



**Mustansiriyah University / Pharmacy
College
Practical Physiology 2024-2025
Second Stage**



Lab One

compound Microscope & Laboratory Safety

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Lab Safety

Lab Safety Begins Before You Go to the Lab!

- Wear the clothing and protective wear identified in your risk assessment
- Laboratory coats must be kept fastened
- Don't wear sandals or open shoes
- Long hair must be tied back

- **Before You Leave the Laboratory**
- Clean your workbench with disinfectant at the beginning and at the end of the laboratory exercise.
- Leave all equipment, samples and reagents correct position.
- Wash your hands with soap and water.

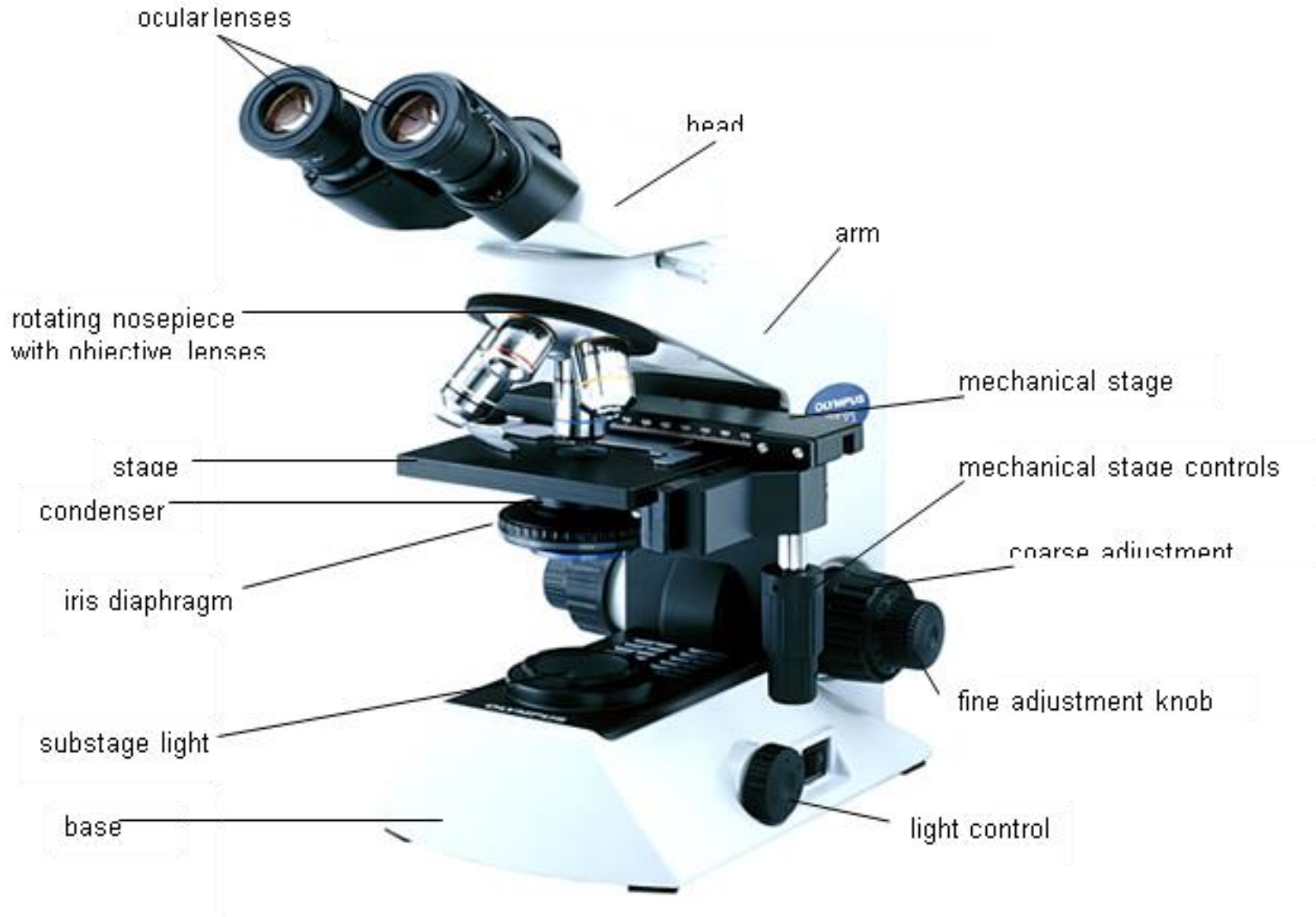
Microscope

- **A microscope** (from the Ancient Greek, *mikrós*, "small" and, *skopeîn*, "to look" or "see"): is an instrument used to see objects that are too small for the naked eye & its one of the most commonly used instruments in the medical colleges, and in clinical laboratories. Students of physiology use it in the study of morphology of blood cells and in counting their numbers. In this laboratory, you will be using a compound light microscope.

