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Muscular and Nervous Tissue Microscopy

Experiment 3 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To distinguish skeletal, cardiac and smooth muscle and identify basic nervous-tissue features on prepared slides.

Principle

Muscle is specialised for contraction; fibre shape, striations and nuclei help separate its types. Nervous tissue contains neurons and supporting glial cells. Neurons receive, integrate and transmit signals through their specialised structure.

Requirements

- Prepared skeletal, cardiac, smooth muscle and nervous tissue slides.
- Compound microscope and drawing materials.

Procedure

1. Locate the tissue

Survey each slide at low power and distinguish longitudinal from transverse sections.

2. Compare muscle fibres

At a suitable higher power, look for striations, branching and nuclear position. A feature absent in one field may be clearer in another.

3. Identify nervous tissue

Locate a neuronal cell body if visible and distinguish it from smaller supporting-cell nuclei. Follow visible processes without assuming that every line is an axon.

4. Draw

Make separate sketches for the three muscle types and a nervous-tissue field. Label only structures seen or clearly identified by the instructor.

5. Relate structure to function

State how the observed arrangement is compatible with voluntary movement, cardiac pumping, visceral contraction or neural signalling.

Comparison of Muscle Types

Feature	Skeletal / cardiac	Smooth
Cell shape	Long unbranched / branched	Spindle-shaped
Striations	Present / present	Not visible as striations
Nuclei	Multiple peripheral / usually central	Single central
Control	Mainly voluntary / involuntary	Involuntary
Typical site	Attached to skeleton / heart	Walls of hollow organs

Neuron: Structures to Identify

- Cell body: contains the nucleus and much of the synthetic machinery.
- Dendrites: generally receive input; an axon carries signals away from the cell body.
- Glial nuclei: smaller supporting-cell profiles around neural structures; slide appearance varies with the region and stain.

Observations and Record

Tissue	Striations / branching / nuclei	Identification
Muscle slide 1	_____	_____
Muscle slide 2	_____	_____
Nervous tissue	Cell body / processes / glia	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- Identification exercise: a branched striated fibre with centrally located nuclei supports cardiac muscle; a long unbranched striated fibre with peripheral multiple nuclei supports skeletal muscle.
- A section showing spindle-shaped cells without visible striations supports smooth muscle when the slide and section quality are suitable.

Result

The supplied muscle slides were identified using ____ and ____. The nervous-tissue sketch shows ____ at ____ x.

Precautions

- Do not confuse transverse muscle sections with another tissue solely because striations are absent.
- Intercalated discs may not be clear in every cardiac preparation.
- A routine stained slide cannot establish every neuron's functional direction.

Viva Questions and Answers

1. Which muscle is voluntary?

Skeletal muscle is mainly under voluntary control.

2. What are intercalated discs?

Specialised junctional regions connecting cardiac muscle cells.

3. What is the role of glia?

They support and maintain the environment of nervous tissue.

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