Immune system

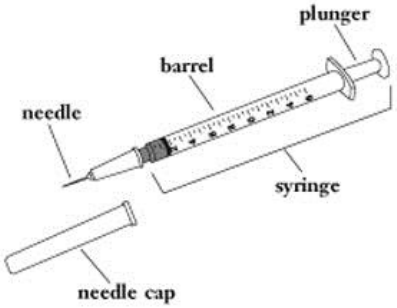
The immune system is the body's natural defense in fighting organisms. There are two kinds of immunity, natural(Innate) and acquired immunity.

Innate immunity :(non-specific) Everyone is born with innate (or natural) immunity, a type of general protection . It also includes the external barriers of the body, like the skin and mucous membranes (like those that line the nose, throat, and gastrointestinal tract), which are the first line of defense in preventing diseases from entering the body .

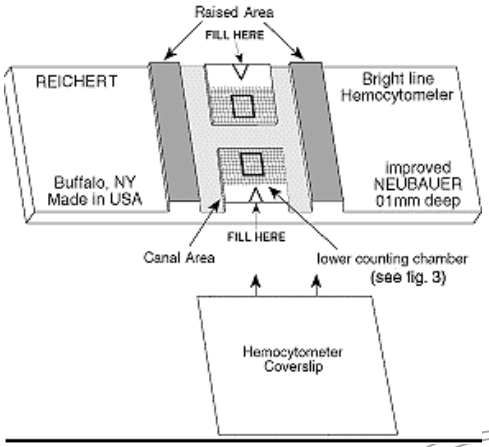
The adaptive immunity: (Specific) The second kind of protection is adaptive (or active) immunity, which develops throughout our lives. Adaptive immunity involves the lymphocytes and develops as people are exposed to diseases or immunized against diseases through vaccination .

