

Exercise walk-through

4.5

Organ histology: urinary, endocrine, reproductive and skin

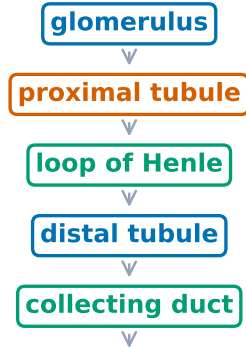
University Medicine

Urinary and endocrine organ histology

- 1 **Nephron** Glomerular tuft → proximal (**brush border**, ~65% back) → flat loop → distal → columnar collecting duct.
- 2 **Endocrine** Secretory cords directly on fenestrated capillaries - no ducts, shortest path to blood.
- 3 **Skin** Keratinised stratified squamous over vascular dermis; ~4-week turnover; basement membrane survival decides regeneration.

Urinary histology - the nephron and its segments

filtrate flows down



fenestrated capillary tuft

cuboidal + BRUSH BORDER (~65% back)

flat squamous (passive)

cuboidal, no brush

tall columnar, water channels

The **nephron** segments with their epithelial signatures.

Exercises 2.1-2.3

2.1 Which nephron segment reabsorbs ~65% of filtrate? [3]

2.2 Why do endocrine cells sit on fenestrated capillaries? [3]

2.3 What is the epidermal turnover time? [3]

Exercises 2.1-2.3

2.1 Which nephron segment reabsorbs ~65% of filtrate? [3]

2.1

- The proximal tubule.
-

2.2 Why do endocrine cells sit on fenestrated capillaries? [3]

2.2

- No ducts: secretion goes straight into blood – shortest path.
-

2.3 What is the epidermal turnover time? [3]

2.3

- About four weeks.

Exercise 3.1

3.1 For each nephron segment, state the epithelium and its functional reason.

Glomerulus, proximal, loop, distal, collecting duct – five segments, five signatures ✓. [8]

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3.1

- Glomerulus: fenestrated capillary tuft (filtration).
- Proximal: cuboidal + brush border (reabsorption area).
- Loop: flat squamous (passive exchange).
- Distal: cuboidal, no brush (fine-tuning).
- Collecting duct: tall columnar (controlled conveyance).
- Consistent epithelium-function pairing.

Exercise 3.2

3.2 A burn heals poorly (fictional case).

Explain why basement-membrane survival decides regeneration (the re-seeding template). Contrast partial- and full-thickness injury in one sentence each. State the immediate risks in the first 48 hours.

[7]

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3.2

- Keratinocytes re-seed from the basement membrane: no membrane, no resurfacing.
- Partial thickness: membrane intact → heals from remaining appendages; full thickness: membrane destroyed → needs grafting.
- First 48 h: fluid loss and infection – the barrier is gone.