AmbujaNeotia

THE NEOTIA UNIVERSITY

ज्ञानम् आत्म प्रदीपाय

I SEMESTER (1st year B.Pharm)

REMEDIAL BIOLOGY

PRACTICAL LAB MANUAL

Semester – I
Remedial Biology practical

EXPERIMENT NO- 1
Study of Compound Microscope

Objects which are ordinarily not visible by naked eye are seen with microscope, generally an object smaller than 0.1 mm cannot be seen by our eyes. Therefore, to observe an object smaller than this, compound microscope is very helpful. Hand lens (magnifying lens) is also a type of microscope but its magnifying capacity is very low. Dissecting microscope is also used to visualize tiny things, but it has only one lens. Compound microscope is generally used in the laboratories. Therefore, description, use and maintenance of ordinary compound microscope are mentioned here.

Parts of a Compound Microscope

Take out the microscope from the box holding the arm by one hand and supporting the base by another hand. Place carefully on the table and study the names and functions of the parts as mentioned in the figure. The parts of a compound microscope can be divided into 4 main parts:

(a) Base: This is U-shaped lower portion of the microscope on which the other parts of the microscope lie. Above the U-shaped portion, there is a perpendicular portion known as the pillar. On the top of this, another arm is fixed. This is known as inclination joint. This can be used to tilt the microscope at a desired angle.

(b) Arm: It supports the body tube and base of the microscope. This portion is used to hold or carry the microscope. On the base of this, stage is fixed. On the top of the arm body tube of the microscope is fixed and two knobs are fitted. One is for the coarse adjustment and the other for the fine adjustment. These are used for focussing the body tube.

(c) Body Tube: This is attached to the knob of the arm. It has one lens on the upper end known as eye piece. This lens can be changed according to the required magnification. On the bottom of this tube there is a nose piece. Two to four lenses can be fitted in this nose piece. Because the lenses are fitted on the objective, these are known as objective lenses. These are fitted in the body tube, known as objective lens body. The objective lens body is fitted into the noise piece.

(d) Stage: It is a platform having a circular hole in the centre to allow the passage for light from below. It is fixed to the base by the stand. One mirror is fixed to the stand. It is known as reflecting mirror. Below the stage is a condenser through which concentrated beam of light passes. Iris diaphragm is also attached to the condenser. The

reflecting mirror reflects the light upward through the iris and diaphragm. These beams of light pass through the hole in the stage and provide light to the object kept on the slide.
There are two clips for holding the slide above the hole on the stage.

Operation (Use): Keep a clean prepared slide in the centre of the stage. Use clips to fix the slide on the stage so that it does not move. Now move the body tube by the help of coarse adjustment knobs. Bring the slide in focus under the objective lens. Focussing should be made sharp by the use of fine adjustment knobs. When the focus is sharp then study the slide. The specimen is viewed by keeping one eye on the eye piece and the second eye should be kept open. This type of compound microscope is known as monocular compound microscope. Some compound microscopes have two body tubes. So there are 2 eye pieces and specimen can be viewed by both the eyes. Such type of compound microscope is known as binocular compound microscope. In the research work generally binocular compound microscope is used.

How to use a Compound Microscope
To use the microscope first of all rotate the nose piece until the low power objectives is in line with the body tube and clicks into position. Open the iris diaphragm. Look through the eye piece, adjust the mirror and diaphragm to set a complete field of vision. Place the slide you want to examine on the stage of the microscope and by the help of the clips fix it. Move the slide till the object comes roughly to the centre of the hole or the stage. Bring the object into focus using the coarse adjustment knob. Turn the fine adjustment knob to bring the object into sharp focus.
How much magnification the object needs will be learnt through experience. Eye lenses of 5x, 10x or 15x are available. Some way objective lenses of 4x, 10x & 40x are also available. The multiplication of magnification of eye piece and nose piece denotes the size of the object under observation.

Maintenance of Microscopes:
Microscope is costly equipment. Therefore, it should be handled carefully. Always keep the microscope in an upright position while taking it from one place to another. As far as possible don't tilt the arm. Clean the lenses of the microscope with the lens paper or muslin cloth, never with the filter or any other kind of paper. If you are using the high power objective lens then after the observation is over, turn the nose piece and bring low power objective lens in line with the hole in the stage. Objective lens should be kept at least 1 cm above the stage. After using the microscope always keep it in the box. Take care

to see that the stages of microscope, the eye piece, the objective lens are dry and clean. No chemical should stick to these. Adjustment knobs and joints should be protected from rusting by applying vaseline.