Equipment


ALCOHOL


plunger
barrel
needle
syringe
needle cap

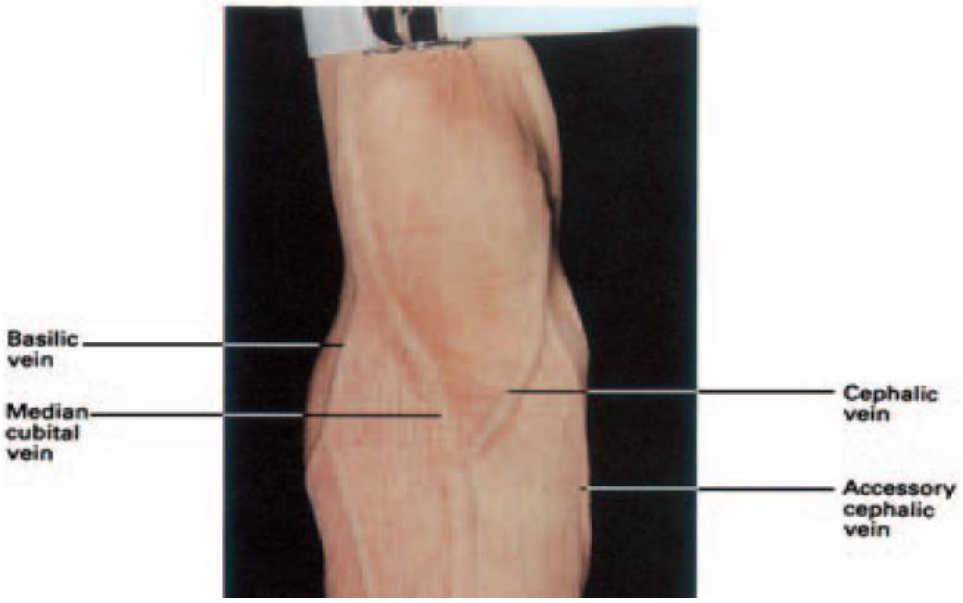

C-28A

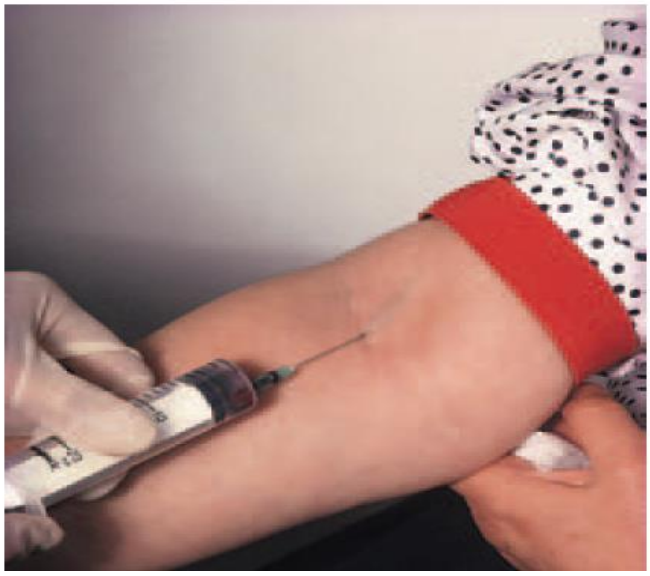

Raised Area
FILL HERE
REICHERT
Bright line
Hemocytometer
Buffalo, NY
Made in USA
improved
NEUBAUER
01mm deep
FILL HERE
Canal Area
lower counting chamber
(see fig. 3)
Hemocytometer
Coverslip

Obtaining a blood specimen

1.Gloves should be worn during vine puncture, for the protection of the person carrying out the procedure. In an adult, peripheral venous blood is most easily obtained from a vein.

2. The arm should be positioned on the armrest so that the vein identified is under some tension and its mobility is reduced. The skin should be cleaned with 70% ethanol or 0.5% chlorhexidine and allowed to dry, to avoid stinging when the skin is penetrated. A tourniquet is applied to the arm, sufficiently tightly to distend the vein. The tourniquet should be left on the arm only long enough to allow penetration of the vein.





3.Blood specimens can be obtained with a syringe . This may be done in a single movement or in two separate movements for the skin and the vein. With one hand steadying the barrel of the syringe ,so that the needle is not accidentally withdrawn from the vein, blood is withdrawn into the syringe using minimal negative pressure.

4.Following removal of the needle, direct pressure is applied to the puncture site with cotton wool or a sterile gauze square, the arm being kept straight and, if preferred, somewhat elevated.

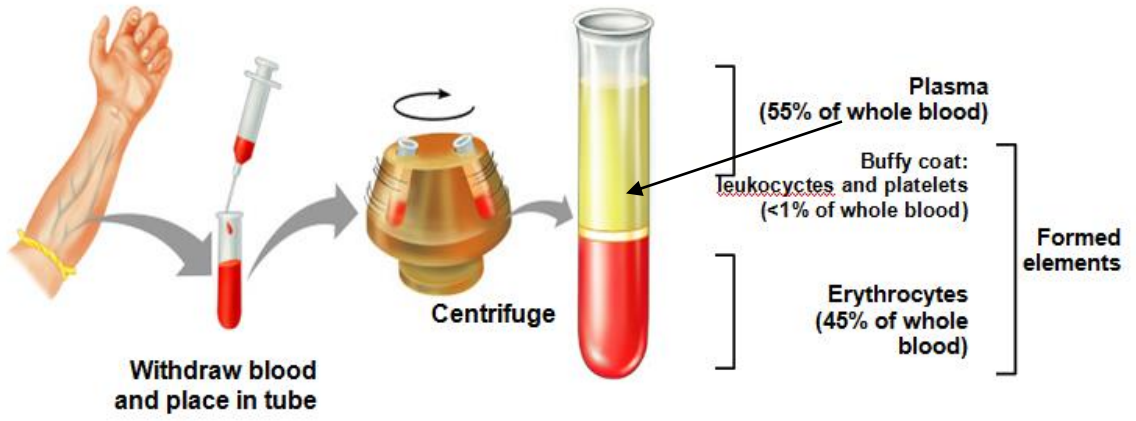
5. The specimen container is then labelled with the patient's name

and identifying details and, depending on hospital standard operating procedure.

