin envelope plays a role in maintaining breast shape.
(E) Stretching of suspensory ligaments can lead to breast ptosis.

(7) True or False regarding forearm muscles?
(A) Supinator muscle is the primary muscle of supination.
(B) The brachioradialis muscle is innervated by the radial nerve.
(C) The pronator quadratus is located in the superficial layer of the anterior compartment.
(D) Damage to the radial nerve will result in "claw hand" deformity.
(E) Insertion of the extensor carpi radialis brevis is at the base of the third metacarpal.

(8) True or False regarding the lumbrical muscles of the hand?
(A) First lumbrical muscle is innervated by the median nerve
(B) Second lumbrical muscle is a bipennate in type.
(C) They flex the interphalangeal joints
(D) They are inserted into the proximal phalanx
(E) Paralysis leads to clawing of fingers.

(9) True of False regarding the right root of the lung?
(A) The right pulmonary artery lies anterior to the right main bronchus.
(B) The eparteriai bronchus is present in the right lung.
(C) The superior pulmonary vein is the most anterior structure in the root.
(D) The phrenic nerve passes posterior to the root of the right lung.
(E) The bronchus is the most posterior structure in the root.

(10) True or False regarding the right atrium?
(A) Crista terminalis separates the smooth and rough parts of the internal wall.
(B) Coronary siņus opens into it between inferior vena cava and tricuspid valve.
(C) Sinoatrial (SA) node is located in the lower part of the interatrial septum.
(D) Right auricle is a muscular pouch that increases the capacity of the atrium.
(E) Fossa ovalis is located on the interatrial septum.

Question No. 11-20 are Single Best Answer (SBA) type questions.
Select the best response to each question.

(11) A newborn presents with absence of radius (radial club hand). Which embryological structure is primarily affected?
(A) Apical ectodermal ridge
(B) Neural crest cells
(C) Somites
(D) Notochord
(E) Endoderm

(12) A prenatal ultrasound at 6 weeks of gestation shows a fetus with a large ventral body wall defect, with the heart and abdominal organs lying partially outside the body cavity. The amniotic cavity appears abnormally expanded, and there is failure of proper incorporation of the yolk sac into the gut tube. This condition was a result of absence of lateral folding of the embryo. Which of the following structure is primarily formed as a result of lateral folding of the embryo?
(A) Neural tube
(B) Notochord
(C) Placenta
(D) Primitive gut tube
(E) Somites

(13)A 24-year-old man presents after a motorcycle accident with shoulder dislocation. He is unable to abduct his arm beyond 15°. There is loss of sensation over the lateral aspect of the shoulder. Which of the following nerve is most likely injured?
(A) Axillary nerve
(B) Musculocutaneous nerve
(C) Radial nerve
(D) Suprascapular nerve
(E) Thoracodorsal nerve

(14) A 45-year-old woman complains of numbness over the lateral 31½ fingers and weakness of thumb opposition. Which of the following nerve is most likely compressed?
(A) Digital nerves
(B) Median nerve
(C) Musculocutaneous nerve
(D) Radial nerve
(E) Ulnar nerve

(15) A 52-year-old woman presents with a hard lump in the upper outer quadrant of the right breast. There is palpable lymphadenopathy. Which of the following lymph nodes are most likely involved first?
(Á) Axillary nodes
(B) Parasternal nodes
(C) Posterior intercostal nodes
(D) Submental nodes
(E) Supraclavicular nodes

(16) A tall young man presents with sudden chest pain and breathlessness. Examination reveals decreased breath sounds on the right side. He was suspected of having pneumothorax. Which of the following structure is most likely ruptured?
(A) Bronchial artery
(B) Intercostal muscle
(C) Parietal pleura
(D) Pulmonary vein
(E) Visceral pleura

(17) A patient complains of dysphagia. Endoscopy shows narrowing where the esophagus is crossed by a major vessel. Which of the following vascular structure most likely causes this constriction?
(A) Arch of aorta
(B) Azygos vein
(C) Pulmonary trunk
(D) Subclavian artery
(E) Superior vena cava

