

Practical Microbiology

Lab 1

Compound Light Microscope

Microbiology : It is the study of organisms that are too small to be seen with naked eye .These organisms are unicellular or bacteria and eukaryotes such as fungi and protists . Viruses are also studied .

Causative agents of the most common diseases are microorganisms which can not be seen without using the microscope , therefore it is an important apparatus in the laboratory .

Microscopic parts

In order to operate a microscope properly and effectively , it is necessary to have an understanding of some of the various parts of the microscope and their functions.

- 1- Base : It supports the microscope and gives the apparatus stability .
- 2- Arm : The part of the microscope that you carry the microscope with.
- 3- Body tube : The long tube that holds the eye piece and connects it to the objectives .
- 4- Ocular lenses (Eye pieces) : The lenses in the upper part of the microscope where you look through to see the image of your specimen .

There are two kinds of microscope :

- a. Monocular microscopes : have one ocular lens .
- b. Binocular microscopes : have two oculars .

5- Revolving nose piece : The rotating part of the microscope at the bottom of the body tube , it holds the objectives .

6- Objective lenses : The microscope may have 2,3 or more objectives attached to the nose piece, they vary in length (the shortest is the lowest power or magnification).

- a. Scanning lens (4X).
- b. Low power lens (10X).

- c. High power lens (40X).
- d. Oil immersion lens (100).

7- Coarse adjustment knob : The large round knob on the side of the microscope used for focusing the specimen , it may move the stage up or down to the correct distance from the objective for viewing .

8- Fine adjustment knob : The small round knob on the side of the microscope used for focusing the specimen after using the coarse adjustment knob .

9- Stage : The large flat area under the objectives , it has a hole in it that allows light to pass through . The slide is placed on the stage for viewing .

10- Stage clips : The clips on the stage which hold the slide in place.

11- Aperture : The hole in the stage that allows light to pass through for better viewing of the specimen .

12- Diaphragm and light usually found near the base of the microscope , the light source makes the specimen easier to see.

Oil Immersion Lens

It is one of the objectives which has the highest magnification . It is used for the examination of the organisms that could not be seen without high magnification . A special oil is used with this objective which is called "cedar oil".

The Function of Oil

The oil contributes to two characteristics of the image viewed through the microscope :

- 1- Finer resolution .
- 2- Finer brightness .

These characteristics are important when high magnification is used , so it is usually designed for oil immersion lense.

The reason of using oil

When the light passes from a material of one refractive index to a material of another ,as from glass to air or from air to glass.

Placing a drop of oil with the same refractive index as glass between the slide and the objective lens eliminates two refractive surfaces and increases the clarity of the image .

Cleaning the oil immersion lens

A disadvantage of oil immersion viewing is that the oil must stay in contact with the glass and oil is viscous . Oil immersion lenses are used only with oil, and oil can not be used with dry lenses , such as low and high power lenses ; therefore , oil distorts images seen with dry lens , so once you place oil on a slide , it must be cleaned off thoroughly before using the high dry lens again. Oil on non –oil lenses will distort viewing and possibly damage the coatings.

Cleaning this lens is done by using :

- 1- Dry "lens paper".
- 2- Wet lens paper with xylene .
- 3- Dry lens paper.

Calculating the total magnification :

Objective lens magnification * Ocular lens magnification example
:40x *10x =400x.