

Exercise walk-through

4.3

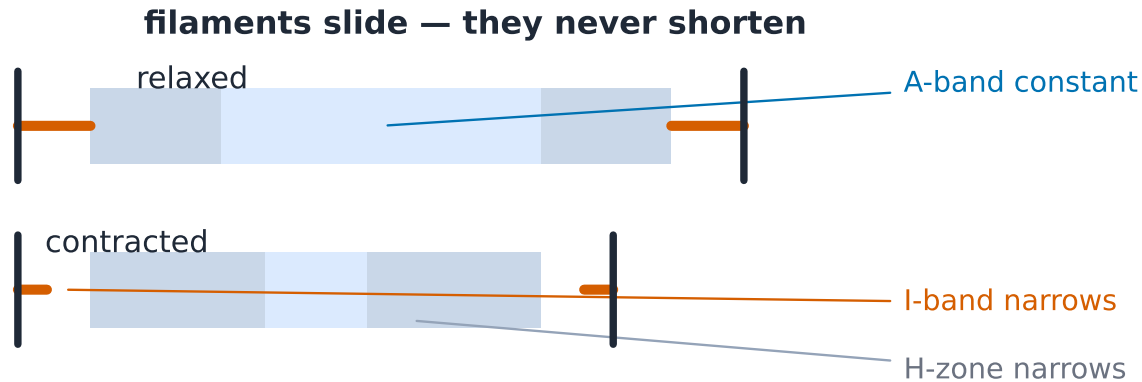
Muscle and nervous tissue

University Medicine

The machinery you can see

- 1 Fingerprints** Skeletal: striated, peripheral nuclei. Cardiac: striated, branched, intercalated discs. Smooth: unstriated spindles.
- 2 Bands** A-band (myosin) CONSTANT in contraction; I-band and H-zone narrow; filament lengths never change.
- 3 Glia** Astrocytes support; oligodendrocytes/Schwann myelinate; microglia scavenge
- glial disease is nervous disease.

Relaxed vs contracted: A constant, I and H narrow.



Relaxed vs contracted: A constant, I and H narrow.

Exercises 2.1-2.3

2.1 Which structure joins cardiac cells electrically and mechanically? [3]

2.2 In contraction, what happens to the A-band? [3]

2.3 Which cell type myelinates CNS axons? [3]

Exercises 2.1-2.3

2.1 Which structure joins cardiac cells electrically and mechanically? [3]

2.1

- Intercalated discs.
-

2.2 In contraction, what happens to the A-band? [3]

2.2

- Nothing – it stays constant (myosin's full length).
-

2.3 Which cell type myelinates CNS axons? [3]

2.3

- Oligodendrocytes (CNS); Schwann cells peripherally.

Exercises 3.1-3.2

3.1 Identify each: (a) long parallel fibres, striated, nuclei at the periphery; (b) branched striated cells with dark cross-lines; (c) spindle cells, no striations, single central nuclei.

Name each tissue and its control (voluntary/involuntary). State one location for each. [8]

3.2 A nerve biopsy shows onion-bulb formations (fictional progressive weakness).

State what the onion bulbs are (concentric Schwann processes). Explain what they imply (repeated de/remyelination). State why a primary neuron disease would look different. [7]

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3.1

- (a) Skeletal – voluntary; e.g. quadriceps.
- (b) Cardiac – involuntary; myocardium.
- (c) Smooth – involuntary; e.g. intestine.
- Consistent pairing of fingerprint with control and site.

3.2 A nerve biopsy shows onion-bulb formations (fictional progressive weakness).

State what the onion bulbs are (concentric Schwann processes). Explain what they imply (repeated de/remyelination). State why a primary neuron disease would look different. [7]

3.2

- Concentric wraps of Schwann-cell processes around a thinly myelinated axon.
- Cycles of demyelination and remyelination have recurred.
- A neuron (axonal) disease would show fibre loss, not circumferential glial proliferation.