(18) A 62-year-old woman with diabetes presents with central chest pain radiating to the back. ECG shows ST-segment elevation in leads I, aVL, V5, and V6. Coronary angiography reveals an occlusion of the circumflex artery. Which of the following structure is most likely to be affected due to this arterial occlusion?
(A) Anterior wall of the left ventricle
(B) Lateral wall of the left ventricle
(C) Posterior one-third of the interventricular septum
(D) Right ventricle
(E) SA node

(19) A 45-year-old man undergoes surgery for a mediastinal mass. Postoperatively, he develops shortness of breath, especially when lying flat. Chest X-ray shows an elevated right hemidiaphragm. On examination, there is reduced movement of the diaphragm on the affected side. Which of the following nerve is most likely injured during this procedure?
(A) Intercoştal nerves
(B) Long thoracic nerve
(C) Phrenic nerve
(D) Recurrent laryngeal nerve
(E) Vagus nerve

(20) A neonate presents with respiratory distress. Imaging shows herniation of abdominal contents into thorax through posterolateral defect. Which of the following structure most likely failed to develop properly?
(A) Dorsal mesentery
(B) Pericardial membrane
(C) Pleuroperitoneal membrane
(D) Septum transversum
(E) Somatic mesoderm

Batch 03 – CAT 01 – MCQ Answers

(1)	T	T	T	F	F
(2)	T	F	T	T	T
(3)	T	T	F	F	F
(4)	T	T	F	T	T
(5)	F	T	F	T	T
(6)	T	T	F	T	T
(7)	F	T	F	F	T
(8)	T	F	T	F	T
(9)	T	T	T	F	T
(10)	T	T	F	T	T

(11) A

(12) D

(13) A

(14) B

(15) A

(16) E

(17) A

(18) B

(19) C

(20) C

Batch 03 – CAT 01 – SEQ Paper

UVA WELLASSA UNIVERSITY OF SRI LANKA
FACULTY OF MEDICINE
Continuous Assessment 03
June 2026
2024/2025 (03rd) Batch
Anatomy
Structured Essay Questions (SEQ) Paper

Time 11.15 a.m. – 12.15 p.m. (01 hour) Date of the exam: 2026.06.08

Index (MED) Number ……..

Please do not attempt or promote copying. No textbooks, notes, mobile phones, smart watches, or any other electronic communication devices are allowed.

Instructions to Candidates

- This paper contains two (02) Structured Essay Questions.
- Answer all questions.
- Write your answers in the spaces provided.
- If additional space is required, you may use extra sheets. Ensure that the relevant question number is clearly indicated on each additional sheet.
- Write your index number in the designated space on each answer sheet, including any extra sheets used.

(Q1) A 2-day-old newborn develops excessive salivation, choking during feeding, and cyanosis. Attempts to pass a nasogastric tube were unsuccessful. Imaging suggests a congenital communication between the airway and digestive tract.

(1.1) Describe the embryological development of the trachea and its anomalies. (30 marks)
(1.2) Outline the relations of the trachea in the superior mediastinum. (40 marks)
(1.3) Name two conditions causing tracheal deviation. (10 marks)
(1.4) List four anatomical differences between right and left bronchi. (20 marks)
(Total = 100 marks)

(Q2) A 32-year-old man presents with weakness of hand grip and difficulty in finger abduction after sustaining a fracture near the medial epicondyle of the humerus. On examination, there is clawing of the ring and little fingers and sensory loss over the medial one and a half digits.

(2.1) Identify the nerve affected in this case. (10 marks)
(2.2) Describe the origin, course and distribution of this nerve. (40 marks)
(2.3) List the possible site of compression or injury to this nerve. (20 marks)
(2.4) Outline the mechanism of “claw hand deformity”. (30 marks)
(Total = 100 marks)

Batch 03 – CAT 01 – SEQ Answers

(Q1)

(1.1) Describe the embryological development of the trachea and its anomalies. (30 marks)
(6 points × 5 marks each)

