Blood Group Testing :

Identification of blood groups: In grouping, two main systems are tested for,

ABO system that represents the major obstacle in all transfusions by the presence of natural antibodies (it is also a system of tissular histocompatibility antigens HLA).

Rh system since the D antigen is the most immunogenic of all the blood group antigens.

ABO system		
Blood Group	Antigen	Antibody
A	A	Anti b
B	B	Anti a
AB	A and B	-
O	-	Anti a & anti b

Rh system	
Blood group	Antigen
Rh +ve	D
Rh -ve	-

The main manual methods can be used when performing blood grouping:

First: Slide or white porcelain tile Method (forward method): This technique may be used for emergency ABO grouping tests or for preliminary grouping particularly in an outdoor camp. Slide or tile testing is not recommended for routine .

Advantages:

1. Can be used in emergency and blood camps for preliminary grouping.

2. Easy to perform

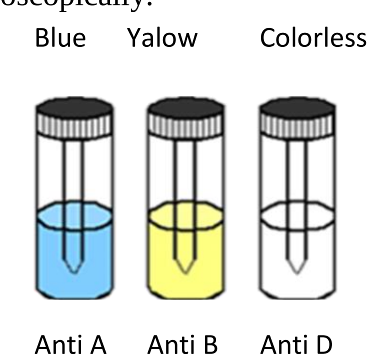
3. Quick

Disadvantages

1. Less sensitive than the tube test
2. Drying up of the reaction mixture can cause aggregation of cells , giving false positive results
3. Weaker reactions are difficult to interpret s
4. Not reliable for weak reactions as negative results cannot be checked microscopically.
5. Serum testing cannot be performed.

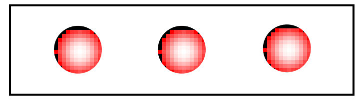
Slide Blood Typing proceture:

When testing for blood groups, 3 bottles of reagent containing a specific type of antibody each is used. Each antibody is given a characteristic and universal color.

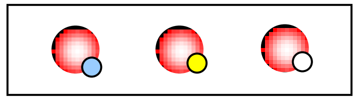


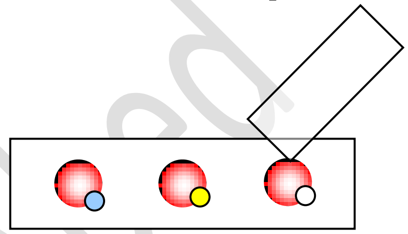
Method :-

- Clean a finger with surgical spirit, and prick with a sterile lancet.
- Put three drops of blood on to a slide



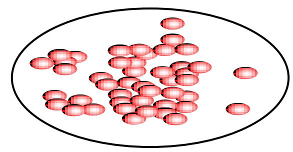
- Add a drop each, of anti A, anti B and anti D onto them, taking care not to touch the blood drop with the pipette.





- Now, take another slide and using its edge, mix the drops thoroughly.
- Use different corners of this slide to mix, in order to avoid mixing the different reagents.

- Observe for agglutination under a microscope
- Note that anti D takes time to clump.
- Clumping may also be seen with the naked eye, However, microscope is better.



Interpretation :-

Anti A	Anti B	Anti D	Blood Group
Agglutination +	no	Agglutination +	**A +**
Agglutinaion +	no	no	**A -**
no	Agglutination +	Agglutination +	**B +**
no	Agglutinaion +	no	**B -**
Agglutination +	Agglutination +	Agglutination +	**AB +**
Agglutinaion +	Agglutinaion +	no	**AB -**
no	no	Agglutination +	**O +**
no	no	no	**O -**

Notes:

1. A “false positive” is when agglutination occurs not because the antigen is present, but cells may already be clumpled.

2. A “false negative” is one in which the cells are not clumped because there are too many cells or not enough reagent.

Second : Tube Method (reserve or backward methods): Test tubes either of glass or plastic may be used.

Advantages of tube method

1. It allows for fairly long incubation without drying up of the tubes contents.
2. Centrifugation involved enhances the reaction allowing weaker antigens and antibodies to be detected.
3. Simplicity of reading and grading of results.
4. Clean and more hygienic.
5. Requires smaller volume of reagents
6. More sensitive than slide technique for ABO grouping

Reagents required:

1. Monoclonal Antisera-A and Antisera-B. Antisera-A, B is optional.
2. Normal saline
3. Known cells of group A, B, O

Equipment required : Centrifuge **,** Glass tubes 12 × 100 mm **,** Glass tubes 75 × 10 mm.

Direct Test tube method:

1. Take two tubes, label one tube 'anti- A' and the second ' anti -B'
2. Add one drop of anti- A serum to the tube labeled 'anti-A' and one drop of anti- B to the tube labeled anti- B'
3. Put one drop of the 2-5% cell suspension to both tubes
4. Mix the antiserum and cells by gently tapping the base of each tube with the finger or by gently shaking
5. Leave the tubes at RT for 5- minutes. Centrifuge at low speed (2200-2800 rpm)for 30 seconds 40
6. Read the results by tapping gently the base of each tube looking for agglutination or haemolysis against a welllighted white background.
7. Interpret the results .

Indirect Test tube method:

1. Take two tubes, label one tube A- Cells' and the second 'B cells'

2. Put one drop of the serum to be tested each tube.

3. Add one drop of 2-5% A cells to the tube labeled 'A cells' and one drop of 2-5% B cells to the tube labeled 'B cells'.

4. Mix the contents of the tubes.

5. Leave the tubes at RT for 5- minutes. Centrifuge at low speed (2200-2800 rpm) for 30 seconds.

6. Read the results by tapping gently the base of each tube looking for agglutination or haemolysis against a welllighted white background.

7. Interpretation of results: The interpretation of ABO group is as follows:

Cell Typing			Serum Typing			Interception of ABO group
Anti-A	**Anti-B**	**Anti-AB**	**A_C**	**B_C**	**O_S**	
C	-	C	-	C/L	-	A
-	C	C	C/L	-	-	B
C	C	C	-	-	-	AB
-	-	-	+	+	-	O
C=Clumps, L=Lysis						

Rhesus D blood types and transfusion :

1. Persons with Rhesus D positive blood can only give and receives from Rhesus D Positive

2. Persons with Rhesus D negative Blood can give to Rhesus D positive but receives only from Rhesus D negative

Notes:

1. **Universal donors:** These applies to persons who have Blood Group O Rhesus D negative(No antigenic expression on the Red Blood Cells)
2. **Universal recipients** : These applies to individuals who are Blood Group AB Rhesus D negative.