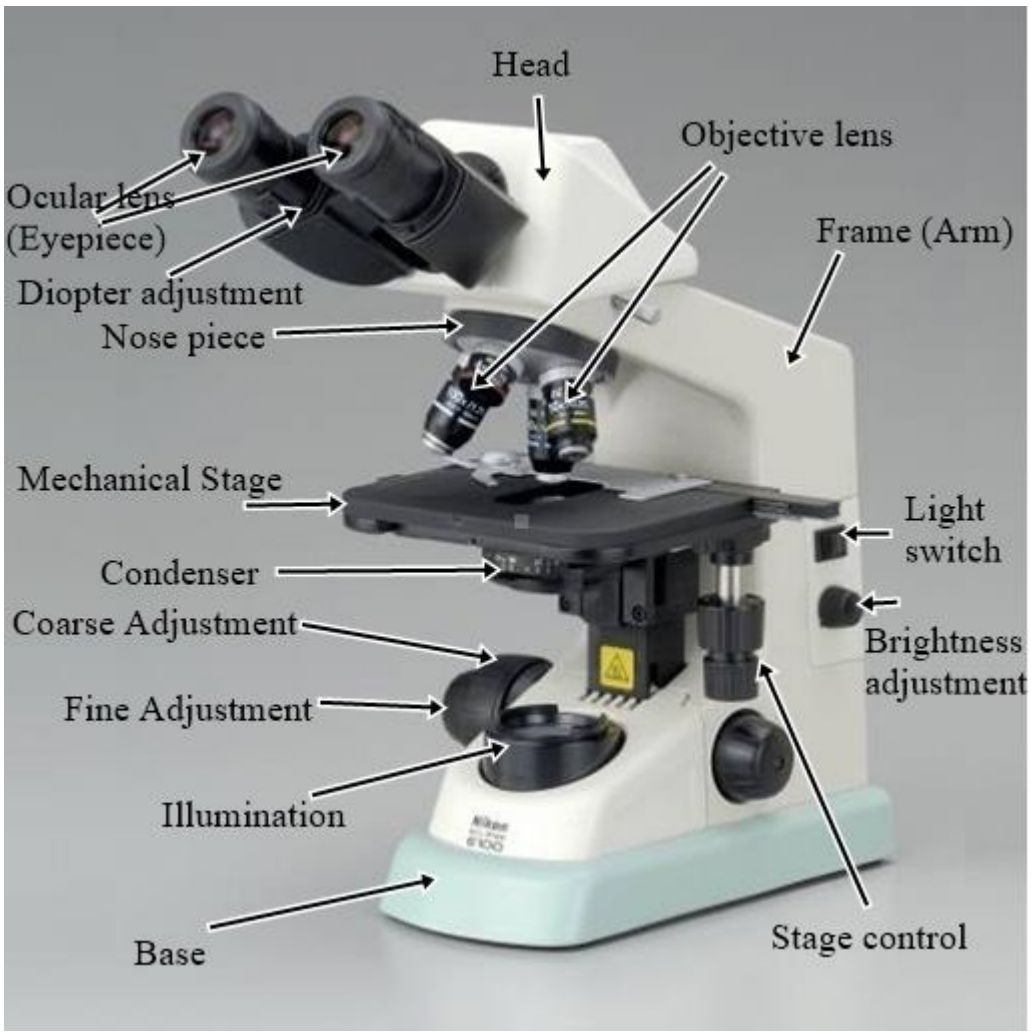
Class 1

Microscope and selected methods of histological study.

1. Microscope parts:

a) mechanical parts: base, frame with coarse and fine adjustments, mechanical stage, nose piece (objective turret, revolver), head

b) optical parts: illumination, condenser, objectives, oculars



2. Resolution:

$$D = \frac{\lambda}{2 \times A}$$

λ – the wavelength of light

A – numeric aperture

Resolution is the smallest distance between 2 structures which one may differentiate them as 2 different structures.

The best resolution for simple light microscope is D=0,25µm

Aperture – an effective diameter through which the beam of light passes

$$A = n \times \sin \alpha$$

n – refractive index – constant value for particular medium (n=1,515 for air)

α - angle between the optical axis and the external light beam

3. Objectives:

a) dry objectives – A=0,95

b) immersive objectives

- water objectives – A=1,2

- oil objectives – A=1,42

4. Light microscope variants:

a) phase contrast microscope

b) polarising microscope

c) fluorescence microscope

d) confocal microscope

5. Electron mictoscopes:

a) transmission electron microscope

b) scanning electron microscope

6. Histological techniques

Features of a good fixative:

a) rapid and even cells penetration

b) fast cytoplasm killing

c) Complete precipitation of protein compounds

d) Absence of shrinking and swelling of cells and absence of artefacts

Simple stains:

Basic stain – haematoxylin – stains nucleus in navy blue

Acidic stain – eosin – stains cytoplasm in red/pink

Neutral stains (indifferent) – stain fat: Orange G in orange, Sudan III in orange, Scarlet R in red, Nile blue in pink, Osmium tetraoxide in Black