Aim:

To study the parts of a compound microscope and to view the morphology of some tissue sections under microscope.

Parts of the Compound Microscope:



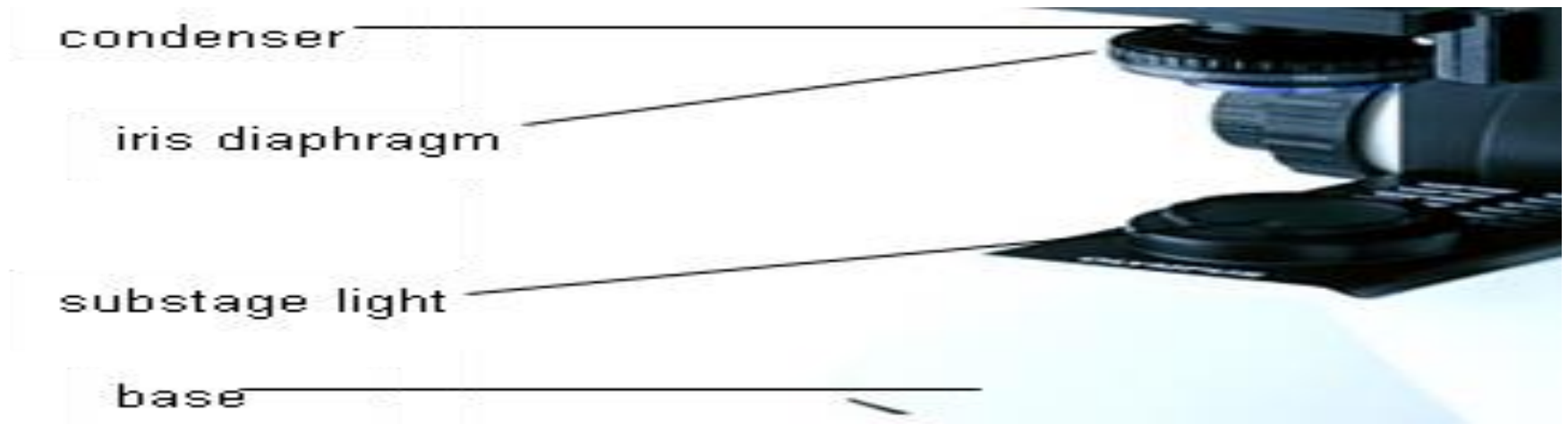
Compound Light Microscope Parts and Functions

1. Base & Light Source : The base :Supports the microscope.

Substage light: Located in the base, the light passes directly upward through the microscope.

2. Condenser: Concentrates the light on the specimen. The condenser has a height-adjustment knob that raises and lowers the condenser to vary light delivery. Generally, the best position for the condenser is close to the inferior surface of the stage.

3. Iris diaphragm dial: Dial attached to the condenser that regulates the amount of light passing through the condenser. The iris diaphragm permits the best possible contrast when viewing the specimen.



4. Coarse adjustment knob: Used to focus on the specimen when on 4x or 10x.

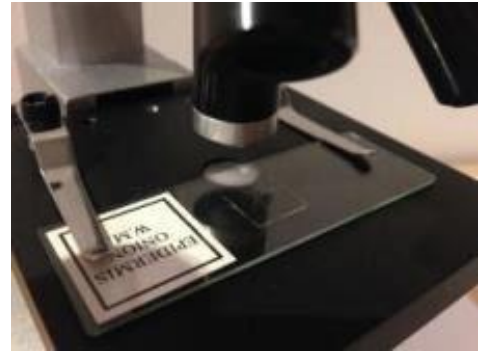
5. Fine adjustment knob: Used for precise focusing once coarse focusing has been completed. Use only this knob when on 40x or 100x.