1. Origin from laryngotracheal diverticulum arising from ventral foregut (4th week) – 5 marks
2. Formation of laryngotracheal groove → diverticulum (respiratory bud) – 5 marks
3. Development and fusion of tracheoesophageal ridges → tracheoesophageal septum – 5 marks
4. Division into:
    - Ventral laryngotracheal tube (trachea & lungs)
    - Dorsal esophagus – 5 marks
5. Tissue differentiation:
    - Endoderm → epithelium & glands
    - Splanchnic mesoderm → cartilage, smooth muscle – 5 marks
6. Anomalies due to faulty separation:
    - Tracheoesophageal fistula
    - Esophageal atresia (± clinical correlation) – 5 marks

(1.2) Outline the relations of the trachea in the superior mediastinum. (40 marks)
(8 points × 5 marks each)

1. Anterior relations (manubrium sterni, thymus) – 5 marks
2. Relation to left brachiocephalic vein – 5 marks
3. Relation to arch of aorta – 5 marks
4. Relation to branches of arch (brachiocephalic trunk, left common carotid) – 5 marks
5. Posterior relation: esophagus – 5 marks
6. Relation to left recurrent laryngeal nerve (tracheoesophageal groove) – 5 marks
7. Right side relations (pleura, lung, vagus nerve, brachiocephalic trunk) – 5 marks
8. Left side relations (arch of aorta, carotid, subclavian, pleura) – 5 marks

(1.3) Name two conditions causing tracheal deviation. (5 marks for any 2 = 10 marks.)

1. Tension or open pneumothorax – 5 marks
2. Massive pleural effusion – 5 marks

(Accept: lung collapse, fibrosis, mediastinal tumor)

(1.4) List four anatomical differences between right and left bronchi. (20 marks)
(4 points × 5 marks each)

1. Right bronchus shorter, left longer – 5 marks
2. Right wider, left narrower – 5 marks
3. Right more vertical, left more horizontal – 5 marks
4. Foreign body entry more common on right side – 5 marks

(Q2)

(2.1) Identify the nerve affected in this case. (10 marks)

Ulnar nerve – 10 marks

(2.2) Describe the origin, course and distribution of this nerve. (40 marks)
(8 points × 5 marks each)

Origin

1. Arises from medial cord of brachial plexus (C8–T1 ± C7) – 5 marks

Course

2. Descends along medial side of arm, medial to brachial artery – 5 marks
3. Pierces medial intermuscular septum to enter posterior compartment – 5 marks
4. Passes behind medial epicondyle (cubital tunnel) – 5 marks
5. Enters forearm between heads of flexor carpi ulnaris (FCU) – 5 marks
6. Travels with ulnar artery in forearm – 5 marks
7. Passes superficial to flexor retinaculum via Guyon's canal – 5 marks

Distribution

8. Motor + sensory supply:
    - Motor: FCU, medial half of FDP, most intrinsic hand muscles
    - Sensory: medial 1½ digits (palmar & dorsal) – 5 marks

(2.3) List the possible site of compression or injury to this nerve. (20 marks)
(4 points × 5 marks each)

1. Medial epicondyle fracture / trauma – 5 marks
2. Cubital tunnel (behind medial epicondyle) – 5 marks
3. Between heads of flexor carpi ulnaris – 5 marks
4. Guyon's canal (ulnar canal at wrist) – 5 marks

(2.4) Outline the mechanism of "claw hand deformity". (30 marks)
(6 points × 5 marks each)

1. Paralysis of interossei muscles (loss of finger abduction/adduction) – 5 marks
2. Loss of lumbricals to ring and little fingers – 5 marks
3. Unopposed action of long extensors → hyperextension at MCP joints – 5 marks
4. Unopposed action of long flexors → flexion at IP joints – 5 marks
5. Results in clawing of 4th and 5th digits – 5 marks
6. More pronounced in distal lesions (ulnar paradox concept may be mentioned) – 5 marks

Batch 03 – CAT 01 – OSPE

(1)

(A) Identify the type of epithelium shown in the specimen.

