



# Medical laboratory instrument

## Lecture one

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# MICROSCOPES

**A microscope :** is an optical instrument used to see very small things that cannot be seen with the naked eye or to show the fine details of things in order to discover their composition and study them.



The microscope is one of the most important tools used in biology and chemistry, so this tool allows enlarging objects to look at them in detail. There are several different types of microscopes, where these microscopes provide different levels of magnification and the production of different types of images.

## Types of microscope:

- 1- Optical microscope
- 2- Electron microscope
- 3- Bright field microscope
- 4- Phase contrast microscope
- 5- Dark field microscope
- 6- Fluorescence microscope

**1- Optical microscope:** it uses optical lenses to magnify images resulting from the passage of electromagnetic waves, and this microscope is used to study single-celled microorganisms; Like small parasites, different types of bacteria, it is the simplest and most common type of microscope, **and there are two types of this microscope, which are**

**Simple optical microscope:** it uses only one lens to zoom in.

**Compound optical microscope:** it uses a group of lenses to increase magnification.

**2- Electron microscope:** This microscope uses beams of electrons to enlarge samples, and these electrons have a much shorter wavelength than visible light, so that the accuracy is much higher, and their lenses are distinguished by electromagnetism, and there are two types of electron microscopes, which are:

**Scanning electron microscope(SEM):** used in spectroscopy.

**Transmission electronic microscope(TEM):** It is used in biology to study the internal structure of cells; such as mitochondria and organelles

**The optical microscope is composed of several mechanical and optical parts as follows:**

:**First:** mechanical parts

**Base:** The part on which the device rests and takes various forms, depending on the company producing it.

**Arm:** The part that holds the microscope tube and is connected to the theater and controls.

**Stage:** It is a part that can be moved in more than one direction by side controls, and the microscopic slide is fixed by the holder.

**Adjustments are two types:**

**Coarse Adjustment:** used to display the image.

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**Fin Adjustment:** used to fine-tune the focal length.

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**Second: the optical parts:**

Eye piece of the microscope, consisting of:

**1. Ocular lens:** It is attached to the top of the microscope tube, its magnification ranges from 6-10 times.

**2. The Nose piece** of the microscope consists of:

**Objective lenses:** They are attached to the bottom of the microscope tube near the stage, on a moving circular disk.

**There are three types of objective lenses:**

- **Low power:** 4-10x magnification.
- **High power:** 40x magnification
- **Oil lens:** 100x magnification

**Condenser:** The condenser is below the stage.

It consists of a group of lenses, arranged in a special way, that collects light rays.

**light source:** the lamp (or mirror) under the stage that sends light through the object being viewed.

## Microscope Parts

