OPTICAL MICROSCOPE

INVERTED OPTICAL MICROSCOPE

FLUORESCENCE MICROSCOPE

GÖRKEM ANIT
20419666

21.04.2011

OUTLINE

- MICROSCOPE
- OPTICAL MICROSCOPE
  - HISTORY
  - PARTS OF OPTICAL MICROSCOPE
  - WORKING PRINCIPLE
  - USAGE AREA
  - ADVANTAGES AND DISADVANTAGES
- INVERTED OPTICAL MICROSCOPE
  - HISTORY
  - PARTS OF INVERTED OPTICAL MICROSCOPE
  - WORKING PRINCIPLE
  - USAGE AREA
  - ADVANTAGES AND DISADVANTAGES
- FLUORESCENCE MICROSCOPE
  - HISTORY
  - PARTS OF FLUORESCENCE
  - WORKING PRINCIPLE
  - USAGE AREA
  - ADVANTAGES AND DISADVANTAGES
- SUMMARY
- REFERENCES

MICROSCOPE

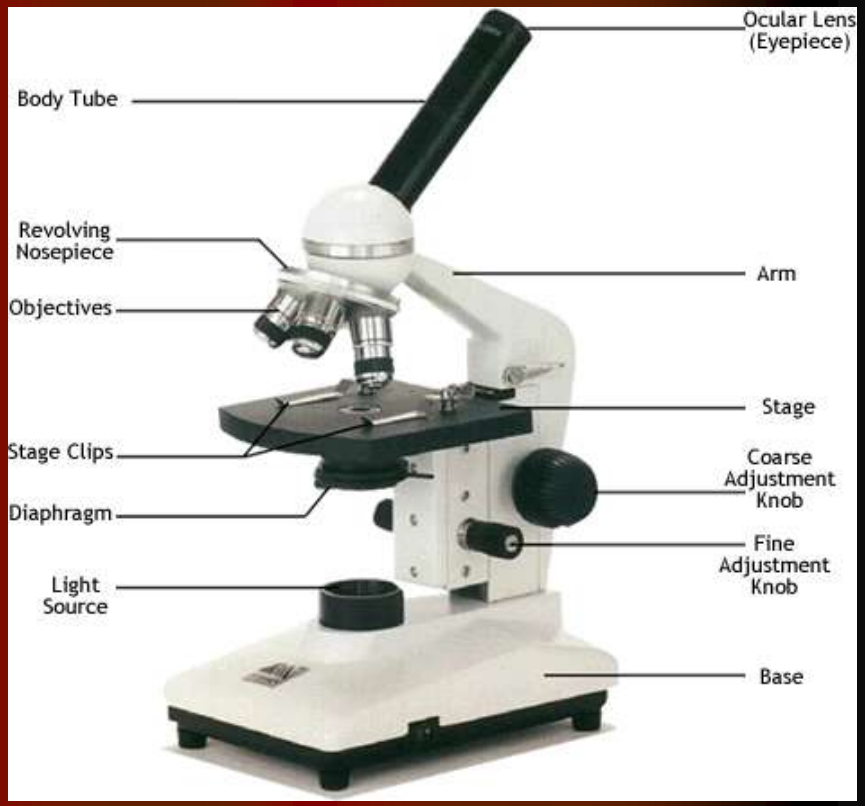
- A microscope is an instrument to see small objects.
- Consist the combination of the words “micros (small)” and “skopeein (look)” in Greek.
- It is seen first in XVII. Century
- Anton van Leeuwenhoek invented the basic microscope in Netherlands

OPTICAL MICROSCOPE

- A primitive microscope was invented in 1590 in Middelburg, Netherlands, by the eyeglass makers Hans Lippershey, Zacharias Jansen and his father Hans Jansen.
- Consist of two lens system; objective and ocular.
- Pick up the image and magnify