Experiment 2
Determination of blood group

ABO blood group system, the classification of human blood based on the inherited properties of red blood cells (erythrocytes) as determined by the presence or absence of the antigens A and B, which are carried on the surface of the red cells. Persons may thus have type A, type B, type O, or type AB blood. The A, B, and O blood groups were first identified by Austrian immunologist Karl Landsteiner in 1901. *See* blood group.

Blood containing red cells with type A antigen on their surface has in its serum (fluid) antibodies against type B red cells. If, in transfusion, type B blood is injected into persons with type A blood, the red cells in the injected blood will be destroyed by the antibodies in the recipient's blood. In the same way, type A red cells will be destroyed by anti-A antibodies in type B blood. Type O blood can be injected into persons with type A, B, or O blood unless there is incompatibility with respect to some other blood group system also present. Persons with type AB blood can receive type A, B, or O blood.

The ABO and Rh groups in transfusion

System	Recipient type	Donor red cell type	Donor plasma type
ABO	A	A* or O	A or AB
ABO	B	B or O	B or AB
ABO	O	O only	O, A, B, or AB
ABO	AB	AB*, A*, B, or O	AB
Rh	+ve	positive or negative	positive or negative
Rh	-ve	negative or positive**, ***	negative or positive**

*Not if the patient's serum contains anti-A1 (antibody to common type A red cell in subgroup A patients).

**Not if the patient is a female less than 45 years old (childbearing possible), unless life-threatening hemorrhage is present and transfusion of Rh-positive blood is lifesaving.

***Not if the patient's serum contains anti-D (antibody to positive red cells), except under unusual medical circumstances.

Blood group O is the most common blood type throughout the world, particularly among peoples of South and Central America. Type B is

prevalent in Asia, especially in northern India. Type A also is common all over the world; the highest frequency is among the Blackfoot Indians of Montana and in the Sami people of northern Scandinavia. The ABO antigens are developed well before birth and remain throughout life. Children acquire ABO antibodies passively from their mother before birth, but by three months of age infants are making their own; it is believed that the stimulus for such antibody formation is from contact with ABO-like antigenic substances in nature. ABO incompatibility, in which the antigens of a mother and her foetus are different enough to cause an immune reaction, occurs in a small number of pregnancies. Rarely, ABO incompatibility may give rise to erythroblastosis fetalis (hemolytic disease of the newborn), a type of anemia in which the red blood cells of the foetus are destroyed by the maternal immune system. This situation occurs most often when a mother is type O and her foetus is either type A or type B.

Experiment no. 3
Determination of blood pressure

Definition of Blood Pressure

Arterial blood pressure is the force exerted by the blood on the wall of a blood vessel as the heart pumps (contracts) and relaxes. Systolic blood pressure is the degree of force when the heart is pumping (contracting). The diastolic blood pressure is the degree of force when the hearts relaxed.

Requirements- Stethoscope, Mercury Sphygmomanometer.

Procedure-

I. Ask the subject to sit or lie down & allow 5 minutes to relax.
II. Place the arm of the subject in a position so that it is at the level of the heart.
III. Uncover the arm up to shoulder & tie cuff around the arm, neither too tight nor too loose. Record the blood pressure first with palpatory method followed by auscultatory method.

Palpatory method-

I. Palpate the radial artery at wrist & feel the pulse.
II. Tighten the screw to leak valve & inflate the cuff slowly with air pump until the pulse disappears & note the reading.

Ausccultatory method-

I. Place the chest piece of the stethoscope on bifurcation of brachial artery at the elbow level.
II. Inflate the cuff rapidly & raise the pressure 30-40 mm Hg above the reading determined by palpatory method.
III. Release the pressure gradually using knob until a clear sharp tapping sound is heard; note this pressure as systolic pressure.
IV. Continue to release the pressure until the sound disappears; note this pressure as diastolic pressure.
V. Take three readings at an interval of 30 minutes with auscltatory method & find out the average & express the result as systolic/diastolic blood pressure.

