

LAB-2

TYPES OF MICROSCOPES

A microscope is a scientific instrument that makes things that are too small into big so that they can be examined correctly. Various types of microscopes are available for use in the microbiology laboratory. The microscopes have varied applications and modifications that contribute to their usefulness.

1) The light microscope

a- Simple microscope

is a microscope that uses only one lens for magnification. It is the original design of the light microscope. One of the disadvantages of this type of microscopes is that the focal length decreases at increasing magnification power leading to an aberration of the final image. This disadvantage has been overcome by adding a second set of lenses, which are ocular lenses.

b- compound microscope

is the common light microscope used in the laboratory. It contains two types of lenses that function to magnify an object. The lens closest to the eye is called the ocular, while the lens closest to the object is called the objective. Most microscopes have on their base an apparatus called a condenser, which condenses light rays to a strong beam. A compound light microscope often contains four objective lenses: the scanning lens (4X), the low-power lens (10X), the high-power lens (40X), and the oil-immersion lens (100X).

e- phase-contrast microscope that through light "out of phase" and cause it different speeds. Live, unstained organisms and internal cell parts can be seen clearly with this microscope, and internal cell parts such as mitochondria, Golgi body can be seen with this instrument. Phase-contrast microscope also contains special condensers through the object at various angles. Live, unstained organisms are seen clearly with a specially constructed microscope in which the incident light is split into two beams that pass through the specimen and recombined in the image plane where the interference effects the transparent (invisible) refractive object details become visible as intensity differences; permits measurements of light retardation, index of refraction, and thickness and mass of specimen useful in the examination.

of living or unstained cells.

d- Interference microscope

e- Polarizing microscope (dark-field microscope)

A polarizing microscope is a microscope that is mainly used in geological studies to study geological specimens. Light waves vibrating at right angles to the direction of propagation with all vibration directions being equally probable. This is referred to as "common" or "non-polarized" white light. In polarized light there is only one vibration direction. Polarization of light is usually using prisms made of a crystallized calcium carbonate which are placed in the beam path, a light object is seen on a dark background.

f- fluorescent microscope

They are used in the study of both organic and inorganic matter. It uses the release of light by a stained substance that has taken in either light or other electromagnetic radiation. Fluorescence Microscopes use an extremely high intensity light (ultraviolet radiation) to generate an image to illuminate the sample being studied. This release of light has a longer wavelength, which is what causes the fluorescence in the sample. Various stains are used in conjunction with the specimen in order to facilitate the fluorescing process.

used for health and Fluorescence Microscopes are most commonly used in biological research, environment monitoring, public medicine. One of the greatest advantages of Fluorescence Microscopes is that it enables the viewer to obtain faster laboratory results would not be seen under a routine light microscope.

2) Electron microscope

The energy source used in the electron microscope is a beam of electrons. Since the beam has an exceptionally short wavelength, it strikes the microscope significantly. Viruses and some large molecules can be seen with this instrument. The electrons travel in a vacuum to avoid contact with deflecting air molecules, and magnets focus the object to be viewed. An image is created on a monitor and viewed by the technologist. There are many types of E.M. such as TEM, it most objects in its path and increases the resolution of the molecules can be the beam on

a- transmission electron microscope (TEM)

To use this instrument, one places ultrathin slices of

microorganisms or viruses on a wire grid and then stains them with gold or palladium before viewing. The densely coated parts of the specimen deflect the electron beam, and both dark and light areas show up on the image. This microscope is access to the cell to photograph and examine all parts of the inner cell such as the nucleus and nucleolus and other.

b- scanning electron microscope (SEM)

Although this microscope gives lower magnifications than the TEM, the SEM permits three dimensional views of microorganisms- and other objects. Whole objects are used, and gold or palladium staining is employed. This microscope examines the external surface of the samples and the type of wall whether smooth or rough.

ELECTRON MICROSCOPE COMPO

- 1) Electron gun
- 2) Electron magnetic lenses:
 - a- Condenser lens
 - b- Objective lens
 - c- Projector lens
- 3) Fluorescent screen
- 4) Camera
- 5) Deflation device
- 6) Voltage measuring device

PRACTICAL PARTT

View images for each of

- 1- Simple microscope
- 2- compound microscope
- 3- phase-contrast microscope
- 4- Interference microscope
- 5- Polarizing microscope (dark-field microscope)
- 6- fluorescent microscope
- 7- Electron microscope