

Structural Organisation in Animals — NEET Biology PYQ (2006-2021)

Class 11 Biology · 28 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2021

1. Which of the following statements wrongly represents the nature of smooth muscle ?

- (A) These muscle have no striations
- (B) They are involuntary muscles
- (C) Communication among the cells is performed by intercalated discs
- (D) These muscles are present in the wall of blood vessels

NEET 2021

2. Identify the types of cell junctions that help to stop the leakage of the substances across a tissue and facilitation of communication with neighbouring cells via rapid transfer of ions and molecules.

- (A) Gap junctions and Adhering junctions, respectively.
- (B) Tight junctions and Gap junctions, respectively.
- (C) Adhering junctions and Tight junctions, respectively.
- (D) Adhering junctions and Gap junctions, respectively.

NEET 2020 · Q15

3. Cuboidal epithelium with brush border of microvilli is found in:

- (A) lining of intestine
- (B) ducts of salivary glands
- (C) proximal convoluted tubule of nephron
- (D) eustachian tube

NEET 2020 · Q89

4. Goblet cells of alimentary canal are modified from:

- (A) Squamous epithelial cells
- (B) Columnar epithelial cells
- (C) Chondrocytes
- (D) Compound epithelial cells

NEET 2019 · Q101

5. Select the correct sequence of organs in the alimentary canal of cockroach starting from mouth :

- (A) Pharynx → Oesophagus → Crop → Gizzard → Ileum → Colon → Rectum
- (B) Pharynx → Oesophagus → Gizzard → Crop → Ileum → Colon → Rectum
- (C) Pharynx → Oesophagus → Gizzard → Ileum → Crop → Colon → Rectum
- (D) Pharynx → Oesophagus → Ileum → Crop → Gizzard → Colon → Rectum

NEET 2019 · Q104

6. The ciliated epithelial cells are required to move particles or mucus in a specific direction. In humans, these cells are mainly present in :

- (A) Bile duct and Bronchioles
- (B) Fallopian tubes and Pancreatic duct
- (C) Eustachian tube and Salivary duct
- (D) Bronchioles and Fallopian tubes

NEET 2017 · Q102

7. Select the correct route for the passage of sperms in male frogs:

- (A) Testes → Bidder's canal → Kidney → Vasa efferentia → Urinogenital duct → Cloaca
- (B) Testes → Vasa efferentia → Kidney → Seminal Vesicle → Urinogenital duct → Cloaca
- (C) Testes → Vasa efferentia → Bidder's canal → Ureter → Cloaca
- (D) Testes → Vasa efferentia → Kidney → Bidder's canal → Urinogenital duct → Cloaca

NEET 2017 (Gujarati paper) · Q60

8. Select the incorrect option with respect to features present in three animals.

Characters | Cockroach | Earthworm | Frog

- (A) Blood vascular system: open | closed | closed
- (B) Body surface: dry | moist | moist
- (C) Eyes: compound | absent | simple
- (D) Development: direct | indirect | indirect

NEET 2017 (Gujarati paper) · Q82

9. Which of the following structures does not open into the genital chamber of female cockroaches?

- (A) A single median oviduct
- (B) Spermatheca
- (C) A pair of anal cerci
- (D) A pair of collateral glands

NEET 2016 Phase 2 · Q141

10. Smooth muscles are

- (A) involuntary, fusiform, non-striated
- (B) voluntary, multinucleate, cylindrical
- (C) involuntary, cylindrical, striated
- (D) voluntary, spindle-shaped, uninucleate

NEET 2016 Phase 1 · Q142

11. Which type of tissue correctly matches with its location?

- (A) Smooth muscle - Wall of intestine
- (B) Areolar tissue - Tendons
- (C) Transitional epithelium - Tip of nose
- (D) Cuboidal epithelium - Lining of stomach

AIPMT 2015

12. The terga, sterna and pleura of cockroach body are joined by:

- (A) Cartilage
- (B) Cementing glue
- (C) Muscular tissue
- (D) Arthroal membrane

