

# Human Biology

1<sup>st</sup> practical lesson : The Microscope

Sunday, 27/11/2022



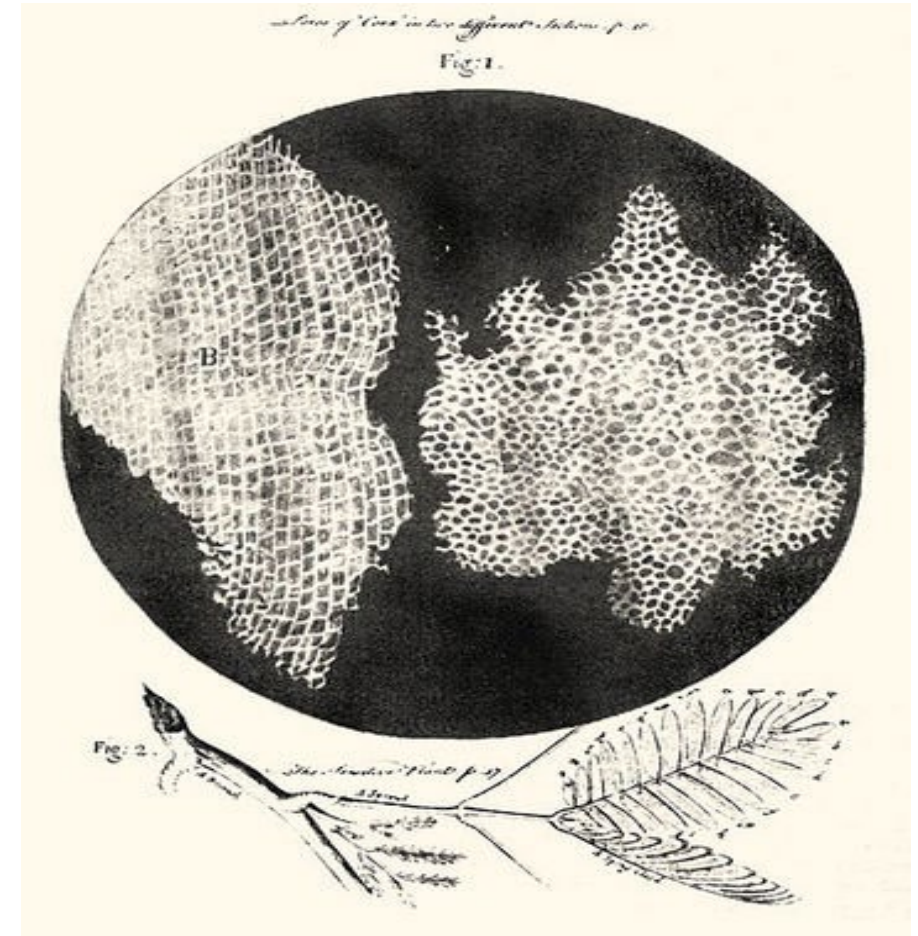
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# A microscope invention

**English physicist (Robert Hooke)**

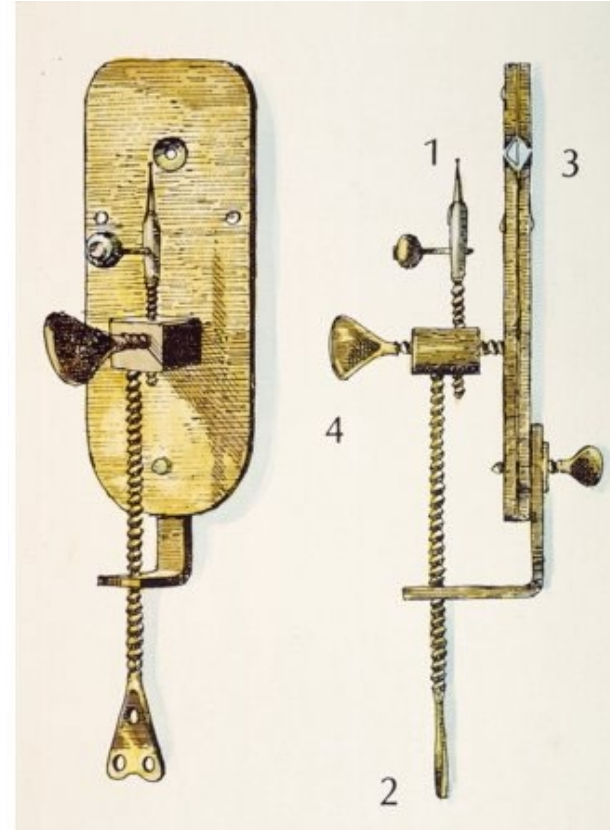
In 1665 he looked at a sliver of cork through a microscope lens and noticed some “pores” in it.