Buffy Coat Preparation

Centrifuge an EDTA blood sample in a plastic tube for 5–10 min at 3000-5000 rpm . Then remove the supernatant plasma carefully with a fine plastic pipette, and with the same pipette deposit the platelet and underlying leucocyte layers onto one or two slides. Mix the buffy coat in a drop of the patient's plasma and then spread the films. Allow them to dry in the air and then fix and stain in the usual way.

As an alternative to centrifugation, the blood may be allowed to sediment by placing the tube vertically on the bench without disturbance, with or without the help of sedimentation-enhancing agents such as fibrinogen, dextran, gum acacia, Ficoll (Pharmacia), or methylcellulose . is particularly suitable for obtaining leucocyte preparations with minimal red cell contamination.



Making a blood film

There are two types of blood films ,classified according to the purpose of needing to make a blood smear. These types are :

Thin blood film : use for describing blood cells RBC 's , platelets and for differential leucocytes count .

Thick blood film : use for detecting malarial parasites and microfilaria .

Preparation of thin blood film :-

To prepare a thin smear , you should follow the following steps:

1. A blood film may be made from non-anticoagulated blood, Place a small drop of blood in the center line of a slide about 1 cm from one end.
2. Then, without delay, place a spreader in front of the drop at an angle of about 30 degrees to the slide and move it back to make contact with the drop. The drop should spread out quickly along the line of contact.
3. With a steady movement of the hand, spread the drop of blood along the slide. The spreader must not be lifted off until the last trace of blood has been spread out; with a correctly sized drop, the film should be about 3 cm in length. It is important that the film of blood finishes at least 1 cm before the end of the slide .

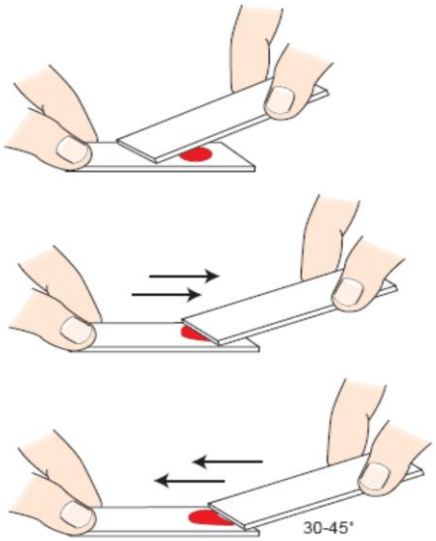


Figure 20.6 Preparing a wedge-type smear. Size of drop and angle of spread are important features.

Staining of blood film by Leishman's Stain

Method :

1- Make a thin film and air dry rapidly.

2- Place the film on a staining rack, flood with Leishman's stain, and leave for ٢ min to fix.

3- Add twice as much buffered distilled water (preferably from a plastic wash bottle because this permits better mixing of the solution), pH 7.2.

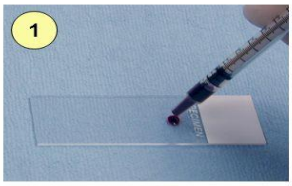
4- Leave to stain for 10 min.

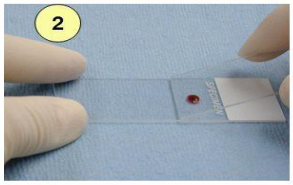
5- Wash off stain with tap water.

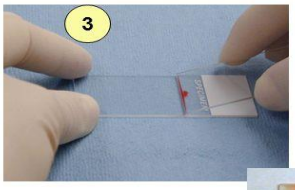
6- Examine slide under microscope by oil lens .