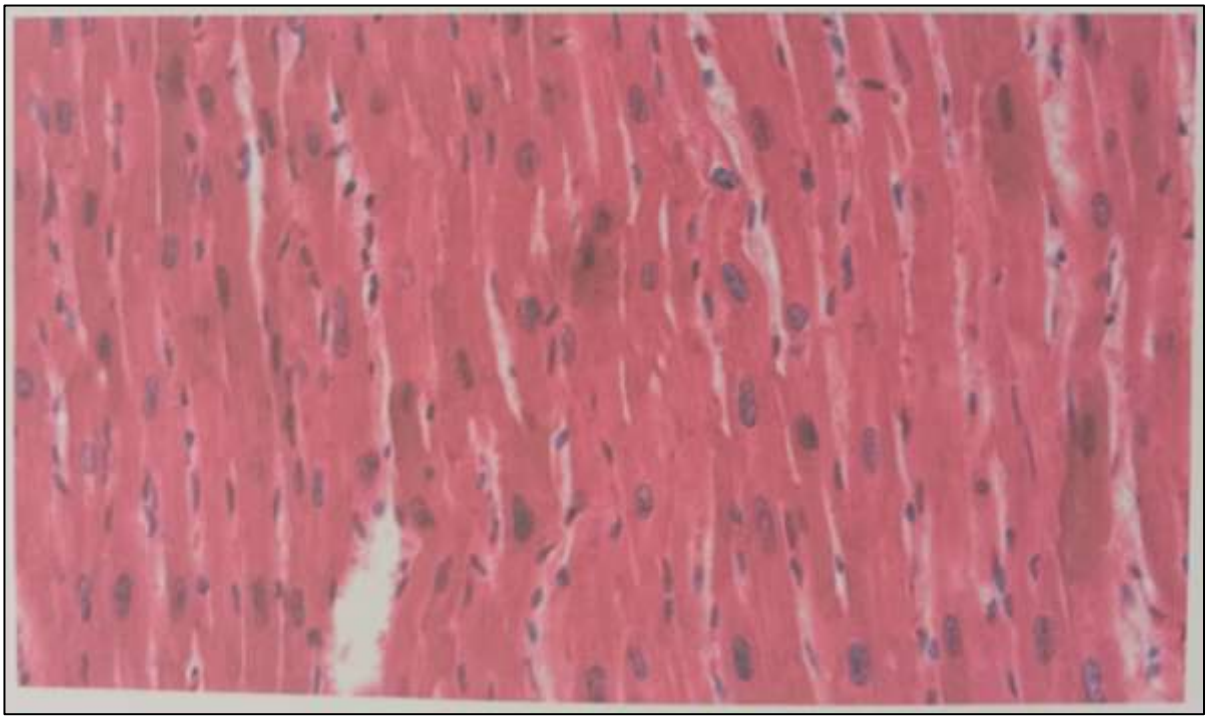
(B) Mention one anatomical location in the human body where this epithelium can be found.