# A microscope invention

## Anton van Leeuwenhoek

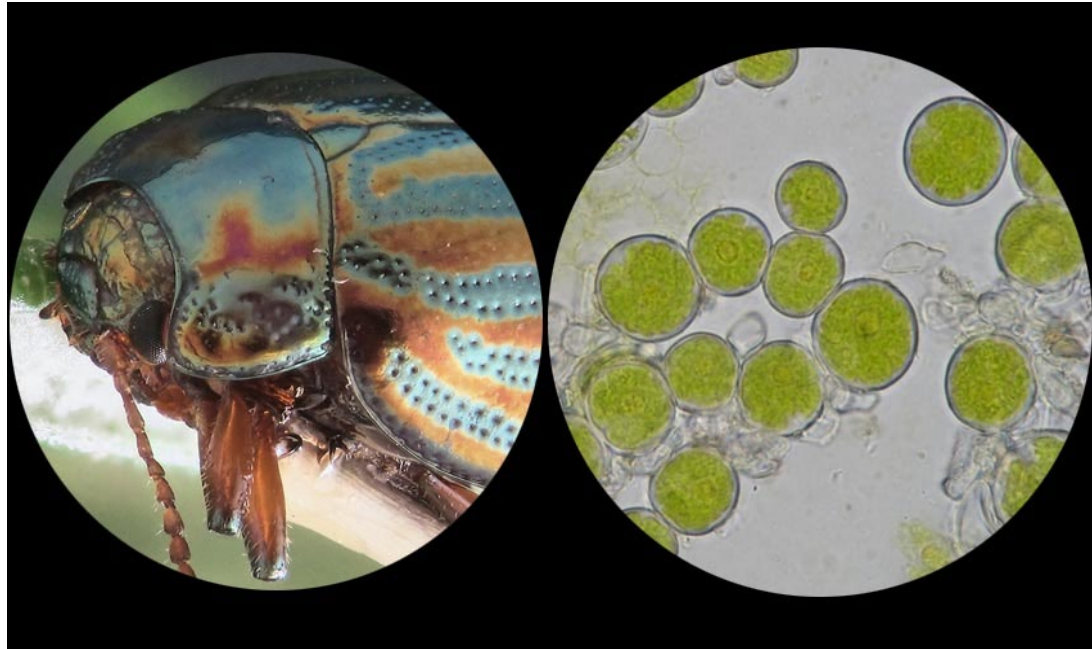
In 1674 he was built a simple microscope with only one lens to examine blood , yeast , insects and many other tiny objects .



# Introduction to the Microscope

## What Is Microscope?

It is an instrument which deals with too small organisms that may cannot be seen distinctly with the naked eye.



# Microscope parts

1. **Ocular lenses** : They have magnification of 10x.
2. **Body tube** : It connects an eyepiece to objective lens.
3. **Revolving nosepiece** : It holds two or more objective lenses and can be rotated to easily change power .
4. **Objective lenses**: they have magnification of 10x, 40x, 100x.
5. **Arm**: It supports a body tube to connect it to a microscope base.
6. **Stage**: Flat platform to place your slides
7. **Stage clips** : They hold slides on a microscope stage.
8. **Stage moving control**: It controls the stage movement around

# Microscope components

9. **Diaphragm:** It controls light amount going through samples
10. **Course adjustment knob:** It moves a microscope stage up and down
11. **Fine adjustment knob:** It is used to fine-tune the focus on specimens
12. **Condenser controls:**
13. **Switch :** To turn light on
14. **Light :** It makes a specimen easier to observe
15. **Base :** A microscope bottom to support it

# Microscope Types

## Compound Microscope

- it is illuminated with a light to see two-dimensional images.
- It is the most commonly used and you can view individual cells, even living ones.
- Its magnification is high. However, the resolution is low.



# Microscope Types

## Dissecting Microscope

Another call : stereo microscope

- It is lightly illuminated to view three dimensional images
- It is suitable for dissection to obtain a good view of the larger specimen
- Due to its low magnification, you cannot see individual cells.

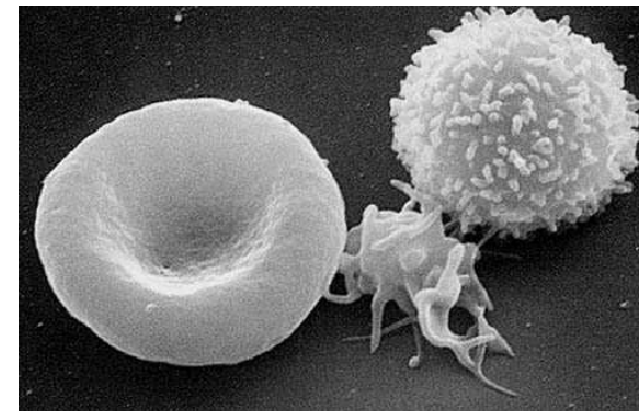




# Microscope Types

## Scanning Electron Microscope (SEM)

- Its work depends on electron illumination.
- It has high magnification and high resolution to view 3-dimensional images.
- gold is used to coat samples and the electrons bounce off to give you an exterior view
- The images are colored in black and white.



# Microscope Types

## Transmission Electron Microscope (TEM)

- TEM is an electron illuminated to give a 2-dimensional view.
- Thin slices of specimen are needed in order to pass electron beams through it.
- It has high magnification and high resolution



# Care of the microscope

- Use 2 hands to hold; one on the arm ; and one on the base
- Avoid touching the lenses with your fingers and only use tissue paper for cleaning
- Set up a microscope in a clear are on the lab bench space
- use only power outlets accessible on the bench top to keep power cord tidy

# Using the microscope

1. Place the slide on a microscope stage and fasten it with the stage clips.
2. The light must be powered on and adjust it with a slider.
3. Start with the lowest magnification usually the smallest objective lens.
4. Adjust the focus by turning the coarse adjustment knob to bring the slide close to lens without touching it.

# Using the microscope

5. Once the slide is in focus rotate the objective lenses to the next power of magnification.

6. In order to be the slide in focus you must use the fine adjustment knob instead the course one.

7. Once the image is in focus you can move to the higher level of magnification and repeat the process itself.

# Immersion objectives

- Immersion objectives are used only at very large magnifications that require high resolving power.
- Rotate so that the 100x oil immersion objective touches the oil and clicks into place.
- Place a small drop of oil on the slide in the center of the lighted area.
- Put the small drop of oil directly over the area of the sample to be investigated.

# Factors determine the quality of an optical image:

- Magnification:

It is enlarging an image

- Resolution:

It is the amount of fine detail that can be seen



## When you are finished :

- Make sure that you have removed the slide
- Turn light off
- Rotate eyepiece to the lower power objective
- Return a microscope to the to its proper place



