

## Lab 2

## Microscopic type

It is a device for magnifying **small** objects that cannot be seen with the naked eye, and the science interested in exploring small objects or the fine details of things using these devices is called microscopy. The word "microscopic" or "microscopic" is used to describe something that can only be seen with the help of a microscope. The microscope is one of the most widely used devices in biology. Biologists use it to study living organisms, cells and their small parts that cannot be seen with the naked eye.

### Types of microscopes:

1-Optical microscopes الضوئي

2-Electron microscopes الالكتروني

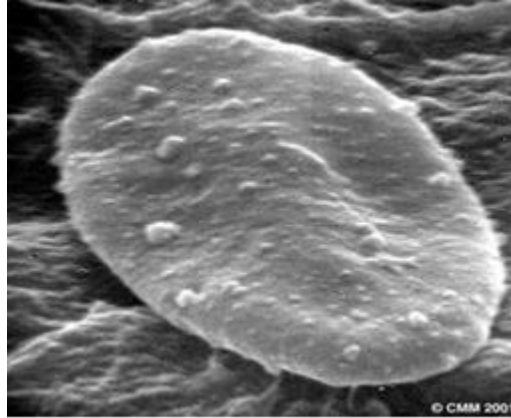
### Types of electron microscopes:

**Scanning electron microscope (الماسح):** This microscope works by shining a stream of **electrons** on the **outer surface** of the cell. It specializes in studying the **outer parts**, to form a three-dimensional image with a magnification of up to 50,000 times.

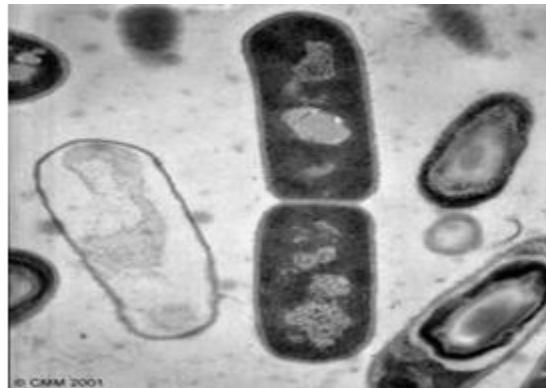
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## Lab 2



**Transmission electron microscope (النافذ):** An electric or electronic current is applied to the entire cell. This type specializes in studying the interior of the cell.



## Lab 2

### Optical microscope:

It is a magnifying device that **depends** on **light** and **lenses** to magnify matter. It is characterized by its **low cost** and is most **widespread** in the fields of education and medicine. It is distinguished by its ability to monitor the activities of living cells.

### Types of optical microscopes:

**Simple light microscope البسيط**: enlarges an object with a **simple magnifying power**; Because it consists of **one double-sided lens**.



**Dissecting microscope التشريحي**: This device consists of **two eyepieces and objective lenses**, and its magnification power for objects ranges from 6 to 50 microns.



## Lab 2

**Compound light microscope المركب:** This device consists of a magnifying lens in the eyepiece and another in the objective lens. Its magnification power reaches 40 to 1000 times, and it is considered one of the most important devices in biology.



**Inverted light microscope المقلوب:** Its design differs from other light microscopes in that the objective lens is placed at the bottom to magnify the sample, and the light is controlled as needed.



## Lab 2

**Digital microscope الرقمي:** This type is characterized by the presence of an imaging camera added to it, and allows the magnified image to be displayed on the computer screen, data show, and television, and its image magnification power reaches 400 zoom.

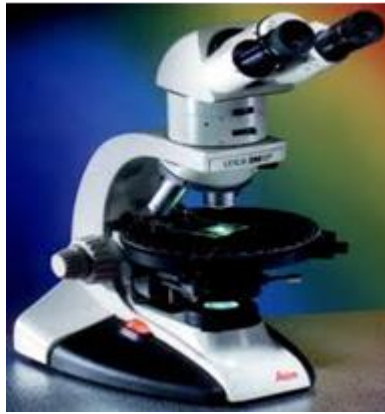


**Dark field microscope حقل المظلم:** It is characterized by the **dark floor** of the slide, and the **light is in the form of a ring** on the organism whose activity is to be observed. It is special for **examining a type of bacteria**.



## Lab 2

**Polarizing microscope** **المستقطب** : It relies on the polarization of the **light** beam to distinguish between substances with double refractive power, and the most important fields in which it is **used are geology, medicine, and biology.**



**A compound optical microscope consists of several parts as follows:**

**First: mechanical parts** **اجزاء الميكانيكية**

- 1- **Body Tube** انبوبة جسم المجهر
- 2- **Rotary disk** القرص الدوار
- 3- **Arm** الذراع
- 4- **Base** القاعدة
- 5- **Stage** المسرح
- 6- **Coarse & Fine Adjustment** المنظم التقريبي والدقيق