AIPMT 2014

13. Choose the correctly matched pair:

- (A) Moist surface of buccal cavity - Glandular epithelium
- (B) Tubular parts of nephrons - Cuboidal epithelium
- (C) Inner surface of bronchioles - squamous epithelium
- (D) Inner lining of salivary ducts - Ciliated epithelium

AIPMT 2014

14. Choose the correctly matched pair:

- (A) Adipose tissue - Dense connective tissue
- (B) Areolar tissue - Loose connective tissue
- (C) Cartilage - Loose connective tissue
- (D) Tendon - Specialized connective tissue

AIPMT 2012 Mains

15. The supportive skeletal structures in the human external ears and in the nose tip are examples of

- (A) ligament
- (B) areolar tissue
- (C) bone
- (D) cartilage

AIPMT 2011 Mains

16. The cells lining the blood vessels belong to the category of

- (A) Columnar epithelium
- (B) Connective tissue
- (C) Smooth muscle tissue
- (D) Squamous epithelium

AIPMT 2011 Mains

17. Which one of the following structures in Pheretima is correctly matched with its function?

- (A) Setae-defence against predators
- (B) Typhlosole - storage of extra nutrients
- (C) Clitellum - secretes cocoon
- (D) Gizzard - absorbs digested food

AIPMT 2011 Prelims

18. The ciliated columnar epithelial cells in humans are known to occur in

- (A) Fallopian tubes and urethra
- (B) Eustachian tube and stomach lining
- (C) Bronchioles and Fallopian tubes
- (D) Bile duct and oesophagus

AIPMT 2010 Prelims · Q117

19. The kind of epithelium which forms the inner walls of blood vessels is

- (A) Squamous epithelium
- (B) Cuboidal epithelium
- (C) Columnar epithelium
- (D) Ciliated columnar epithelium

AIPMT 2010 Prelims · Q149

20. If for some reason our goblet cells are non-functional this will adversely affect

- (A) Smooth movement of food down the intestine
- (B) Production of somatostatin
- (C) Secretion of sebum from the sebaceous glands
- (D) Maturation of sperms

AIPMT 2009 Prelims · Q51

21. Which one of the following is correct pairing of a body part and the kind of muscle tissue that moves it?

- (A) Biceps of upper arm – Smooth muscle fibres
- (B) Abdominal wall – Smooth muscle
- (C) Iris – Involuntary smooth muscle
- (D) Heart wall – Involuntary unstriated muscle

AIPMT 2009 Prelims · Q52

22. The epithelial tissue present on the inner surface of bronchioles and fallopian tubes is:

- (A) Glandular
- (B) Ciliated
- (C) Squamous
- (D) Cuboidal

AIPMT 2009 Prelims · Q67

23. The cell junctions called tight, adhering and gap junctions are found in:

- (A) Connective tissue
- (B) Epithelial tissue
- (C) Neural tissue
- (D) Muscular tissue

24. The kind of tissue that forms the supportive structure in our pinna (external ears) is also found in:

- (A) nails
- (B) ear ossicles
- (C) tip of the nose
- (D) vertebrae

25. Which one of the following is the true description about an animal concerned?

- (A) Cockroach - 10 pairs of spiracles (2 pairs on thorax and 8 pairs on abdomen)
- (B) Earthworm - The alimentary canal consists of a sequence of pharynx, oesophagus, stomach, gizzard and intestine
- (C) Frog - Body divisible into three regions - head, neck and trunk
- (D) Rat - Left kidney is slightly higher in position than the right one

26. In which one of the following preparations are you likely to come across cell junctions most frequently?

- (A) thrombocytes
- (B) tendon
- (C) hyaline cartilage
- (D) ciliated epithelium

27. Areolar connective tissue joins :

- (A) fat body with muscles
- (B) integument with muscles
- (C) bones with muscles
- (D) bones with bones

28. Mast cells secrete :

- (A) hippurin
- (B) myoglobin
- (C) histamine
- (D) haemoglobin

Answer key and explanations

1. Answer: (C) Communication among the cells is performed by intercalated discs

Intercalated discs are found in cardiac muscle, where they let the cells contract as a unit, so attributing them to smooth muscle is wrong. Smooth muscle is non-striated, involuntary and found in the walls of blood vessels and other hollow organs.