6. Head or body tube: Supports the objective lens system, and the ocular lenses .

7. Arm: Vertical portion of the microscope connecting the base and the head.



8. Mechanical Stage & clips : On the stage, one can place the slide. By shifting the plate, one can choose the part of the object, which one wants to look at.



9. Nose piece : It's used to carry and rotate multiple objective lenses, that have different magnification power.



10. Ocular (or eyepiece): There are two lenses at the superior end of the head, through which observations are made. An ocular lens has a magnification of 10x.

The function of the eyepiece in a microscope is to convert the real-image from the objective into an enlarged-image



11. Objective Lenses:

- The shortest lens is the scanning lens, This objective, a very low power lens, magnifies the image 4 times (4x). It is used for scanning a much larger area on the slide.
- The low power lens is 10x.
- The high-power objective lens is 40x.
- The oil immersion objective lens is usually the longest of the objective lenses and has a magnifying power of 100x

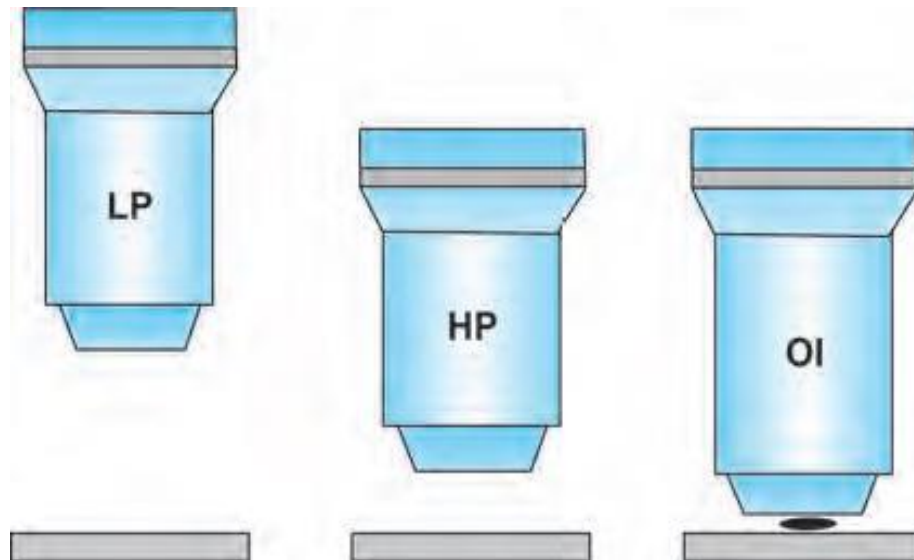


Total Magnification of the Compound Microscope

- The microscope is designed to magnify specimens. The objective lens magnifies the specimen to produce a real image that is projected to the ocular. This real image is magnified by the ocular lens to produce the virtual image seen by your eye.
- The total magnification of any specimen being viewed is equal to the power of the ocular lens multiplied by the power of the objective lens. If the ocular lens magnifies 10x and the objective lens magnifies 50x, the total magnification is 500x (10×50).

The working distance:

- is the distance between the objective and the slide under study. This distance decreases with increasing magnification. It is 8–13 mm in LP, 1–3 mm in HP, and 0.5–1.5 mm in OI lenses respectively. Note that the OI lens has to be immersed in a drop of oil.



