Medical Laboratory Instrument

Inas Qasim

Microscopes

Microscopes Is an important device that produces a magnified image of objects too small to be seen with the naked eye .The microscope is widely used in medicine and biology.

Types of microscope :

1-**Light microscope** : The types of light microscope including:-

A- Bright - field microscope: Simple light microscopes are sometimes referred to as bright field microscopes. It used to view stained or naturally pigmented specimens.

B- Dark - field microscopy: is used to illuminate unstained samples causing them to appear brightly light against a dark background.

C -Ultraviolet microscope: It has quartz lenses and slides and uses ultraviolet radiation as the illumination.

D -Fluorescent microscope :It used to examine material that fluoresces under ultraviolet light.

E - Phase contrast microscope: type of microscopes use to making the transparent microorganisms suspended in a fluid more visible. it is useful for examining:

1. Unstained bacteria : cholera vibrio's in specimens and cultures

2.Amoebae in fecal preparations, Cerebrospinal fluid

3. lymph gland fluid Urine sediments

2- Electronic microscope: These types are :

A- Scanning electron microscope (SEM): This microscope helps in viewing three-dimensional images of microorganisms and other specimens.

B-Transmission electron microscope (TEM) : is used to study cells. like viruses

Parts of Microscope :

A- Frame work

1-Body Tube: It is part of the microscope as it holds the eye piece and connects it to the objective lenses.

2-Revolving Nosepiece: is the part of the microscope. which holds two or more objectives lenses, to provide various magnifications in order to view the same specimen in various dimensions.

3- Arm: is the part of microscope that connects to the base and helps carry the microscope easily.

4-Stage: is an important part of the microscope. It is a flat surface where the slide with the specimen is placed.

5-Base: It is the bottom part of the microscope, that

provide the support to the microscope.

6- Glass slide: a glass slide is a thin and flat piece of . glass used in the microscope. The specimen is kept on the glass slide and put under the objective lenses .

7. Power Switch: It is an electrical switch present at the bottom of the microscope in order to switch of the light source .

B – Mechanical adjustments (Focusing system)

1-Coarse adjustment : is a knob present on the arm of a microscope. use to move the specimen up and down to focus and show the best image.

2 -Fine adjustment : This knob is a sub part of the Coarse adjustment knob. It is used to bring the specimen into sharp focus.

3-Slide adjustment: it used to move the specimen back or forth to adjust the slide containing specimen in order to it to focus.

4-Condenser adjustment :The condenser is used to condense the light required for visualization.

C-Magnification system (Lenses):

1-Eyepiece (Ocular lens): is a magnifying lens attached to the microscope which helps in magnifying the sample object. Eyepiece may be monocular or binocular. Eye lenses magnification 10X , 12X . C

2- Objective lens : is the part of microscope responsible

for magnifying the image of specimen.

There are four objective lenses in a standard microscope as following :

1-Scanning Objective (4X): This shortest objective is useful for getting an overview of the slide (especially handy with some of the slides that

contain whole organs like a section of the spinal cord, lung, digestive tract, ovary……).

2-Low Power Objective (10X): This next shortest objective is probably the most useful lens for viewing slides.

3-High Power Objective (40X): This objective (sometimes called the "high-dry" objective) is useful for observing fine detail such as the striations in skeletal muscle, the arrangement of Haversian systems in compact bone, types of nerve cells in the retina, etc.

4- Oil Immersion Objective (100X): This longest objective is used for observing the detail of individual cells such as white blood cells, the cells involved in spermatogenesis, et. Since the refractive indices of air and this lens are different the oil immersion using to increase the refractive index to make the field clear .

Microscope Parts

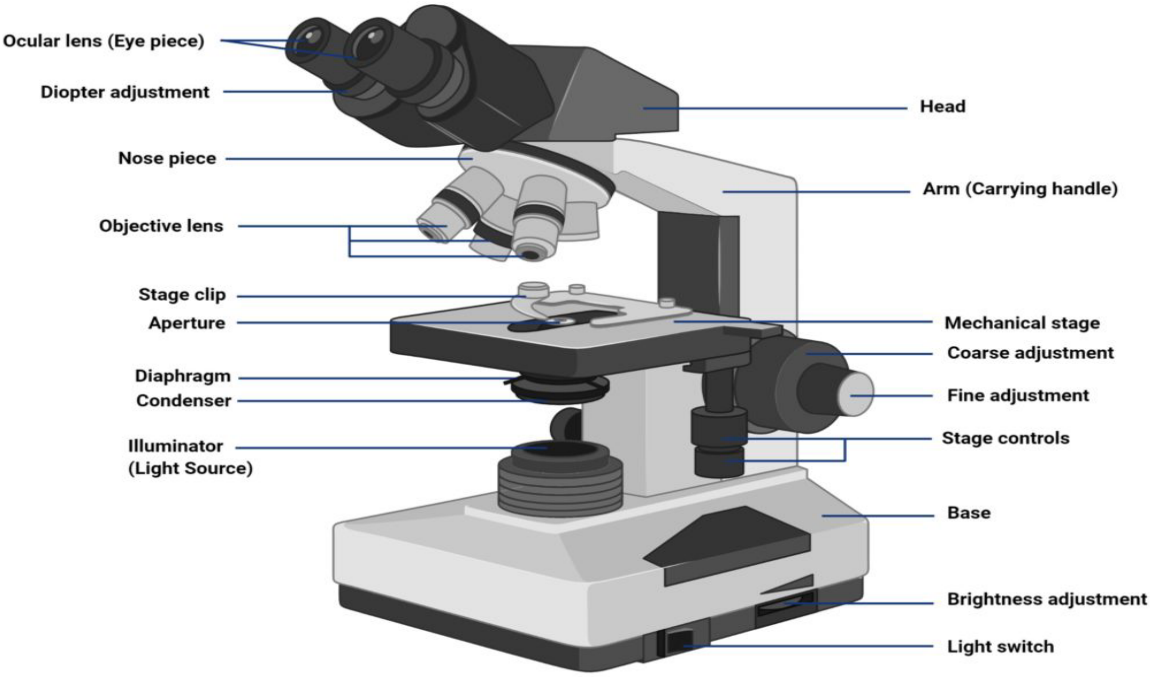

Figure: Parts of a microscope, Image Copyright © Sagar Aryal, www.microbenotes.com