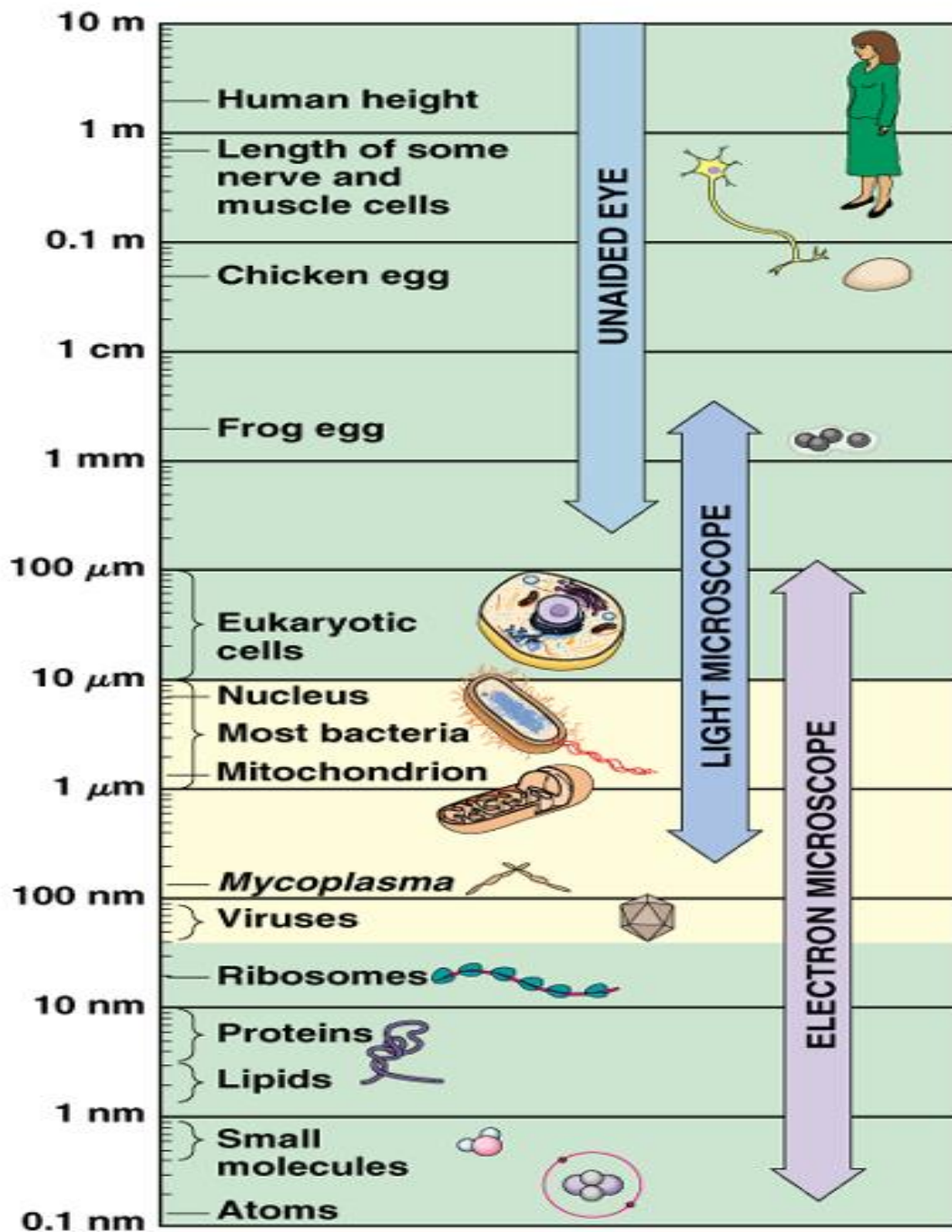


Microscopy

Microscope

- is an instrument used to see objects that are too small for the naked eye.

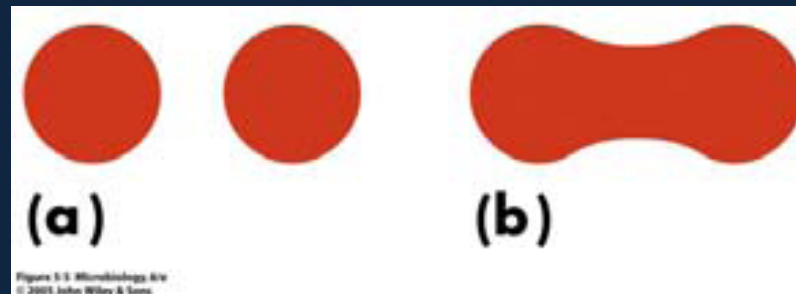




Function of microscope:

1. **Magnification:** to magnify (enlarge) the object being examined.
2. **Resolution:** The ability to distinguish between two points at short distances from each other.