2. Answer: (B) Tight junctions and Gap junctions, respectively.

Tight junctions seal neighbouring cells together and stop substances leaking across a tissue, while gap junctions connect the cytoplasm of adjoining cells for rapid transfer of ions and small molecules. Adhering junctions only cement cells together.

3. Answer: (C) proximal convoluted tubule of nephron

Cuboidal epithelium bearing a brush border of microvilli lines the proximal convoluted tubule of the nephron, where it increases the surface for reabsorption. The intestine is lined by columnar epithelium with microvilli, salivary gland ducts by plain cuboidal epithelium, and the eustachian tube by ciliated epithelium.

4. Answer: (B) Columnar epithelial cells

Goblet cells, which secrete mucus in the alimentary canal, are modified columnar epithelial cells. Squamous cells are flat lining cells, compound epithelium is protective, and chondrocytes are cartilage cells.

5. Answer: (A) Pharynx → Oesophagus → Crop → Gizzard → Ileum → Colon → Rectum

In the cockroach the oesophagus opens into a sac-like crop that stores food, followed by the grinding gizzard; the midgut then leads to the hindgut made of ileum, colon and rectum. The gizzard comes after the crop, not before it.

6. Answer: (D) Bronchioles and Fallopian tubes

Ciliated epithelium lines hollow organs such as the bronchioles and fallopian tubes, where cilia move mucus or the ovum in one direction. Ducts of glands such as bile, pancreatic and salivary ducts are lined by cuboidal or columnar epithelium without cilia.

7. Answer: (D) Testes → Vasa efferentia → Kidney → Bidder's canal → Urinogenital duct → Cloaca

In male frogs the vasa efferentia leave the testes and enter the kidney, where they open into Bidder's canal, which joins the urinogenital duct (ureter) that opens into the cloaca. Routes that place Bidder's canal before the vasa efferentia or skip the kidney do not match frog anatomy.

8. Answer: (D) Development: direct | indirect | indirect

Cockroach development is indirect (paurometabolous, through nymphs) and earthworm development is direct, so the development row is wrong for both. The circulation row (open, closed, closed), body surface and eye rows correctly describe the three animals.

9. Answer: (C) A pair of anal cerci

Anal cerci are jointed filamentous appendages on the 10th abdominal segment of both sexes and are external sense organs, so they do not open into the genital chamber. The median oviduct (vagina), spermatheca and collateral glands all open into the female genital chamber.

10. Answer: (A) involuntary, fusiform, non-striated

Smooth muscle fibres are spindle-shaped (fusiform), uninucleate, have no striations and are not under voluntary control, as in the walls of the gut and blood vessels. Voluntary, multinucleate, cylindrical and striated fibres describe skeletal muscle.

11. Answer: (A) Smooth muscle - Wall of intestine

Smooth (visceral) muscle forms the walls of the intestine and other hollow organs. Tendons are dense regular connective tissue, the tip of the nose has cartilage, and the stomach is lined by columnar epithelium.

12. Answer: (D) Arthrodial membrane

The hardened plates of the cockroach exoskeleton (tergites, sternites and pleurites) are joined by a thin, flexible arthrodial membrane that allows movement. Cartilage and muscle do not join these plates.

13. Answer: (B) Tubular parts of nephrons - Cuboidal epithelium

The tubular parts of nephrons are lined by simple cuboidal epithelium (with brush border in the proximal tubule). The buccal cavity is lined by stratified squamous epithelium, bronchioles by ciliated epithelium, and salivary ducts by cuboidal epithelium, so the other pairings are wrong.