Experiment no. 4.
Determination of tidal volume

Requirements- Spiro- meter

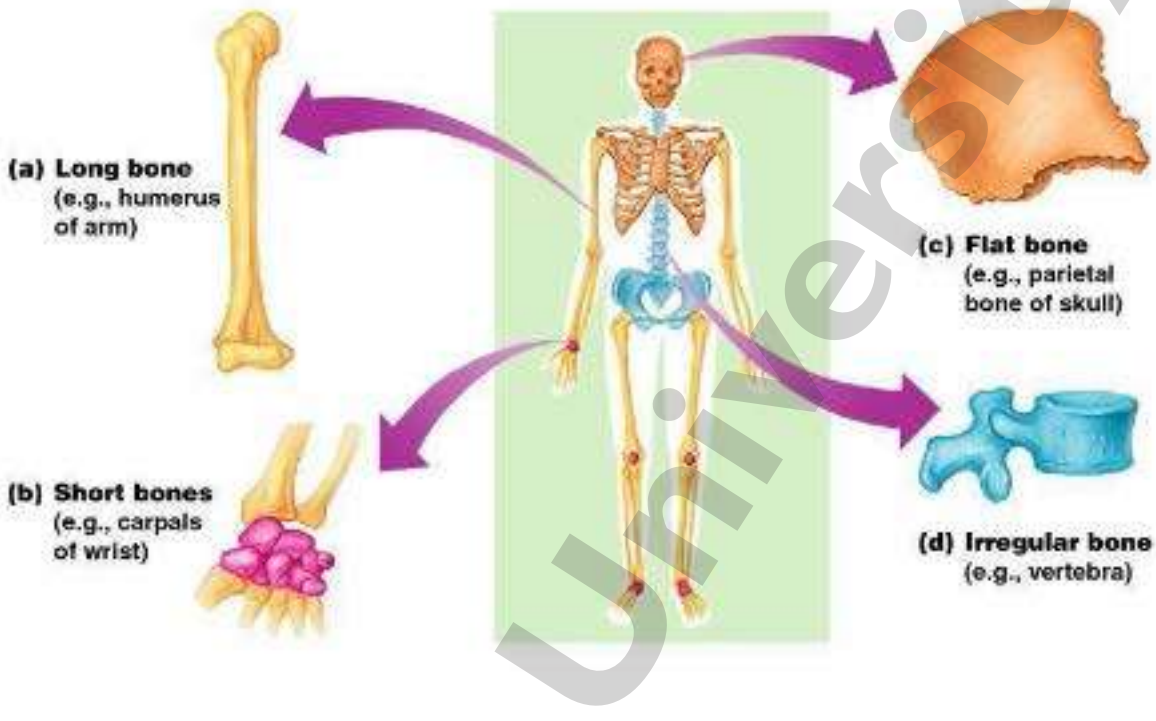
Procedure-

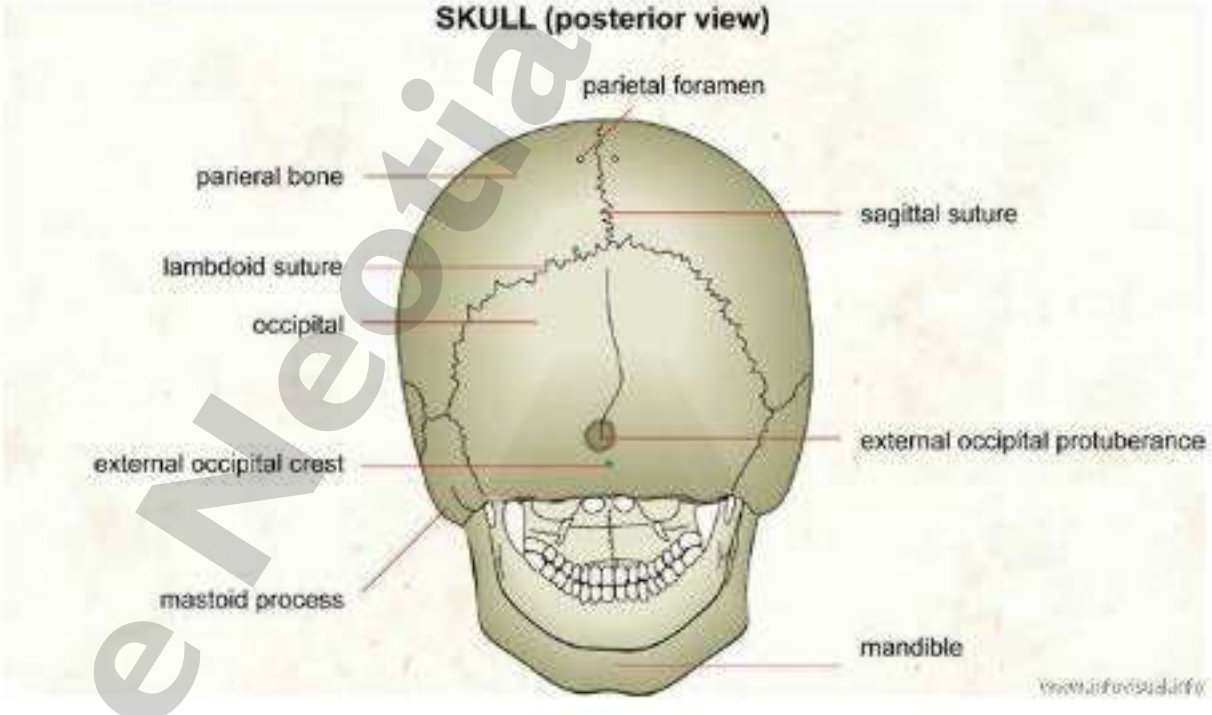
I. Select one healthy subject for the demonstration.
II. Bring the bell to its lowest position by gently pushing it down. Adjust the pointer needle at zero, which indicates that the bell is completely empty.
III. Make the subject to stand comfortably, facing the spirometer to see the movement of the bell.

