

## The Rh system

The terms “Rh-positive” and “Rh-negative” refer to the presence or absence of the D red cell antigen; more correct terms are “D-positive” and “D-negative.”

### False-positive results in Rh typing can be caused by:-

- 1- Immunoglobulin coating of the cells as a result of warm or cold Abs.
- 2- Use of the wrong reagent or Contamination with reagent from another vial.
- 3- Nonspecific aggregation of the red cells due to some component of the reagent other than the antibody (ie, a preservative, antibiotic, or dye).

### False-negative results in Rh typing can be caused by:-



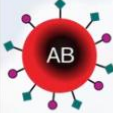




- 1- Failure to add the reagent.
- 2- Use of the wrong reagent or Contamination, improper storage, or outdating of the reagent.
- 3- A red cell suspension that is too heavy for a tube test or too weak for a slide test.
- 4- Aggressive resuspension of the red cell button dispensing the agglutination.
- 5- Non reactivity of a reagent with a weak or partial form of the antigen.

## ABO blood group system

The ABO system is the most important of all blood groups in transfusion practice. It is the only blood group system in which individuals have antibodies in their serum to antigens that are absent from their RBCs. This occurs without any exposure to RBCs through transfusion or pregnancy.

The ABO system contains four blood groups and is determined by the presence or absence of two distinct erythrocytes in which red cells of group A carry antigen A, red cells of group B carry antigen B, red cell of group AB carry both A&B antigens and red cells of group O have neither A or B antigens.

- Prozone phenomenon occurs, when the proportion of antibody is more than antigen
- Postzone phenomenon occurs when the proportion of antigen is more than antibody.

	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies in plasma	 Anti-B	 Anti-A	None	 Anti-A and Anti-B
Antigens in red blood cell	A antigen	B antigen	A and B antigens	None

**Table: 1 Distribution of ABO antigens and antibodies in red cells and serum**

### ABO subgroups:-

- The ABO phenotypes can be divided into categories termed subgroups. These subgroup occurred due to qualitative and quantitative differences.
- **Quantitative difference** due to ↓ Number of antigen sites, ↓ Amount of transferase enzyme and ↓ Amount of branching structure.
- **Qualitative difference** due to differences in the precursor oligosaccharide chains and subtle differences in transferase enzymes.

### What is the cross-match test.?

- Which is a medical test involves the mixing of serum or plasma from the recipient with red cells from the donor or vice versa.

### Serologic cross-match test:-

- Which is consists of mixing the recipient's serum or plasma with donor RBCs.

### Antiglobulin cross-match test type:- ( عدد و اشرح واحدة )

- This procedure type begins in the same manner as the immediate spin cross-match, continues to a 37°C incubation, and finishes with an antiglobulin test.

1) Immediate spin phase:- The purpose of this phase is to detect the cold antibody (IgM) that's including expected ABO alloantibodies and unexpected cold-reacting antibody alloantibodies or autoantibodies.

2) 37°C incubation phase:- The purpose of this phase is to detect (IgG) antibody that react best at warm temperatures.

3) Antiglobulin phase:- The purpose of this phase is to detect the warm antibody (IgG) that's including unexpected warm-reacting antibody alloantibodies or autoantibodies by adding (AHG) reagent.

**what are the causes of positive results in the serologic cross-match.?**

- 1) Incorrect ABO grouping of the patient or donor.
- 2) An alloantibody in the patient's serum reacting with the corresponding antigen on donor RBCs.
- 3) An autoantibody in the patient's serum reacting with the corresponding antigen on donor RBCs.

**What are the causes of false positive results in the serologic cross-match.?**

- 1) Abnormalities in the patient's serum.
- 2) Contamination in the system.