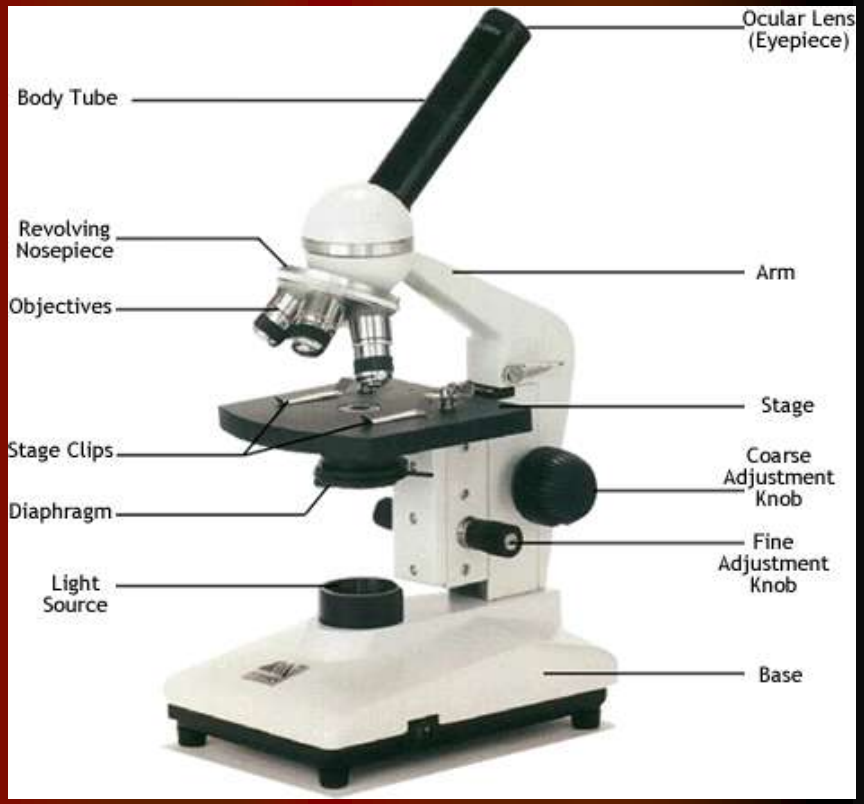
PARTS OF OPTICAL MICROSCOPE

- Eyepiece: contains the ocular lens, which provides a magnification power of 10x to 20x.
- Nosepiece: holds the objective lenses and can be rotated easily to change magnification.
- Objective lenses: usually, there are three or four objective lenses on a microscope, consisting of 4x, 10x, 40x and 100x magnification powers.
- Stage clips: hold the slide in place.



PARTS OF OPTICAL MICROSCOPE

- Stage: supports the slide being analyzed.
- Diaphragm: controls the intensity and size of the cone light projected on the specimen.
- Light source: projects light upwards through the diaphragm, slide and lenses.
- Base: supports the microscope.
- Arm: supports the microscope when carried.
- Coarse adjustment knob: adjust coarse the focus.
- Fine adjustment knob: adjust fine the focus.



WORKING PRINCIPLE

- Optical microscope consist of two lens system.
- Objective and ocular
- Objective enlarges the image with lens (100x)
- Ocular magnifies the image much bigger (20x)
- Total enlargment calculate objective*ocular
- The optical microscope makes the image 2000 times bigger.

AREA OF USAGE

- Optical microscope is used extensively in,

Microelectronics

Nanophysics

Material science and geology

Biotechnology

Pharmaceutic research

Non-transparan objects (ex:metals and alloys)

Minerology and microbiyology

ADVANTAGES AND DISADVANTAGES

- Enlarge only 2000 times,because of using light.
- Optical microscopes are not able to display details that smaller than 250 nm which is the half wave length of the light.
- Fast and adaptable to all kind of systems.
- No need pre-treatment.
- Low resolution.

INVERTED OPTICAL MICROSCOPE

- It was invented in 1850 by J.Lawrence Smith, a faculty member of Tulane University (then named the Medical College of Louisiana)
- It was seen first the world fair in London in 1852
- It has been used at the beginnig of 20. century

PARTS OF INVERTED MICROSCOPE

Differences from the optical microscope are,
-The light sources and the condenser are on the top of the stage.
-The eyepiece is not upside but places standard viewing angle
-Working principle is same with the optical microscope

AREA OF USAGE

Inverted microscopes can be configured for;

- **Work in electrophysiology,**
- **In vitro fertilization,**
- **Micromanipulation,**
- **High-resolution DIC,**
- **Video-enhanced observations,**
- **A variety of advanced fluorescence techniques**