3.



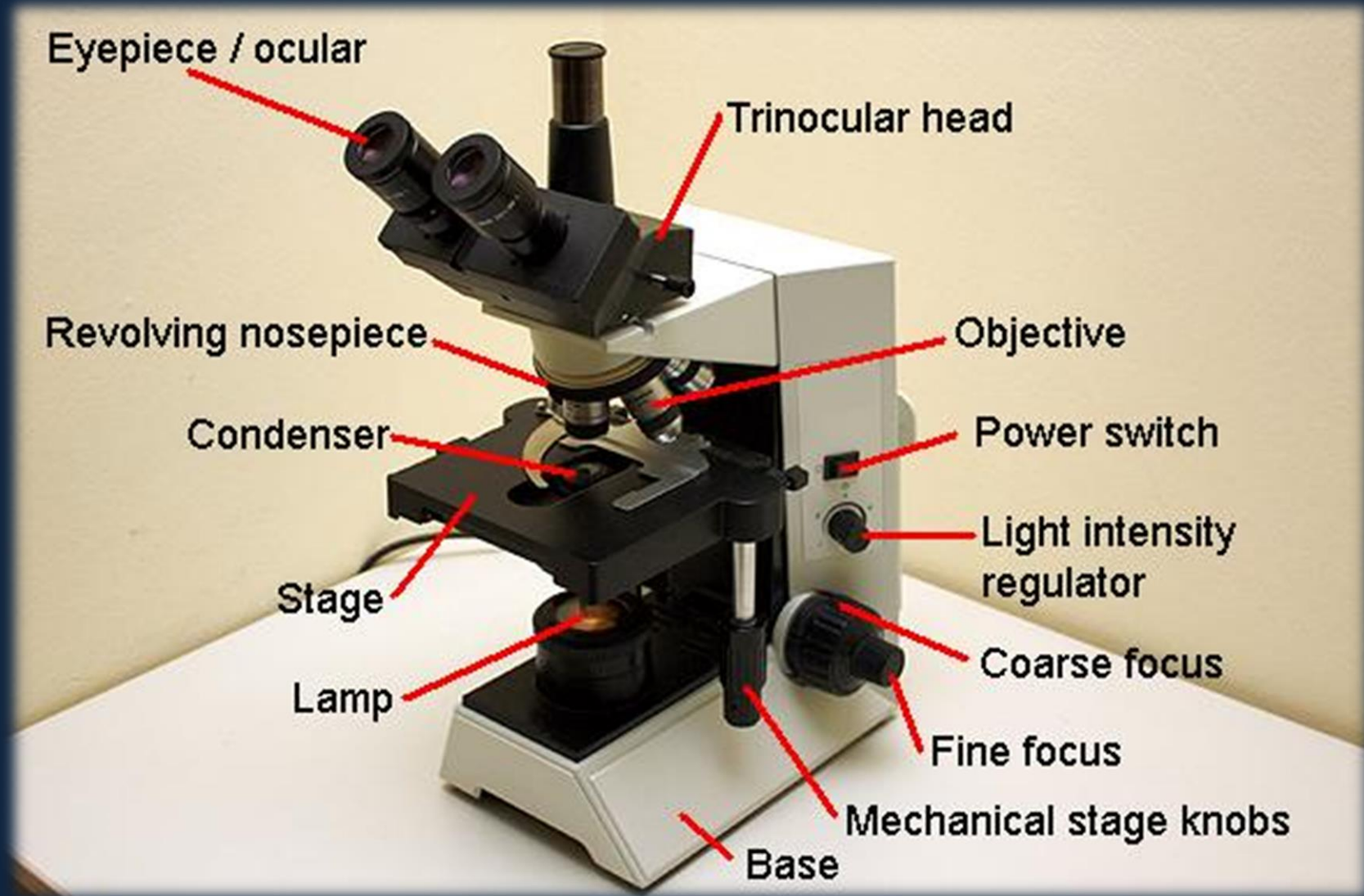
Types of light microscope:

1. Bright field microscope
2. Dark field microscope
3. Phase contrast microscope
4. Inverted microscope
5. Dissecting microscope

Bright field microscope

- Produces a dark image against a brighter background
- Has several objective lenses
- Uses ordinary bulb light as source of light.
- Total magnification is 1000x
- The resolution is $0.2\mu\text{m}$
- It is mainly used to examine stained preparations.

