

ANATOMY

- Science which deals with the structure of the human body from macroscopic to the microscopic level

- Microscopic Anatomy: (HISTOLOGY)

Study of body structures with the help of microscope (Light/Electron)

Microscopic anatomy provides structural details of tissues and cells, which otherwise are not visible to the naked eye.

microscope

Histos = web (tissue)

Logos = the study of

General architecture of the body

- Cell : basic structural and functional unit of any living organism
- Basic types of tissues in the body
 - epithelial tissue : protection
 - connective tissue : support
 - muscular tissue : contraction
 - nervous tissue : conduction

Tissues form building blocks of the
organs

Constitute the various functional system of the
body

*Cells ----- tissues ----- organs -----
systems -----body.*

Processing of tissues for light microscopy

Following procedure to obtain thin translucent Sections so that they can be examined under microscope by transillumination.

- 1) Fixation
- 2) Dehydration
- 3) Clearing
- 4) Embedding
- 5) Microtomy
- 6) mounting

fixation

- Formalin/acetic acid
- Combination of these fixatives: best result
- Bouin's fluid, Zenker's fluid.....
- To preserve morphology and chemical composition
- To prevent autolysis and putrefaction
- To harden the tissue for easy manipulation
- To influence staining

dehydration

- Water from the tissue is removed
- By immersing tissues in ascending grades of alcohol
- To embed tissue in paraffin wax

clearing

- Clearing agents
- Xylene / toluene
- These agents penetrate and replace the alcohol from the tissue and make it translucent

embedding

- To obtain thin sections with microtome, tissue is infiltrated with embedding medium which gives rigid consistency to the tissue
- Embedding media : paraffin wax, gelatin, plastic resins

microtomy

- Thin sections are cut with rotary microtome
- 5-7 micromili thick sections

staining

- Basic and acidic dyes are used
- Basophilic : tissue components that stain more readily with basic dyes
- Acidophilic : stains more readily with acidic dyes
- Combination of these dyes : haematoxylin and eosin is most commonly used
- Haematoxylin : nucleus : blue colored
- Eosin : cytoplasm : pink

Microscopy

- Once paraffin sections are stained with haematoxylin and eosin or some special stains, it can be viewed through a light microscope

Microscope

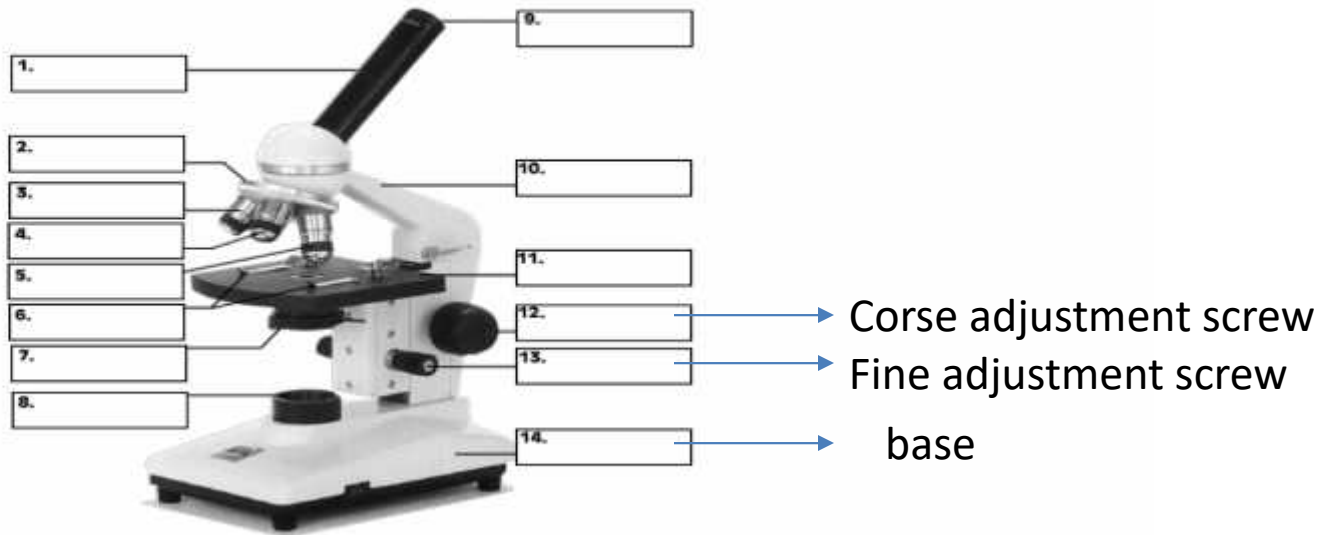
Dark ground

Phase contrast

Polarizing , electron

- TEM : transmission electron microscope
- SEM : scanning electron microscope

Microscope Parts



1. Body Tube – Supports the eyepiece and leads to the nosepiece.
2. Nosepiece – Holds the objective lenses and can rotate to change magnification power.
3. Low Power Objective lens - Views specimen with 4x lens which magnifies 40 times.
4. Medium Power Objective lens – Views specimen with 10x lens, which magnifies 100 times.
5. High Power Objective lens – Views specimen with 40x lens, which magnifies 400 times.
6. Stage clips – Holds the microscope slide in place.
7. Diaphragm – Small openings under the stage that determine how much light can travel through the stage into the lens.
8. Light – Collects light and directs it through the opening in the stage.
9. Eyepiece – The part of the microscope that you look through to view an object. Magnifies the object 10x.
10. Arm – Supports the magnification tube and is used to carry the microscope.
11. Stage – supports the slide being used.

Mechanical parts

- 1) Base or foot
- 2) Limb (Arm)
- 3) Body tube
- 4) Rotating nose piece
- 5) Course adjustment screw
- 6) Fine adjustment screw
- 7) Stage
- 8) Sub stage
- 9) Illuminating mirror

Optical parts (3 system of lens)

- 1) Condenser
- 2) Objective
- 3) Eyepiece

Magnification: common microscope :magnifying power of objective \times eyepiece power

Eyepiece has magnification power of 7.5X or 10X

Objectives have magnification power of 10X,40X,100X

Structure of cell

Basic structural and functional unit

Robert Hook was the first to use the term cell

Cell structure : -cell membrane

-nucleus

-cytoplasm

Haematoxylin & Eosin staining dyes