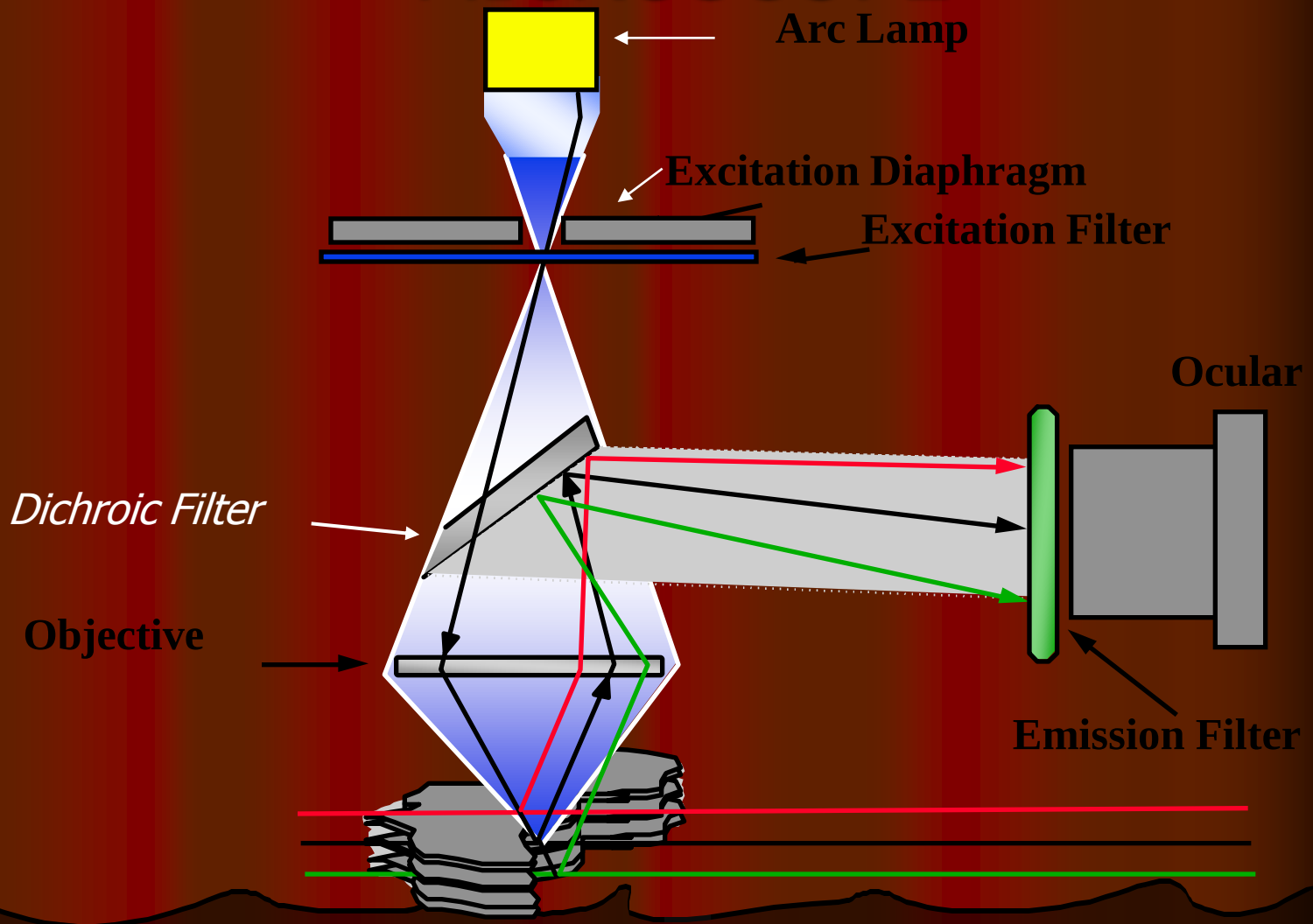
ADVANTAGES AND DISADVANTAGES

- Expensive to built
- Magnification limited (maximum 60x)
- Allows you to work alive microorganism much longer time
- Fine focus