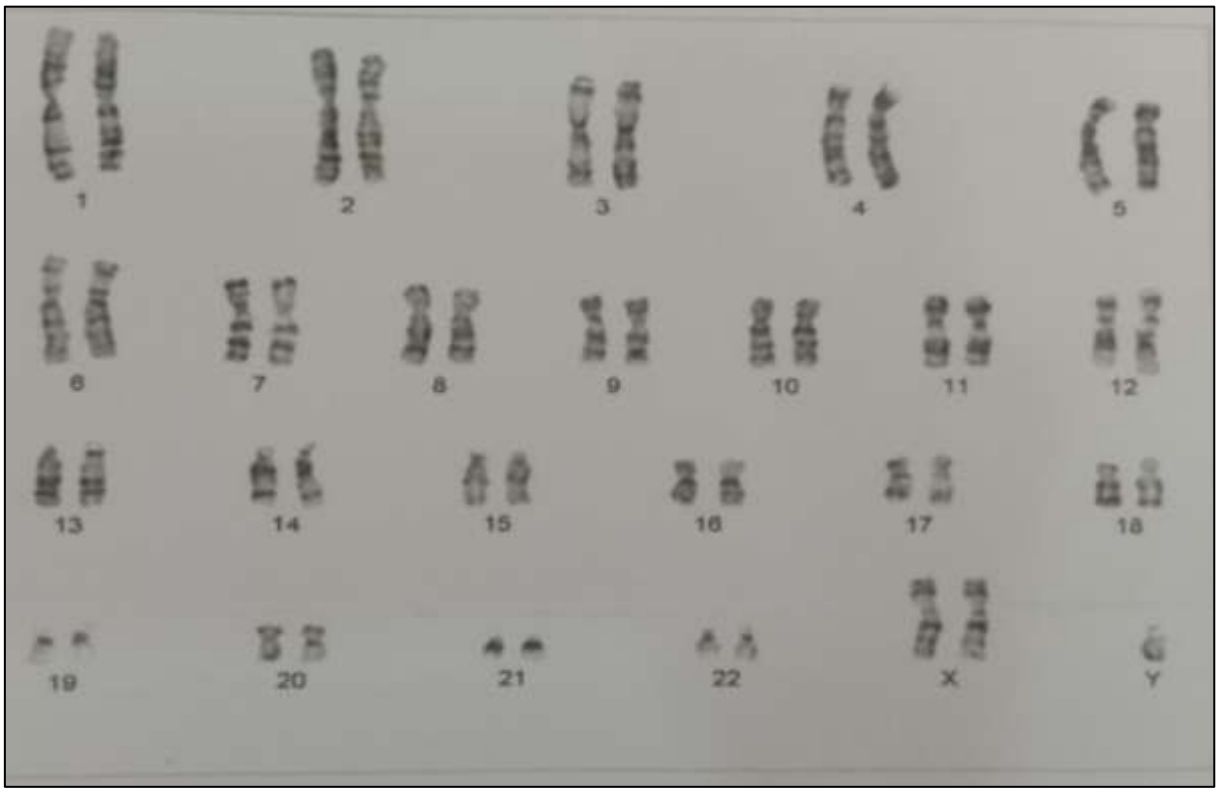
(2)

(A) Identify the tissue shown in the specimen.

(B) State two characteristic features of the cells present in this tissue.



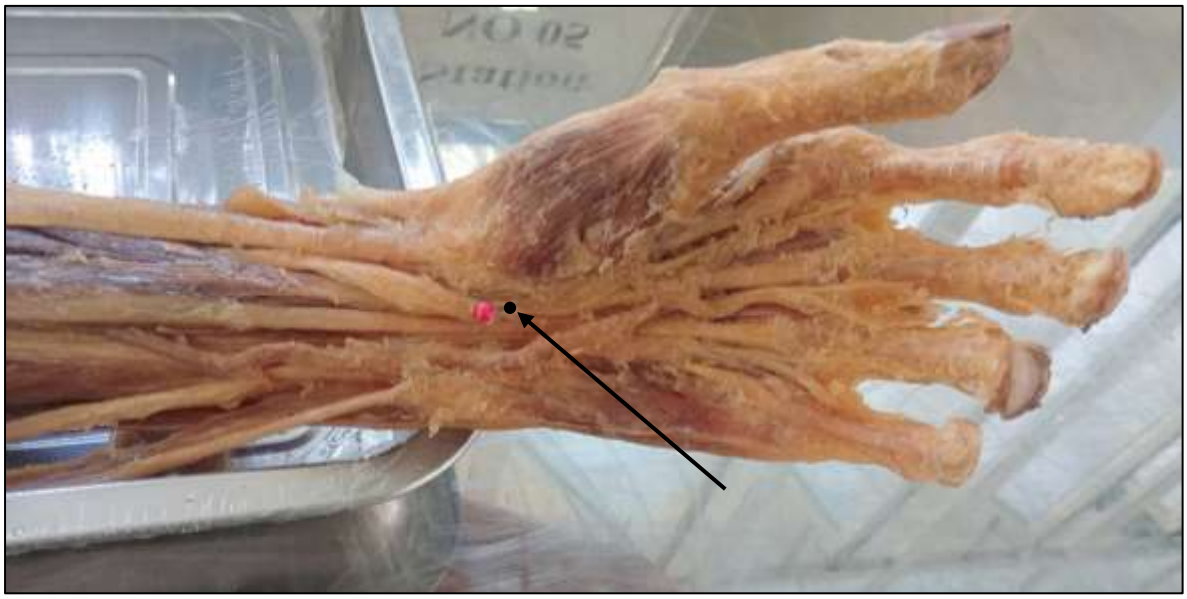
(3) Given below is a karyotype of a patient presented to the genetic clinic.
(A) Name the clinical condition shown in the karyotype
(B) List two clinical features which can be seen on the patient.



