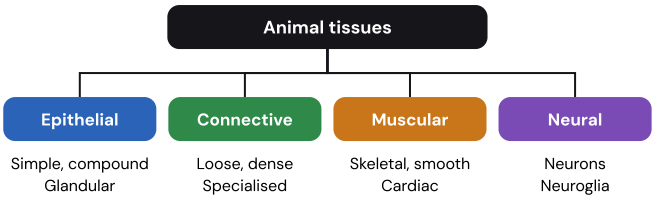
FREE NOTES · NCERT + NEET LEVEL

Structural Organisation in Animals

Animal tissues (epithelial, connective, muscular, neural), cell junctions, aur model organism ke roop me mendhak (frog) ki morphology aur anatomy.

01 Animal tissues: overview
02 Epithelial tissue
03 Connective tissue
04 Muscular aur neural tissue
05 Frog: morphology
06 Frog: anatomy
07 Extra: animal tissues aur vistar se
08 Extra: Cockroach (purana syllabus)
09 Important Q&A
10 Common mistakes
11 Practice (NEET style)
12 Quick revision

01 Animal tissues: overview



Chaar basic animal tissues

Tissue = ek jaise cells ka group jo ek kaam kare. Tissues se organs, organs se organ systems.

02 Epithelial tissue

Type	Shape / feature	Location
Squamous	Chapta, ek layer	Blood vessel walls, alveoli
Cuboidal	Cube jaisa; PCT me microvilli	Glands ki ducts, kidney tubules
Columnar	Lamba; microvilli/cilia ho sakte	Pet, aant ki lining; ciliated: bronchioles, fallopian tubes
Compound	Kai layers; suraksha	Skin, munh, pharynx, salivary gland ducts

Glands: unicellular (goblet cells) ya multicellular; **exocrine** (duct ke saath: saliva, doodh, mucus) vs **endocrine** (bina duct, hormones blood me). **Junctions**: tight (rissav roke), adhering (jodne wale), gap (cytoplasm jodkar ions, molecules).

03 Connective tissue

- Sabse zyada paaya jaane wala tissue. Cells collagen/elastin fibres aur matrix banate (blood ke alawa).
- **Loose**: areolar (skin ke neeche; fibroblasts, macrophages, mast cells), adipose (charbi store, skin ke neeche).
- **Dense regular**: tendons (muscle–bone), ligaments (bone–bone). **Dense irregular**: skin.
- **Specialised**: cartilage (chondrocytes; naak ki nok, bahar ka kaan, vertebrae ke beech), bone (lacunae me osteocytes, calcium salts, bone marrow blood cells banata), blood (plasma, RBC, WBC, platelets).

04 Muscular aur neural tissue

Muscle	Look	Control	Location
Skeletal	Dhaaridaar, kai nuclei, cylinder	Voluntary (apni marzi)	Biceps, haddiyon se jude
Smooth	Bina dhaari, spindle, ek nucleus	Involuntary	Aant ki deewar, blood vessels
Cardiac	Dhaaridaar, branched, intercalated discs	Involuntary	Sirf heart

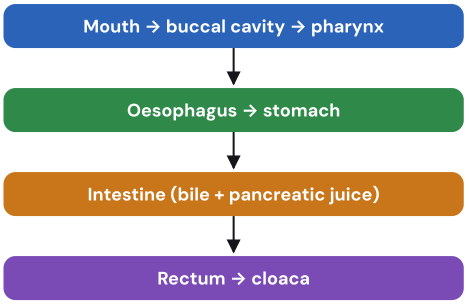
Neural tissue: neurons (excitable) + **neuroglia** (aadhe se zyada volume; neurons ko suraksha aur support).

05 Frog: morphology

- *Rana tigrina*; thande khoon wala (poikilotherm), **camouflage** (rang badalna), aestivation (garmi ki neend) aur hibernation (sardi ki neend).
- Skin geeli aur chikni (mucus); paani peeta nahi, skin se sokhta.
- Body: head + trunk; gardan aur poonch nahi. Paani me nictitating membrane aankh bachati; tympanum awaaz leta.
- Aage ke pair 4 ungli, peeche ke 5 jaal wali ungliyan. Male: vocal sacs aur aage ke pair ki pehli ungli pe copulatory pad.

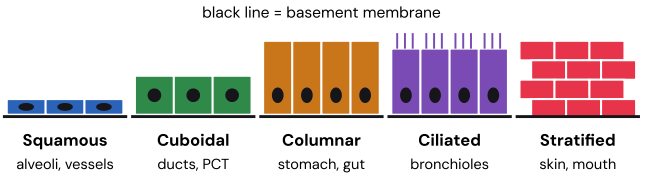
06 Frog: anatomy

- **Digestive**: chhoti aant (maansahari), bilobed jeebh; liver bile banata, gall bladder me store; pet aur aant me pachan; villi sokhte.
- **Saans**: skin (cutaneous, paani me aur hibernation me), lungs (pulmonary, zameen pe) aur buccal cavity.
- **Circulation**: closed; 3-chamber heart (2 atria, 1 ventricle), sinus venosus, conus arteriosus; hepatic aur renal portal systems. Lymph system bhi.
- **Excretion**: kidneys, ureters, cloaca; **ureotelic** (urea). Male me ureter = urinogenital duct.
- **Nervous**: 10 jode cranial nerves; brain cranium me. Sense organs: aankhen, tympanum (kaan), naak, taste buds.
- **Reproduction**: paani me external fertilisation; tadpole larva → metamorphosis.