14. Answer: (B) Areolar tissue - Loose connective tissue

Areolar tissue is a loose connective tissue found beneath the skin. Adipose tissue is also loose (not dense) connective tissue, tendon is dense regular connective tissue, and cartilage is a specialised connective tissue.

15. Answer: (D) cartilage

The external ear (pinna) and the tip of the nose are supported by flexible cartilage. Bone would be rigid, and ligaments join bone to bone rather than forming such frameworks.

16. Answer: (D) Squamous epithelium

The inner lining of blood vessels (endothelium) is a single layer of flat, thin cells, i.e. simple squamous epithelium, which suits diffusion across the vessel wall. Columnar epithelium lines the stomach and intestine, not blood vessels; smooth muscle lies in the middle layer of the wall, not the lining.

17. Answer: (C) Clitellum - secretes cocoon

The clitellum of Pheretima secretes the cocoon in which the eggs are deposited. Setae help in locomotion, the typhlosole increases the absorptive area of the intestine, and the gizzard grinds food rather than absorbing it.

18. Answer: (C) Bronchioles and Fallopian tubes

Ciliated columnar epithelium lines hollow organs such as the bronchioles and the Fallopian tubes, where the cilia move mucus or the ovum along. The stomach is lined by non-ciliated columnar epithelium and the oesophagus by stratified squamous epithelium.

19. Answer: (A) Squamous epithelium

Blood vessels are lined by a single layer of thin, flat cells (simple squamous epithelium, the endothelium), which suits diffusion and filtration. Cuboidal epithelium lines ducts and kidney tubules, not vessels.

20. Answer: (A) Smooth movement of food down the intestine

Goblet cells are unicellular glands in the columnar epithelium of the alimentary canal, and they secrete mucus. Mucus lubricates the gut lining so food moves smoothly. Somatostatin comes from delta cells, and sebum from sebaceous glands, so goblet cells play no part in either.

21. Answer: (C) Iris - Involuntary smooth muscle

The muscles of the iris that change pupil size are smooth, involuntary muscles. The abdominal wall is moved by skeletal (striated, voluntary) muscles, so pairing it with smooth muscle is wrong; the biceps is also skeletal and the heart wall is striated cardiac muscle.

22. Answer: (B) Ciliated

NCERT states that ciliated epithelium lines hollow organs such as bronchioles and fallopian tubes, where the beating cilia move mucus or the ovum in one direction. Squamous epithelium lines blood vessels and air sacs, not these tubes.

23. Answer: (B) Epithelial tissue

NCERT describes tight, adhering and gap junctions as the special junctions that hold epithelial cells together and link them structurally and functionally. Connective tissue cells are scattered in a matrix and do not form such sheets.

24. Answer: (C) tip of the nose

The pinna is supported by cartilage, which NCERT says is also present in the tip of the nose, the outer ear joints and between adjacent vertebrae. Ear ossicles and vertebrae themselves are bone, and nails are keratin.

25. Answer: (A) Cockroach - 10 pairs of spiracles (2 pairs on thorax and 8 pairs on abdomen)

The cockroach has 10 pairs of spiracles, 2 on the thorax and 8 on the abdomen. In earthworm the gizzard comes before the stomach, the frog has no neck (only head and trunk), and in rat the right kidney lies slightly higher than the left.

26. Answer: (D) ciliated epithelium

Epithelial cells are tightly packed with little intercellular matrix, and they are held together by tight, adhering and gap junctions. Tendon and cartilage cells are scattered in abundant matrix, and platelets are free cell fragments, so junctions are rare there.

27. Answer: (B) integument with muscles

Areolar tissue lies beneath the skin and attaches the skin (integument) to the underlying muscles. Bones are joined to muscles by tendons and to other bones by ligaments.

28. Answer: (C) histamine

Mast cells of connective tissue release histamine (and heparin, serotonin) during inflammation and allergy. Haemoglobin and myoglobin are oxygen-binding proteins of RBCs and muscle, not secretions.

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