(4) A 40-year-old male patient with end stage renal failure is waiting for arteriovenous fistula for haemodialysis. The surgeon selected this vessel as one component of the surgery.
(A) Identify the structure pierced by the pin.
(B) Name a suitable nearby other vascular component used for this surgery.



(5) A 55-year-old lady with rheumatoid arthritis presented with pain and numbness of the hand for three months. Clinical features are suggestive of compression of this structure.
(A) Identify the structure pierced by the pin.
(B) What is the clinical condition?



(6)

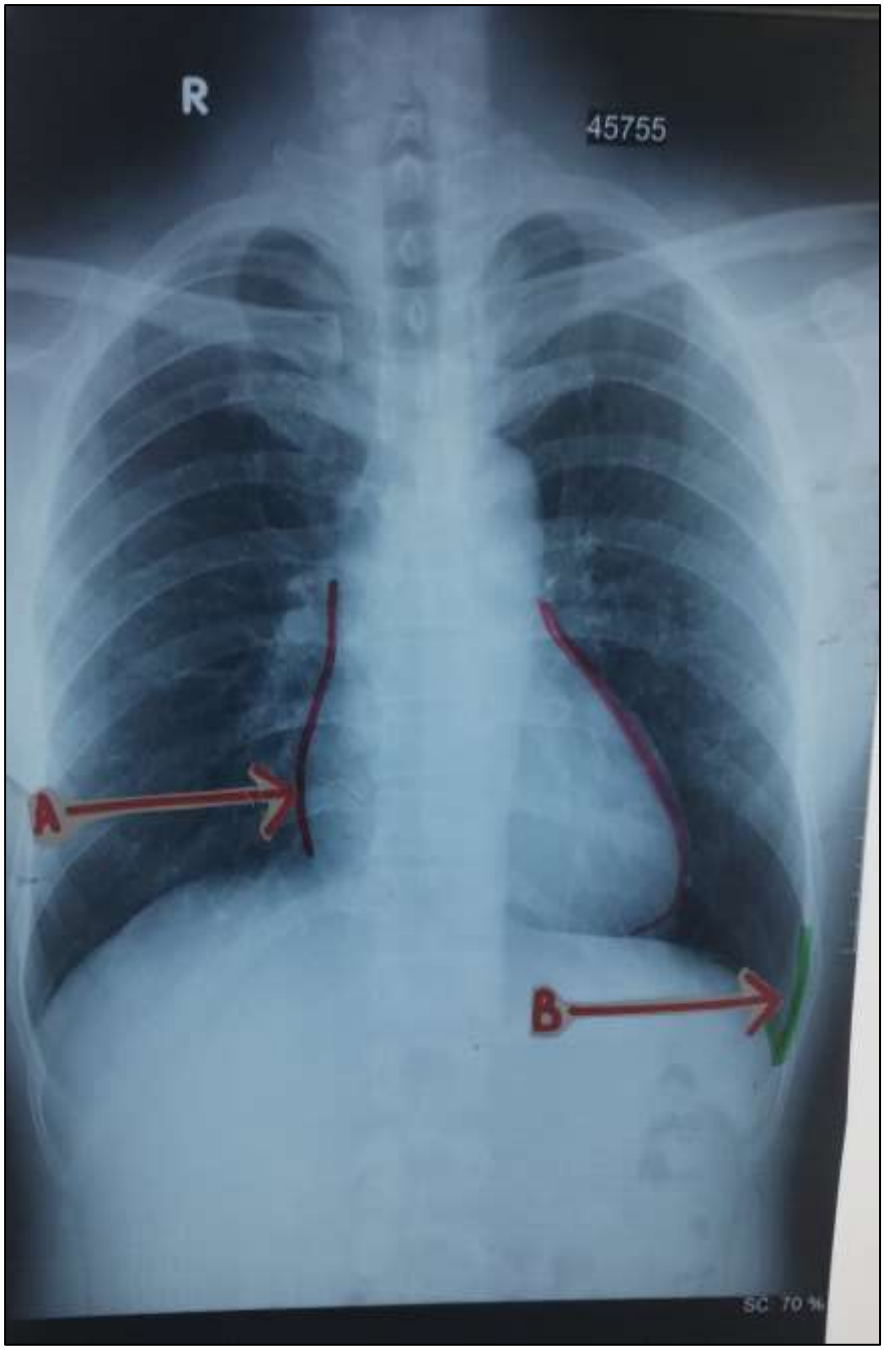
(A) Identify the structure colored.