Bright field Microscope parts



Microscope parts

1) Eye piece (ocular):

- To provide further magnification of image (X10).
- To look through it at the image of object.

2) Eye piece distance scale: To adjust the distance between the two eye pieces.

3) Revolving Nose-piece: It holds the objective lenses.

4) **Objective lenses:** To produce a magnified image with different magnification. (x4, x10, x20, x40, and x100).

➤ **X100 objective lens: called Oil immersion objective.**

To calculate the total magnification of the microscope:

- **Total mag. = objective lens mag. \times ocular lens mag.**
- **The lowest mag. = $4 \times 10 = \text{X}40$**
- **The highest mag. = $100 \times 10 = \text{X}1000$**

- 5) **Mechanical stage:** To put the slide on it.
- 6) **Arm: *Microscope stand*:** Used to support the microscope when carried. Holds the body tube, nose piece and objective lenses.
- 7) **Slide holder:** To hold the slide and prevent it from moving.
- 8) **Stage knob:** To move the stage right and left, forward and backward.

10) Condenser: To collect the light in a cone shape from the light source to the object.

When using X40 or X100 lens raise the condenser up.

11) Condenser knob: Move the condenser up and down.

12) Iris diaphragm: Control the intensity of light that goes to the condenser.

When using X100 lens open iris diaphragm.

13) Course adjustment knob: Move the stage up and down rapidly to get approximate focusing.

14) Fine adjustment knob: move the stage slowly to get fine focusing.

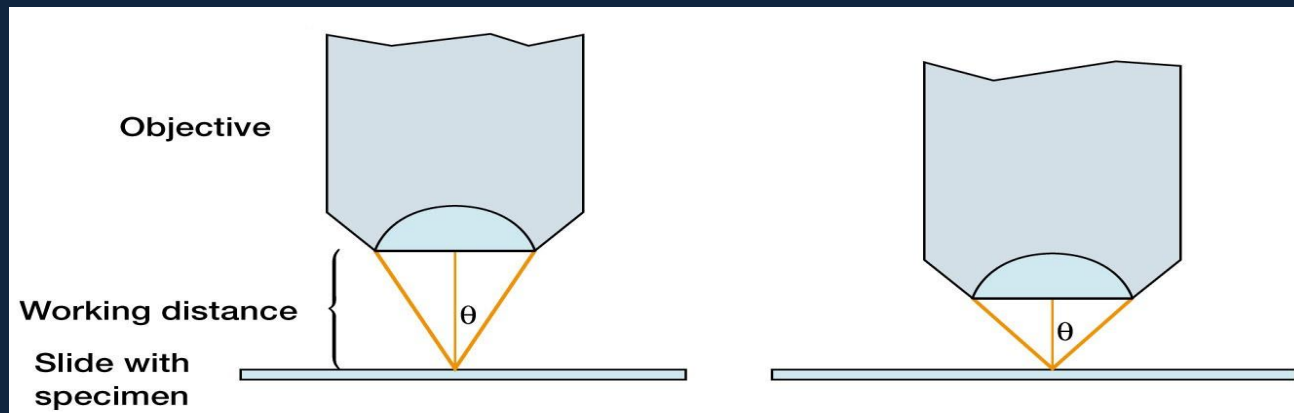
15) Light source.

16) Power switch.

17) Microscope base: Hold all parts of the microscope.

Terms Related To Microscopes

- **Working distance:** The distance between the objective and the object when the object is in focus.



- **Parfocal:** When move from one objective lens to another you are still in approximate focusing.

Dark field microscope

- The condenser condenses the light on the object or specimen but out of the objective.
- The result is dark background and bright object.



- Used:



to see the motility of bacteria.