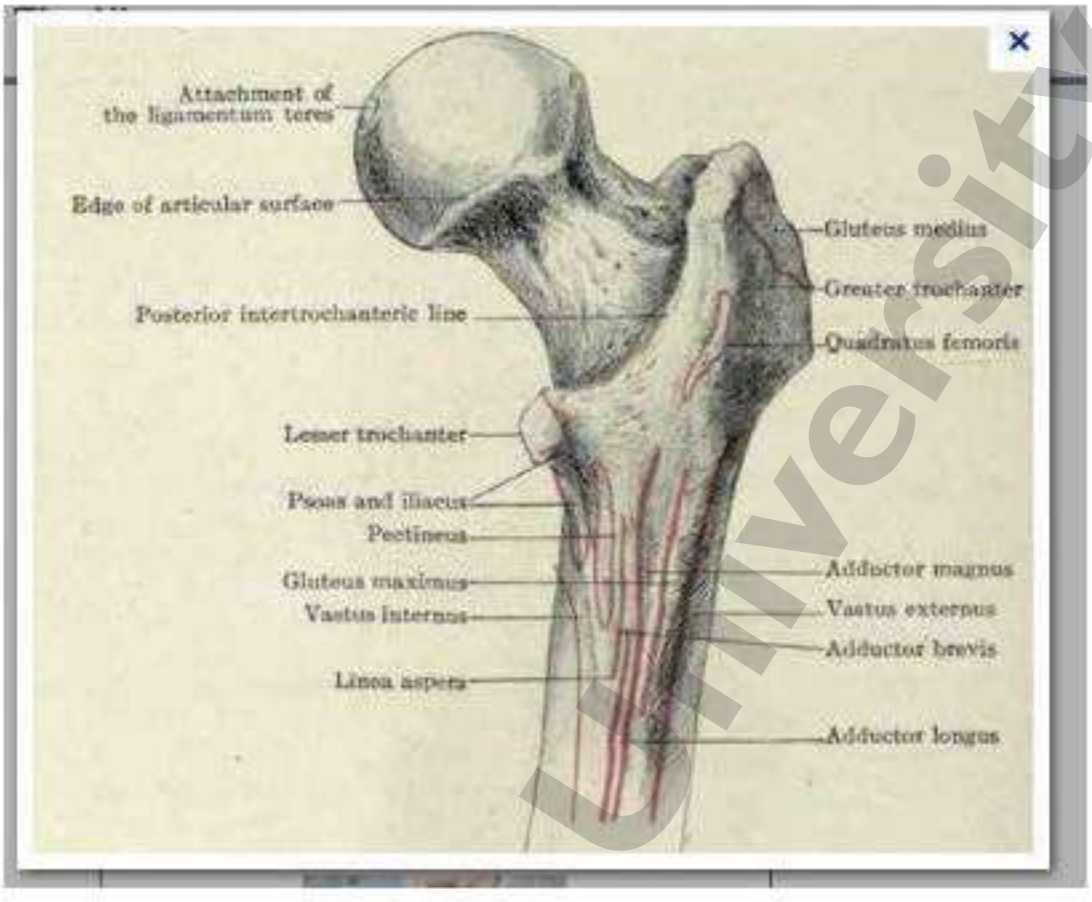
Measurement of Tidal Volume:

I. Ask the subject to breathe normally (quiet breathing) for the period of one minute.
II. In this position, ask him or her to expel the air with normal expiration. The bell moves up & the pointer on the pulley indicates the volume of expired.
III. Take two more readings at interval of 5 minutes.
IV. Repeat this procedure in sitting position.

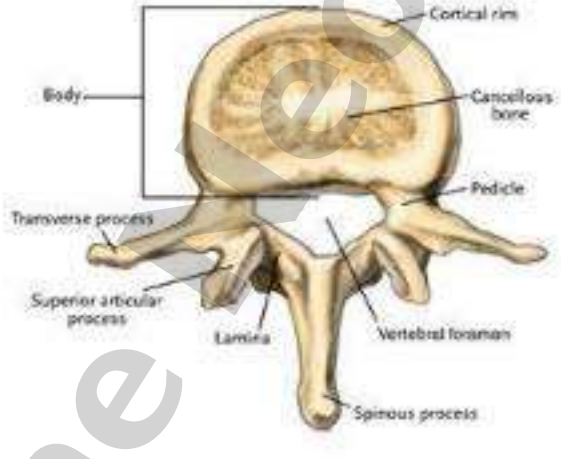
Experiment no. 5
Identification of bones



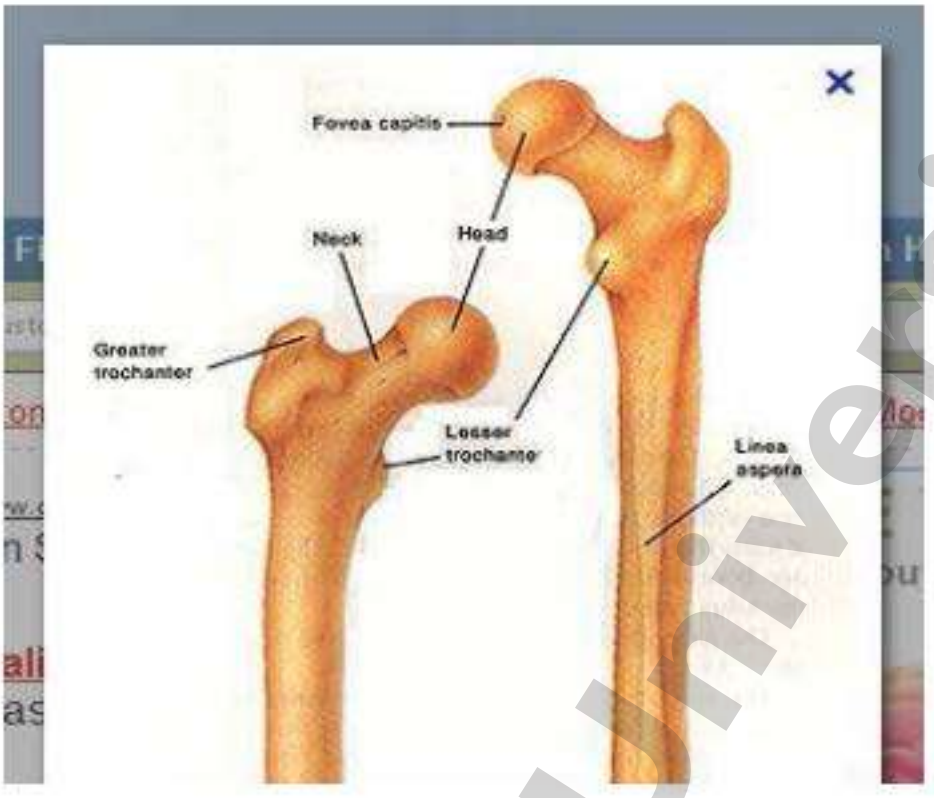




Humerous



Vertebrae



Femur

Scapula & Clavicle

Tibia & Fibula