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Epithelial and Connective Tissue Microscopy

Experiment 2 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To identify epithelial and connective tissues on prepared slides using cell arrangement, extracellular matrix and characteristic structures.

Principle

Epithelium consists of closely arranged cells supported by a basement membrane. Classification considers the number of layers and the shape of surface cells. Connective tissues usually have more extracellular matrix; the arrangement of fibres and cells helps distinguish their types.

Requirements

- Compound microscope, instructor-labelled prepared tissue slides and slide list.
- Notebook and pencil for labelled sketches; lens-cleaning materials approved for the instrument.

Procedure

1. Survey at low power

Inspect the whole section and identify a surface, lumen or broad matrix area. Record the slide label without assuming the tissue from colour alone.

2. Examine epithelium

Identify the free surface and underlying tissue. Count the apparent cell layers and assess the shape of cells nearest the surface.

3. Examine connective tissue

Look for fibres, cells, ground substance and any lacunae or mineralised arrangement. Compare more than one field.

4. Compare diagnostic features

Use the identification tables below. Explain two visible features supporting each identification.

5. Record

Draw a small labelled field and write the slide, objective, total magnification and visible structures.

Epithelial Identification Guide

Type	Typical feature	Common location
Simple squamous	One layer of flattened cells	Alveoli; vessel lining
Simple cuboidal	One layer; roughly square profile	Kidney tubules
Simple columnar	Tall cells; often basal nuclei	Intestinal lining
Pseudostratified ciliated	Nuclei at different levels; all cells contact the basement membrane	Respiratory epithelium
Stratified squamous	Several layers; flat surface cells	Skin surface or oral lining
Transitional	Layered; rounded surface cells when relaxed	Urinary bladder

Connective Tissue Identification Guide

Type	Visible feature	Main role
Areolar	Loose fibres and scattered cells	Support and packing
Adipose	Large adipocyte spaces; peripheral nuclei	Energy storage and insulation
Dense regular	Parallel collagen bundles	Tensile support in tendons
Hyaline cartilage	Chondrocytes in lacunae; glassy matrix	Support and smooth joint surfaces
Bone	Mineralised matrix; lamellar organisation	Support and protection
Blood	Cells suspended in fluid matrix	Transport and defence

Observations and Record

Slide / tissue	Two observed identifying features	Magnification
Epithelial slide	_____	___ x
Connective slide	_____	___ x

Worked Example

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

- A 10x eyepiece with a 40x objective gives 400x total magnification.

- An identification should link appearance to structure: a thin single layer of flattened cells supports simple squamous epithelium; visible layered flat surface cells support stratified squamous epithelium.

Result

Slide ____ was identified as ____ because ____ and ____ were visible. A labelled sketch and magnification are recorded.

Precautions

- A sectioning angle can alter apparent cell shape and layer count.
- Do not identify a tissue from staining intensity alone.
- Use prepared slides; do not obtain or process human tissue for this exercise.

Viva Questions and Answers

1. How is epithelial classification made?

By layer number and surface-cell shape, with special features where relevant.

2. What distinguishes connective tissue generally?

Its extracellular matrix and supporting cell and fibre organisation.

3. Are empty-looking spaces always artefacts?

No; adipocyte lipid may be removed during preparation, leaving an apparent empty cell space.

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