Toroidal and Conventional Darkfield Condensers

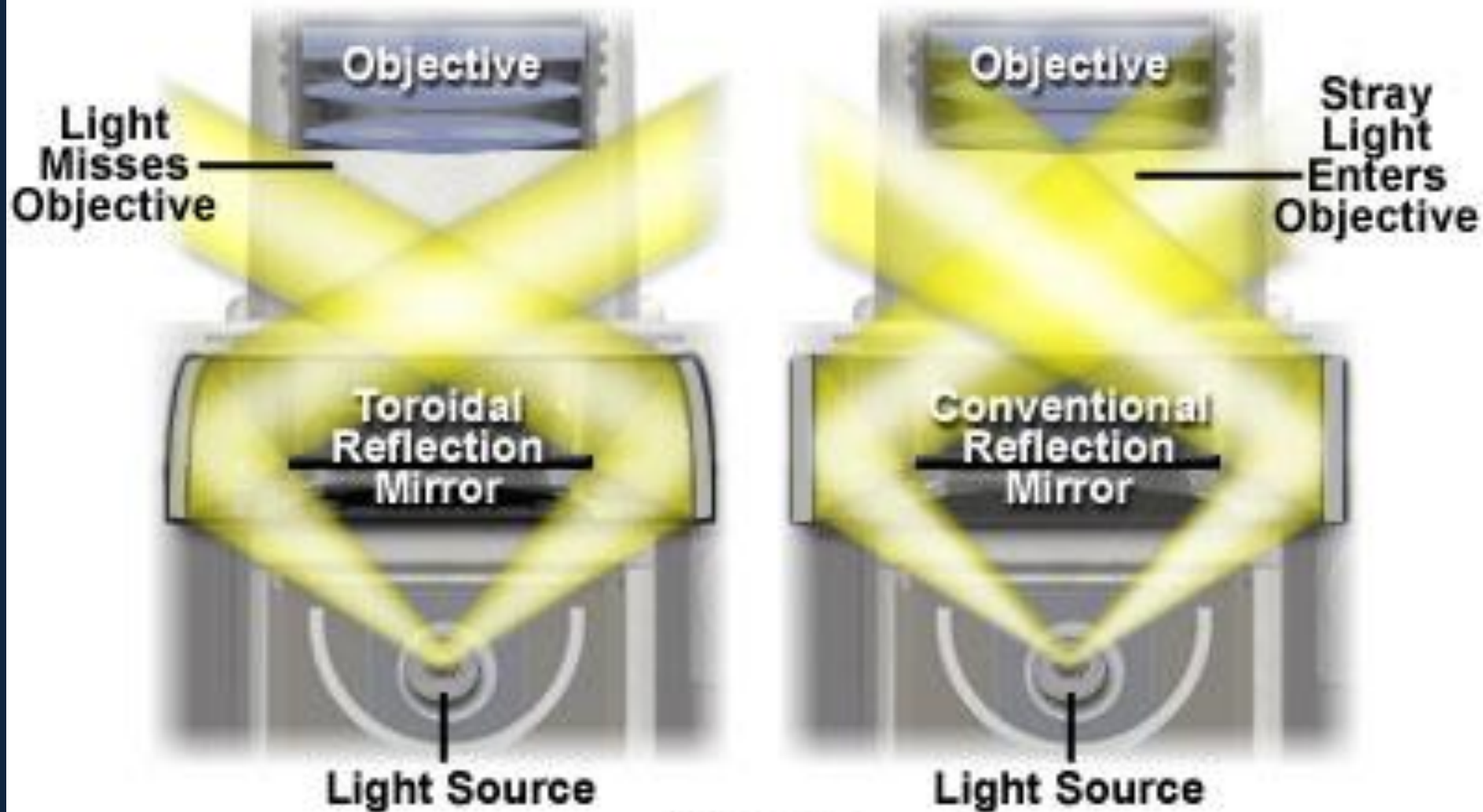
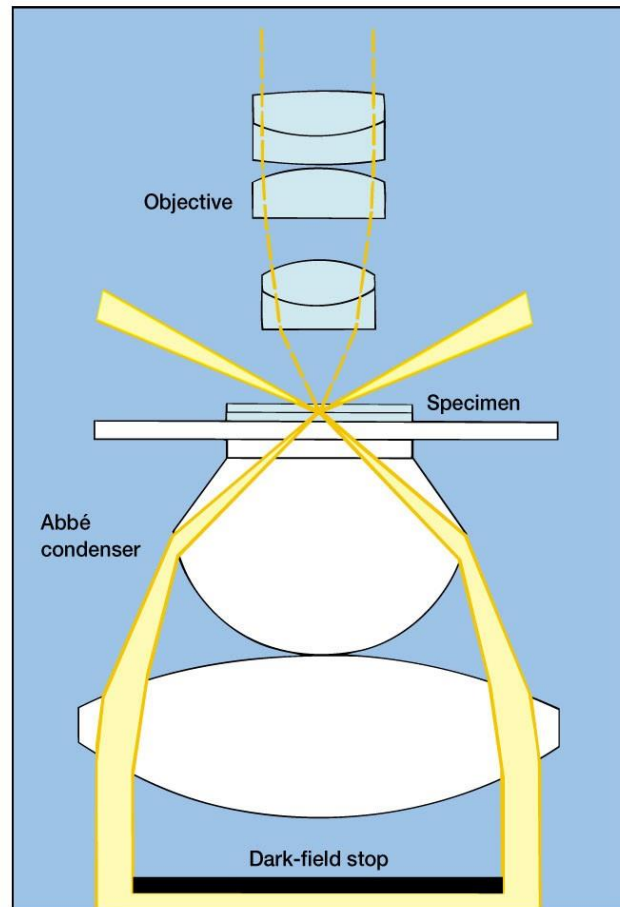
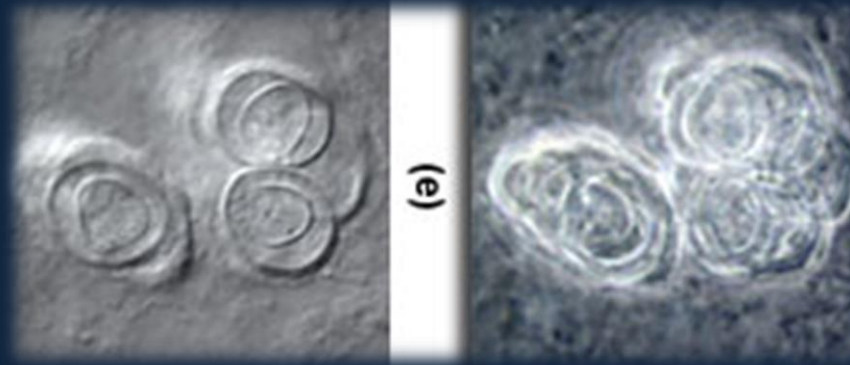