• PRECAUTIONS WHILE USING THE COMPOUND MICROSCOPE

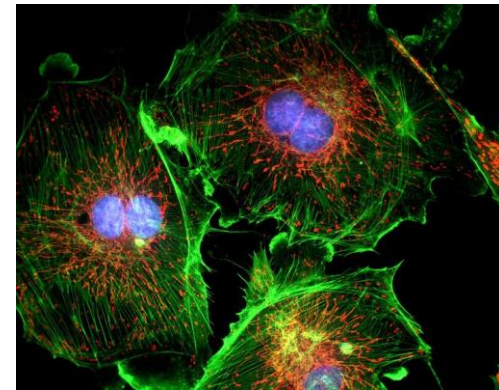
- The microscope must always be handled properly. You must observe the following rules for its transport, cleaning, use, and storage:
- 1- Transport in an upright position with one hand on the arm and the other supporting the base. Set it down carefully at your work station. Do not drag it across the table.
- 2- Use only special lens paper to clean the lenses. Clean all lenses before and after use.
- 3- Always begin the focusing process with the 4x or 10x objective lens in position, changing to the higher-power lenses as necessary.
- 4- The coarse adjustment knob may be used with the 4x or 10x lens, but use only the fine adjustment with 40x or 100x.
- 5- Adjust lighting appropriately. Turn off the light when not in use.
- 6- Always use a cover slip with temporary (wet mount) preparations.
- 7- When you put the microscope away, remove the slide from the stage, and rotate the lowest-power objective lens into position. Wrap the cord around the clips on the back, not around the base.
- 8- Never remove or loosen any parts from the microscope.

Other Types of Microscope

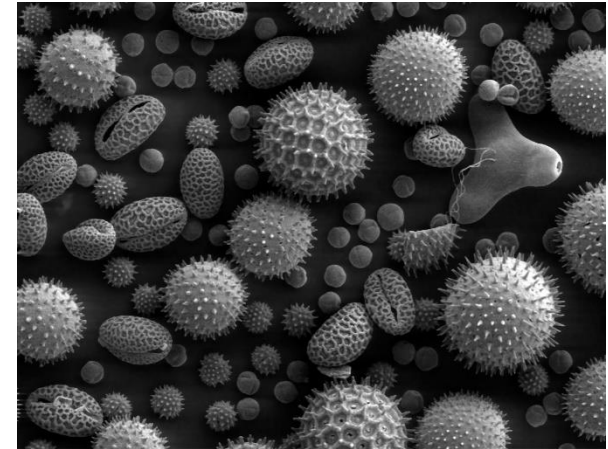
- 1. **The dissection microscope**, is light illuminated. The image that appears is three dimensional. It is used for dissection to get a better look at the larger specimen. You cannot see individual cells because it has a low magnification.



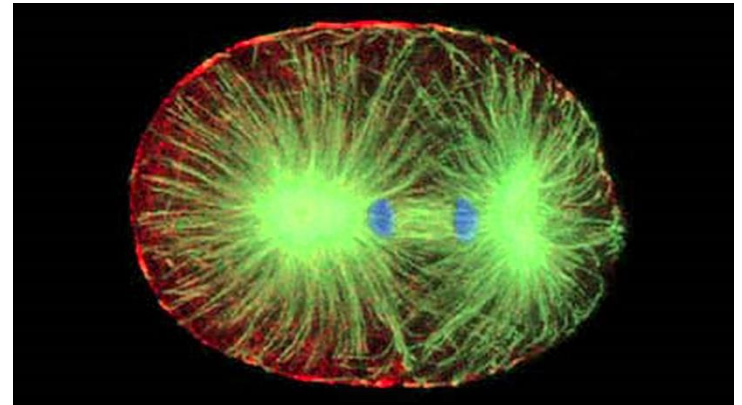
- 2. **The fluorescence microscope** that uses a fluorescent dye to stain tissues, which are studied under the microscope.



- 3. **The scanning electron microscope** SEM uses electron illumination. The image is seen in 3-D. It has high magnification up to several hundred thousand times and high resolution. The pictures are in black and white.



- 4. **The confocal microscope** this microscope uses a laser light. It enables the reconstruction of three-dimensional structures from the obtained images.



Physiology worksheet (Lab-1)

Date-----

Names of the students:

Group-----

Name of the experiment:

Aim of the experiment:

Materials

Procedure:

1. Switch light on and put your slide on the stage.
2. Begin the focusing process with the 4x or 10x objective lens in position, changing to the higher-power lenses as necessary.
3. The coarse adjustment knob may be used with the 4x or 10x lens, but use only the fine adjustment with 40x or 100x.
4. Adjust lighting appropriately and record your results.
5. Turn off the light when you finish.

Result:

SUMMARY CHART	Scanning	Low Power	High Power	Oil Immersion
Magnification of objective lens	x	x	x	x
Total magnification	x	x	x	x
Working distance	mm	mm	mm	mm
Detail observed (draw or describe)				

Discussion: