

Exercise walk-through

4.4

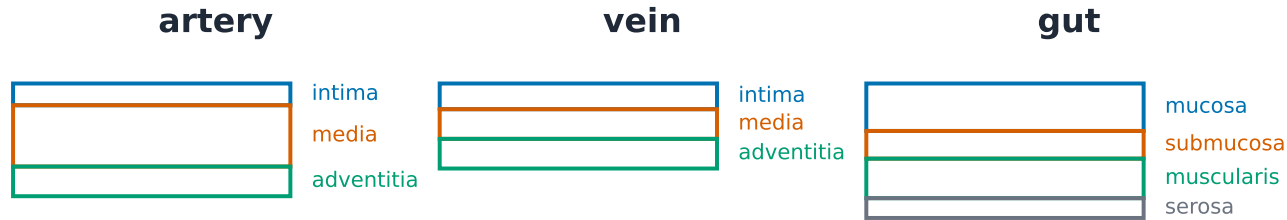
Organ histology: circulatory, respiratory and digestive

University Medicine

Circulatory and digestive organ histology

- 1 **Vessels** Intima / media / adventitia: media $\propto$ pressure - artery mostly media, vein mostly lumen.
- 2 **Gut Mucosa** (absorptive frontline) / submucosa / muscularis externa (two directions) / serosa.
- 3 **Alveolus** Everything removed: simple squamous + basement membrane + capillary $\approx 0.5 \mu\text{m}$ blood-air barrier.

Circulatory walls: artery, vein, gut compare



artery = mostly media (pulse) · vein = thin walls · gut = 4 coats

Artery vs vein vs gut: the same three words in different proportions.

Exercises 2.1-2.3

2.1 Which gut layer is the absorptive frontline? [3]

2.2 Why is the alveolar wall so thin? [3]

2.3 Name the two directions of the muscularis externa. [3]

Exercises 2.1-2.3

2.1 Which gut layer is the absorptive frontline? [3]

2.1

- The mucosa.
-

2.2 Why is the alveolar wall so thin? [3]

2.2

- Exchange: minimal diffusion distance – one flat cell + basement membrane.
-

2.3 Name the two directions of the muscularis externa. [3]

2.3

- Inner circular, outer longitudinal.

Exercises 3.1-3.2

3.1 Compare an artery and a vein in cross-section.

Give three histological differences (media thickness, lumen shape, wall-to-lumen ratio).
Explain each from pressure/flow. State which vessel has valves and why. [8]

3.2 A patient is breathless with clear airways (fictional fibrosis case).

Explain why diffusion, not airflow, now limits oxygen (barrier thickening from $\sim 0.5 \mu\text{m}$ to several μm). Predict the exercise pattern. State why bronchodilators do not help. [7]

Exercises 3.1-3.2

3.1 Compare an artery and a vein in cross-section.

Give three histological differences (media thickness, lumen shape, wall-to-lumen ratio). Explain each from pressure/flow. State which vessel has valves and why. [8]

3.1

- Artery: thick media, rounder smaller lumen, high wall:lumen.
- Pulse pressure demands elastic/muscular buffering; venous low pressure permits thin walls storing volume.
- Veins – valves against gravity-driven backflow at low pressure.

3.2 A patient is breathless with clear airways (fictional fibrosis case).

Explain why diffusion, not airflow, now limits oxygen (barrier thickening from $\sim 0.5 \mu\text{m}$ to several μm). Predict the exercise pattern. State why bronchodilators do not help. [7]

3.2

- Thickened alveolar walls lengthen the diffusion path: Fick's law – flux falls with distance.
- Early desaturation on exertion (diffusion reserves exhaust first).
- Airway calibre is normal: the lesion is in the wall, not the tube.