(B) Name the immediate medial relation of that.



(7)

Identify A and B.



(8) A 70-year-old male with long-term smoking addiction presented with chronic cough with recent coughing up of blood. Investigation revealed carcinoma of this structure.
(A) Identify the structure pierced by the pin.
(B) Name an immediate posterior relation of that.



(9) A 50-year-old lady presented with painful shoulder abduction through 60 to 120 degrees. The clinician suspects a condition of this structure causing the symptoms.
(A) Identify the structure pierced by the pin.
(B) Name one function of it.



(10) A 45-year-old male presented with tightening type central chest pain, sweating and vomiting. Angiography revealed complete occlusion of this vessel.

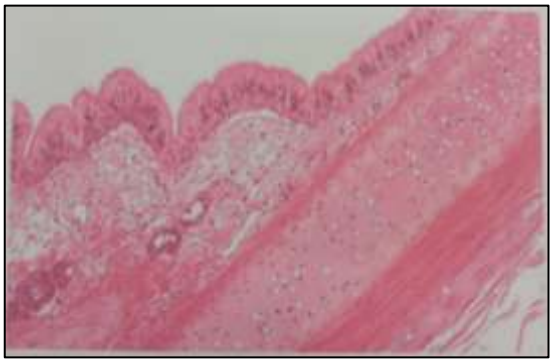
(A) Identify the structure pierced by the pin.

(B) Name its origin.

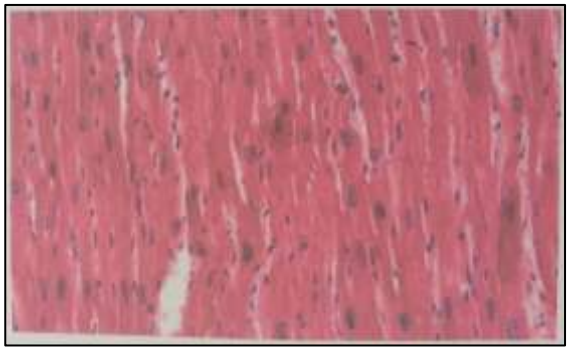


Batch 03 – CAT 01 – OSPE Answers

(1)

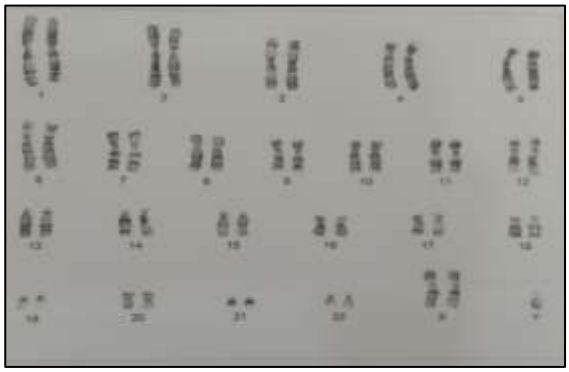


(A) Pseudostratified columnar ciliated epithelium
(B) Trachea/ Primary bronchi/ Nasal cavity / Nasopharynx



(2)