FLUORESCENCE MICROSCOPE

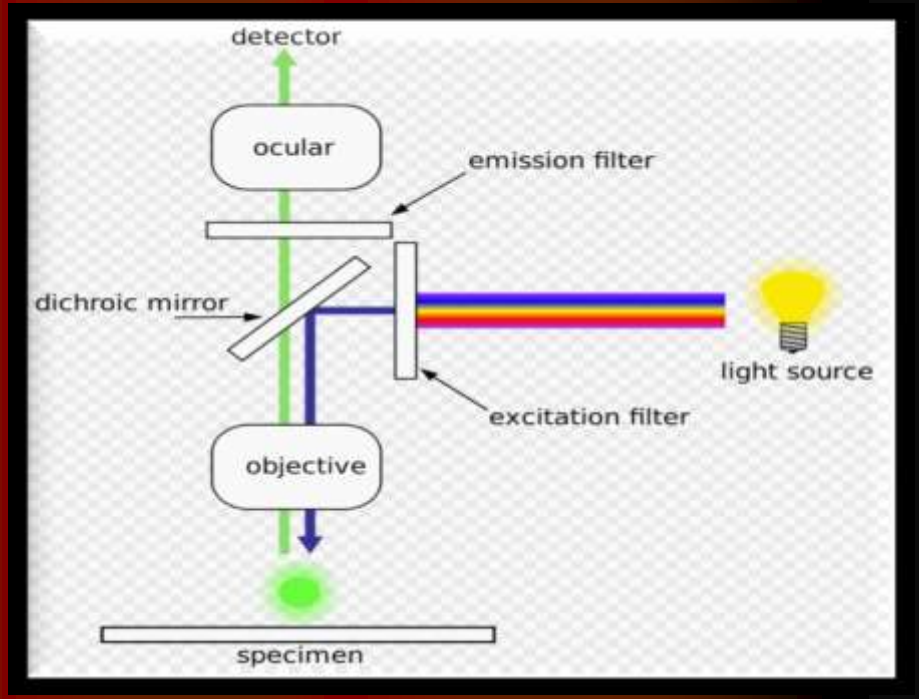
- In 1904, August Kohler invented the ultraviolet absorption microscope that preceded the fluorescence microscope.
- Made the fluorescence microscope with Wilhem Siedentopf,who works in Carl Zeiss firm.

PARTS OF FLUORESCENCE MICROSCOPE



WORKING PRINCIPLE

- Labeled the sample with fluorophore
- Illuminated with light source
- The fluorophore absorbed the light
- Causes them to emit a longer lower energy wavelength light
- Filters seperated the these light to visible wavelength



AREA OF USAGE

- Imaging structural components of small specimens, such as cells
- Conducting viability studies on cell populations (are they alive or dead?)
- Imaging the genetic material within a cell (DNA and RNA)
- Viewing specific cells within a larger population with techniques such as FISH

ADVANTAGES AND DISADVANTAGES

- Easy to use
- Rapid testing
- Sensitive
- High cost
- Need very low voltage

SUMMARY

- Optical microscope is the oldest and most comman microscope. It enlarges the images 2000 times and works in visible light.
- Inverted microscope has the same properties with optical microscope but enlarges the images only 60 times.Its very important property is working with alive organism much longer time.
- Fluorosence microscope uses high intensity light sources which was absorbed by fluorophore. It is used to investigate the cells.

REFERENCES

- http://www.nuveforum.net/1104-genel-araclar/62811-mikroskop-optik-mikroskop/
- http://inventors.about.com/od/mstartinventions/a/microscope.htm
- http://www.microscopeworld.com/MSWorld/labels/inverted.html
- http://www.microscopy-uk.org.uk/mag//artjul98/invert.html
- http://www.olympusmicro.com/primer/anatomy/reflected.html
- http://nobelprize.org/educational/physic/microscopes/fluorescence
- http://science.howstuffworks.com/light-microscope4.htm
- http://serc.carleton.edu/microbelife/research_methods/microscopy/fluromic.html

REFERENCES

- http://www.explainthatstuff.com/microscopes.html
- http://industrial-microscope.com
- http://www.articlesbase.com/advertising-articles/different-types of-microscopes.html
- http://www.microscopehelp.com/thecompoundmicroscope.html
- http://www.brighthub.com/science/medical/articles/5792.aspx
- http://www.ehow.co.uk/facts_5527433_different-kinds-microscopes.html
- http://inventors.about.com/od/mstartinventions/a/microscope
- www.books.google.com

THANKS

FOR YOUR ATTENTION…