

The light microscope (compound microscope)

Definition of the microscope: an instrument consisting of a lens or a combination of lenses that produces enlarged images of small objects for examination and analysis.

Types of microscope:

Depending on the number of eyepiece, the microscopes were classified to:

1- Monocular microscope 2- Biocular microscope 3- multiocular microscope

Depending on the source, the microscopes were classified to:

1-Light microscope 2- Electron microscope 3-Fluorescence Microscope..et cetera.

Structural parts of a microscope :

1. Head -upper part of the microscope.
2. Arms - connecting the base to the head.
3. Base - It acts as microscopes support.

Parts of a compound Microscope and their function :

1. Ocular lens (usually 10X).
2. Objective lenses (usually 10X, 40X, and 100X) on revolving nosepiece .
3. Diaphragm: control the amount of light that reaches/ passes through the slide .



4- Condenser – These are lenses used to collect and focus light from the lamp / illuminator into the slide / specimen. They are found under the stage of the microscope.

5. Stage : is place to supports the microscope slide

6- Stage clips: Metal clips that hold the slide in a stable position.

7- Coarse adjustment: used for rapid movement of the stage (move the stage up & down for focus).

8- Fine adjustment: Fine tunes the focus to increases the detail of the specimen.

9- Stage Control : These knobs move the stage left and right.

10. lamp (light source)

Factors determine the quality of an optical image:

A. Magnification : is its ability to enlarge an image of an object.

B. Resolution: which must produce a clear image of an object or the ability of a lens to distinguish between small objects that are close together.

Total magnification:

To get the total magnification take the power of the objective (4X, 10X, 40x and 100X) and multiply by the power of the eyepiece, usually 10X.

Magnification (total) = magnification (obj. lens) x magnification (ocu. lens)

$$4X.10X=40X$$

$$10X.10X=100X$$

$$40X.10X=400X$$

$$100X.10X=1000X$$

Using High Power 100 X :

- Place a small drop of oil on the slide in the center of the lighted area.
- Rotate the 100x oil immersion objective touches the oil
- Clean up: When you have finished for the day, wipe the 100x oil immersion objective carefully with lens paper to remove all oil. Wipe oil from the slide with wipe.

Oil Immersion Lens:

*Use of oil in this way to enhances the resolving power of the microscope.

⇒ The drop of oil is interposed between the lens and the slide. The oil is used because it has the same refractive index as glass (with a density closer to glass), which prevents the loss of light (to air) and allows more light to enter the objective ;This improves resolution.

بعض الاجراءات الهامة لصيانة وحماية المجهر:

* عند نقل المجهر من مكان إلى آخر يرفع المجهر من الذراع بيد وتوضع اليد الأخرى تحت القاعدة.

* يحفظ في دولاب مغلق بعيداً عن الأتربة.

* تنظف العدسات قبل وبعد الاستخدام بورق تنظيف العدسات والزايلين Xylene أو الاستيون + كحول.

* تحذير: الاستيون لوحده مذيب قوي قد يذيب المادة اللاصقة للعدسات لذلك يحذر من استخدامه.

كما يمكن استخدام cotton swab بدلا من ورق العدسات.