Frog me khane ka raasta

07 Extra: animal tissues aur vistar se

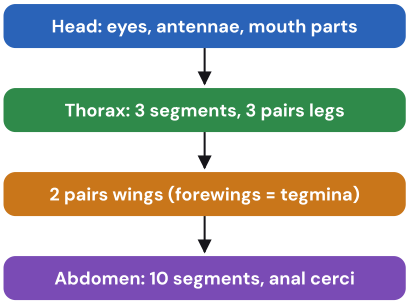


Simple aur compound epithelium ke types

- **Pseudostratified**: ek layer par kai layer jaisi dikhe (trachea). **Transitional**: khinchne wala, urinary bladder aur ureter. **Keratinised** stratified: skin; non-keratinised: munh, vagina.
- Secretion ke hisaab se glands: **merocrine** (sirf secretion: saliva, paseena), **apocrine** (cell ki nok bhi: mammary), **holocrine** (poora cell: sebaceous).
- Junctions: tight (rissav nahi), gap (adla-badli), **desmosomes** (cell–cell ankar), **hemidesmosomes** (cell–basement membrane).
- Haddi: Haversian canals (lambai me) Volkmann's canals se jude; lacunae me osteocytes; red marrow (RBC), yellow marrow (fat).
- Neuroglia: astrocytes (blood–brain barrier), oligodendrocytes (CNS myelin), microglia (phagocytes), ependymal cells (ventricles, CSF).
- Fat: white (fat store, adults) vs **brown** (kai mitochondria, garmi: navjaat, hibernation wale jaanwar).

08 Extra: Cockroach (purana syllabus)

- *Periplaneta americana*; raat ko active, sab khane wala; chitin ke exoskeleton pe sclerites (upar tergites, neeche sternites).
- Pachan: munh → pharynx → oesophagus → **crop** (store) → **gizzard** (proventriculus, 6 chitin daant, peesna) → midgut ke saath 6–8 **hepatic caecae** → hindgut (ileum, colon, rectum). Mid aur hindgut ke jod pe **Malpighian tubules** (100–150): excretion (uricotelic).
- Circulation: open; 13-chamber nali jaisa heart; haemolymph rangheen.
- Saans: 10 jode spiracles → tracheae.
- Nervous: ganglia; sir me brain; zyada tar ventral nerve cord me; compound eyes (~2000 ommatidia) se mosaic vision.
- Prajanan: dioecious; male me mushroom gland, phallomeres; female me spermathecae; ande **ootheca** me (~9–10); paurometabolous vikas (nymph).



Cockroach ke body regions

09 Important Q&A

Q1. Tendon aur ligament me antar?

Tendon muscle ko bone se jodta; ligament bone ko bone se. Dono dense regular connective tissue.

Q2. Cardiac muscles ek saath kaise sikudte?

Intercalated discs (gap junctions ke saath) se impulse jaldi jaata, saare cells saath sikudte.

Q3. Frog paani me saans kaise leta?

Geeli skin se diffusion dwara (cutaneous respiration).

10 Common mistakes

- Blood ko bina matrix kehna (plasma hi matrix hai).
- Kehna ki frog paani peeta.
- Frog heart ko 4-chamber likhna (3 hai).
- Exocrine (duct) aur endocrine (bina duct) mix karna.

11 Practice (NEET style)

1. Alveoli ki lining kaunsa tissue?
2. Rissav rokne wala junction?
3. Frog mainly kya excrete karta?
4. Neural tissue ka zyada volume kaun?
5. Charbi store karne wala tissue?

ANSWERS

1) Squamous epithelium · 2) Tight junction · 3) Urea (ureotelic) · 4) Neuroglia · 5) Adipose

12 Quick revision: exam se 5 minute pehle

EPITHELIUM

- Squamous: alveoli
- Cuboidal: ducts, PCT
- Ciliated columnar: bronchioles

CONNECTIVE

- Tendon: muscle-bone
- Ligament: bone-bone
- Cartilage: naak, kaan

MUSCLE

- Skeletal voluntary
- Smooth spindle
- Cardiac intercalated discs

FROG

- 3-chamber heart
- Skin + lung saans
- Ureotelic, 10 cranial nerves

Koi doubt? padhaiadda.netlify.app pe AI Doubt Solver se poocho, ya is chapter ka mock test do.