(A) Cardiac tissue
(B) Binuclear cells and intercalated discs

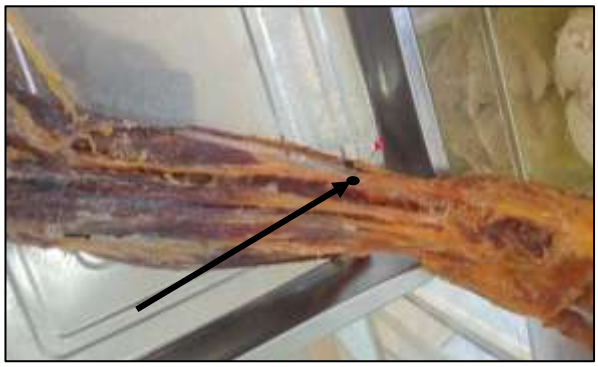


(3)

(A) Klinefelter syndrome (47, XXY)
(B) Any two:

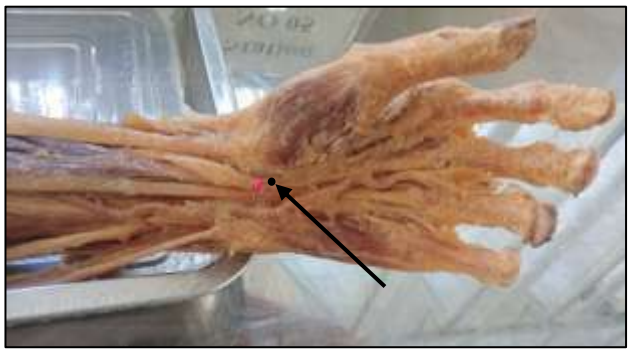
Small testes
Gynecomastia
Sparse facial and body hair
Tall stature with long limbs
Infertility

(4)



(A) Radial artery
(B) Cephalic vein

(5)



(A) Median nerve
(B) Carpal tunnel syndrome

(6)



(A) Dorsal tubercle of radius
(B) Tendon of extensor pollicis longus

(7)



(A) Right atrium (forms the right heart border)
(B) Left costodiaphragmatic angle

(8)



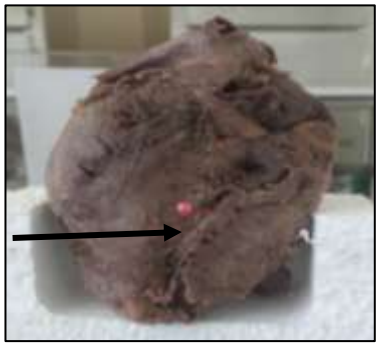
(A) Right main bronchus
(B) Oesophagus

(9)



(A) Supraspinatus tendon
(B) Initiates abduction of the arm at the shoulder joint (first 15°)

(10)



(A) Posterior interventricular artery (Posterior descending artery)
(B) Right coronary artery



MESSAGE OF THE DEAN

As the Dean of the Uva Wellassa Medical Faculty, I am delighted to present "Mastering Anatomy – Semester I - Book - II (2026): A Comprehensive Guide to MCQs, Essays, and OSPEs". This publication represents a significant achievement in our ongoing commitment to enhancing the quality of medical education and supporting student learning.

In the ever-evolving discipline of medicine, a thorough knowledge of Anatomy continues to be a cornerstone of academic and professional success. This guide has been thoughtfully designed to serve as a comprehensive learning resource, covering a wide range of assessment formats, including MCQs, essays, and OSPEs, while providing detailed explanations and model answers to reinforce understanding.

The primary aim of this book is to equip students with the knowledge and skills necessary to excel in examinations and deepen their comprehension of physiological principles. We believe that this guide will become a trusted companion throughout your academic journey, helping to build confidence, improve clarity, and establish a strong foundation for learning.

I extend my heartfelt gratitude to the faculty members and contributors whose dedication, expertise, and hard work made this publication possible. It is our sincere hope that you will find this guide both informative and inspiring as you advance through your medical studies.

I wish you every success in your academic endeavours and in your future career as a medical professional.

Rs. 1500/-