## Lab 2

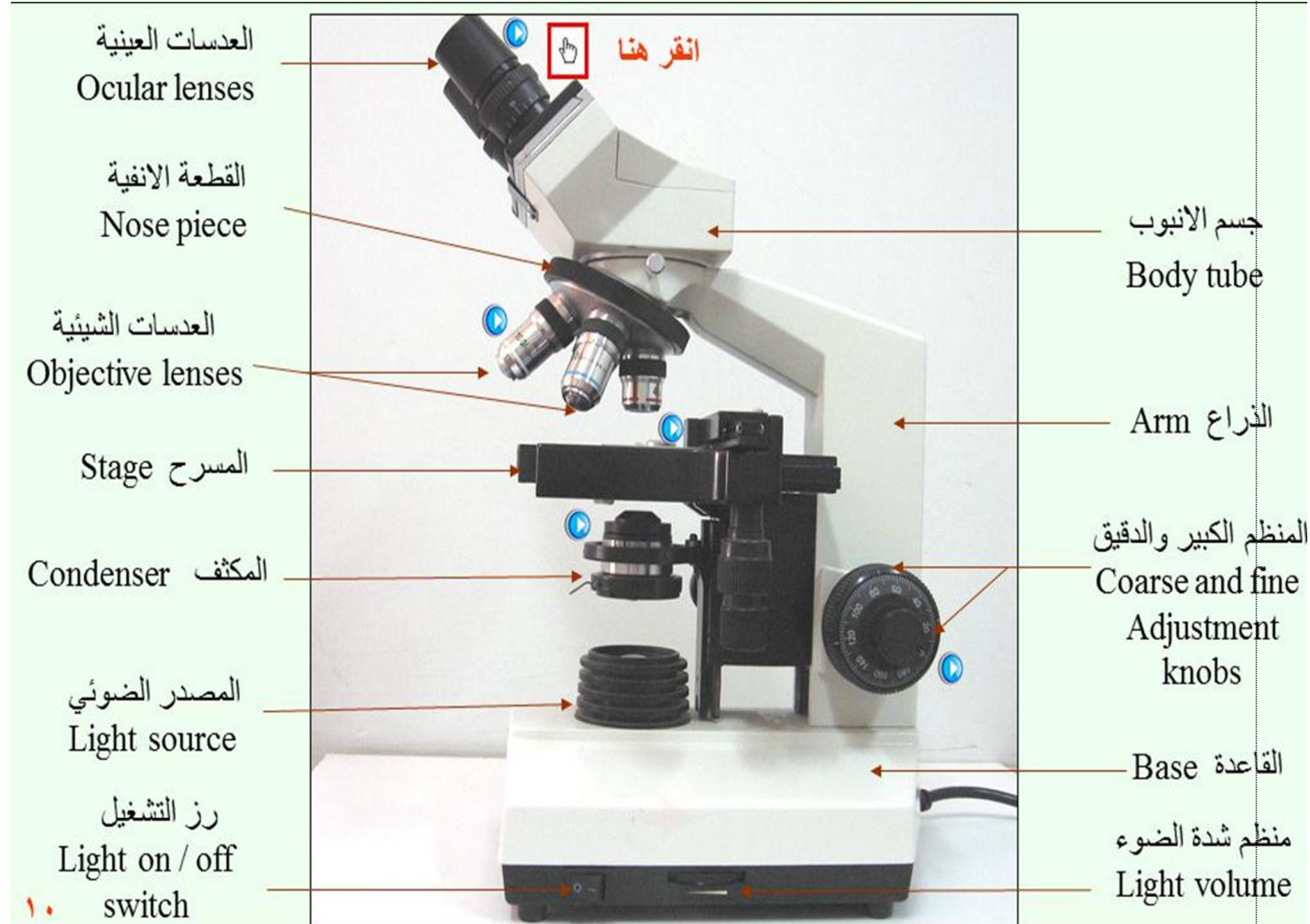
### **Second: Optical parts:** الأجزاء البصرية

- 1- المكثف Condenser
- 2- العدسة العينية Ocular Lens
- 3- العدسات الشيئية Objective Lenses

The oil immersion lens cannot be used except by placing a drop of cedar oil or pure opalescence oil on the sample above the slide to prevent light from being refracted and scattered and to prevent it from being deflected outside the eyepiece.



Lab 2





## Lab 2

### Compound light microscope:

#### Ocular eyepiece lenses **العينية العدسات**

The eyepiece is the lens through which we see the sample, as it is located at the top of the tubular body .The magnification power of this lens is ten meters (100x). Most microscopes contain two eyepieces, and some. Contains one eyepiece.

#### Tube body **الجسم الانبوبي**

It is the cylindrical part of the microscope that carries the eyepieces at the top.

#### lenses objective **العدسات الشيئية**

It is a group of three to four lenses attached to the disc, a short objective lens with magnifying power .The smallest objective lens (x4), the middle objective lens with magnification power (x10), and the large objective lens with magnification power (x40) in addition to the fourth lens, which is an oil lens whose magnification reaches 1000 times. (x100). An oil called **sidr** oil extracted from sandalwood is added to the slice when using, As for the other lenses, no material is used with them.

## Lab 2

### Stage المسرح

It is the flat place on which the glass slides on which the sample is to be examined are placed, and there is an opening. Small, allowing light to pass through the slide.

### Condenser المكثف

The condenser is located under the stage opening and its function is to collect light rays, so we can control the focus of the directed light ,to the slide by moving it up and down.

### Iris diaphragm iris الحجاب الحدقي

It is a small part installed on the surface of the stage and connected to the ondenser where it is preferable to regulate its quantity ,Light into the new lung through the side.

### Revolving nose piece القرص الدوار

It is a circular part connected to the lower part of the tubular body and is used to change the positions of objective lenses related to it.

## Lab 2

### Coarse adjustment المنظم الكبير

It is a large wheel located on both sides of the microscope and is used to regulate the distance between the stage and the objective lens ,To obtain clear vision, it is used with small (x4) and medium (x10) objective lenses. Use with large objective lens (x40) and oil lens (x100).

### Fine adjustment المنظم الصغير

It is a small wheel also located on both sides of the microscope, which is used to help see the sample clearly, It is clearer and is used with the large objective lens (x40) and oil lens (x100).

### Clip الضاغط

There are two of them on the stage used to fix the slide on the stage.

### Arm الذراع

It is the support that is used to hold the microscope and which also holds the cylinder.

### Base القاعدة

It is the lower part on which the microscope rests.

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## Lab 2

### Source light مصدر الضوء

It is a lamp located at the base of the microscope that provides the light necessary to see the sample.