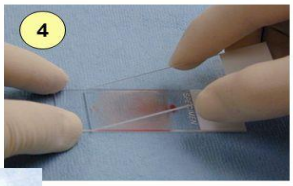
The count :

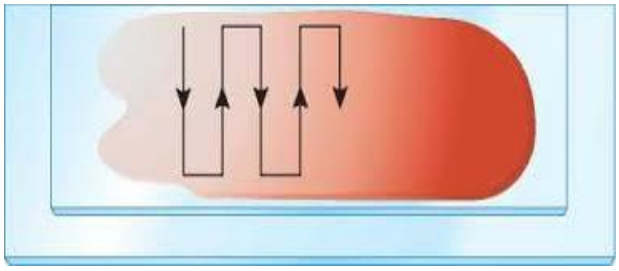
The dry and stained film is examined without a cover slip under oil immersion objective . A total of 100 cells should be counted in which every white cells seen must be recorded in a table under the following heading : Neutrophil , Basophil , Eosinophil , Monocyte and Lymphocyte .

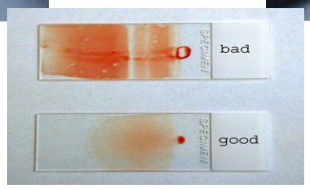


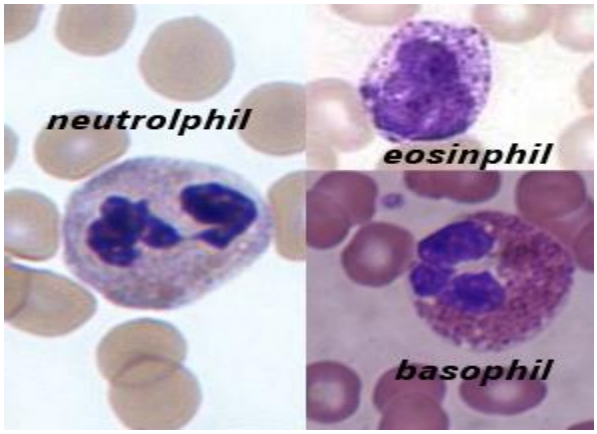


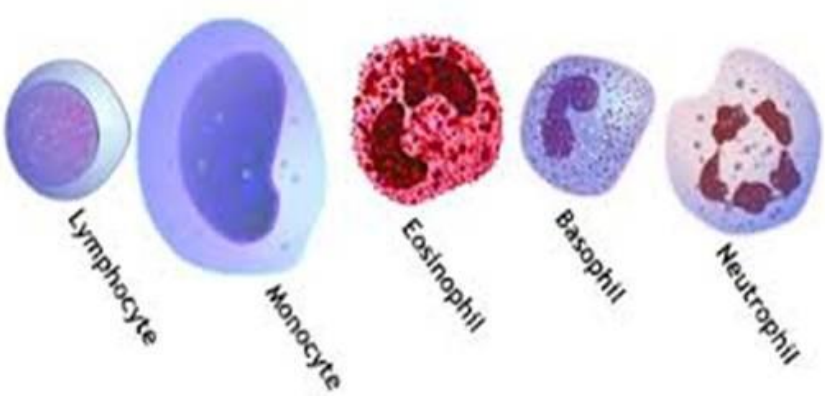












NORMAL COUNTS

- **Total WBC Count : 4000 – 11000 / cu.mm.**
- **Differential count**

Leukocyte	Percentage
Neutrophils	40 – 70 %
Eosinophils	1 – 4 %
Basophils	0 – 1 %
Monocytes	4 – 8 %
Lymphocytes	20 – 40 %

	Cell Type	Cells/μl Blood	Function	Morphology
	erythrocytes	6×10^6	O_2 transport	concave discs, no nuclei, pink
	platelets	3×10^5	blood clotting and blood vessel repair	small, irregular, red granules with blue cytoplasm
	neutrophils	5,000 (50–70%)	phagocytosis	purple granules, 4-lobe nuclei, size: 9–12 μ
	lymphocytes	3,000 (20–30%)	specific immunity	large round nucleus, blue cytoplasm, size: 7–13 μ
	monocytes	500 (2–6%)	phagocytosis, present antigens	convoluted nucleus, granules, size: 14–18 μ
	eosinophils	300 (1–5%)	destroy antibody-antigen complexes, fight parasites	bright reddish-orange granules, size: 9–12 μ
	basophils	30 (<1%)	may prevent clotting in inflammation	deep purple granules, size: 9–12 μ