Figure 3



Phase contrast microscope

- Produce contrast between the cell and the background.
- The cells appear darker against a brighter background.



- Used:
-

in examination of wet preparation.



Inverted microscope

- The condenser is above the stage while the objectives below the stage.
- Used:
to see the effect of
virus on the cells
(cell culture flasks).





Dissecting microscope

- It is a simple microscope.
- It has oculars and stage only.
- It magnifies x10 only
- Used:
in mycology to see the plate of fungi + dissecting of insect.

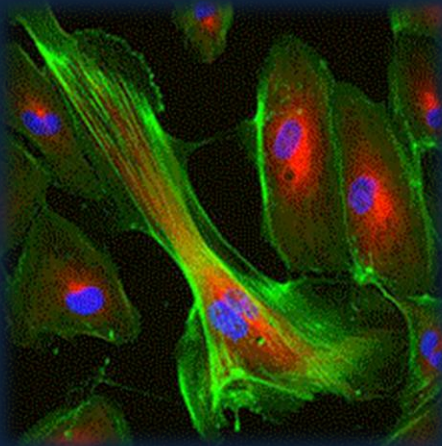


Non-light microscope

1. Fluorescent microscope
2. Electron microscope (E.M)

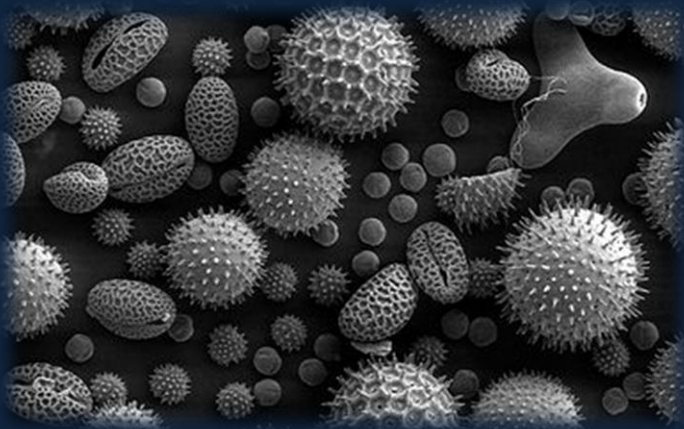
Fluorescent microscope

- Produce ultra violet light.
- The slides stained with fluorochrome.
- Used: in immunology.



Electron microscope (E.M)

- Produce electrons (electron beam).
- Magnification= X100 000- X300 000
- Resolution= 0.0003 μm
- Used:
to see viruses and the cell ingredients.



Caring of Microscope

- Clean only with a soft cloth/tissue
- Make sure it's on a flat surface
- Be gentle with the microscope
- Carry it with 2 HANDS...one on the arm and the other on the base

Thank You

