# Compatibility test

## Procedure:

The compatibility test is divided into 3 phases; the room temperature phase, the incubation phase and the antiglobulin phase.

## 1-The room temperature phase:

Commences with the addition of the patient's serum to two tubes( Tube I and Tube II), to each of which is added the donor's red cell suspension (5% in normal saline), two volumes of serum to one volume RBC suspension. The specimen from the patient should be clotted blood, no more than 48 hours old.

- One of the tube (Tube I) also receives bovine albumin which reduce the repulsion between the red cells and thereby enhance agglutination by Rh antibodies.
- The content of each tube are mixed, centrifuged and examined for agglutination or haemolysis.

## 2-The incubation phase:

The two tubes are placed in a 37°C water bath or incubator for 45 minutes. Both tubes are removed after this time and centrifuged and examined macroscopically for agglutination and for haemolysis.

## 3-The antiglobulin phase:

The antiglobulin phase continues with tube I, the contents of this tube are washed three times in large volumes of saline. At the end of the last washing the saline is decanted completely. Anti-Human Serum is added to the sedimented cells. The tube is shaken to mix the contents and then centrifuged. The cells are examined both macroscopically and microscopically for agglutination.

## Auto control:

Control test of the patient's serum with his own cells are essential to determine if the problem is due to an auto antibody or alloantibody. The auto control is subjected to the same procedure.

## Minor crossmatch**:**

In minor cross match, serum of the donor is mixed with the RBCs of the patient.

It is not carried out as a routine:

## Report of cross matching:

The report of cross matching must contain the following information.

- The name of the patient and number, age, blood group.

- The number of the donor pint, blood group and expiry date.
- The result of each phase.
- The result of compatibility (compatible/incompatible).
- The date of the test.

See the blood request form.

- If incubation phase (37°C) and/or AHG phase show agglutination, the blood is incompatible.
- If all phase show no agglutination, the blood is compatible.
- If the auto controls show agglutination, the patient may suffer from AIHA(Autoimmune hemolytic anemia) or HDN.

## Antibody screening and identification:

### Definition:

Serological tests carried out the patient's serum to detect the presence of an irregular antibody and identify the specificity.

### Indications:

Antibody screening is carried out in pregnant women, when investigating hemolytic disease of the newborn, hemolytic transfusion reaction or suspected immune hemolytic anemia. It should be also performed in all prospective recipients of blood transfusion.

### Principle of antibody screening and identification:

Antibody screening is carried out by the patient's serum against a panel of at least two types of red cells, each collected from a carefully selected group O donor. The panel should contain Rh(D)+ve and Rh(D)-ve red cells. The procedure used for compatibility testing, including the antiglobulin test, is also used for antibody screening. When an antibody has been found in the patient's serum, it is fully identified by testing he patients serum against a panel of red cells collection from six to 20, blood group O, fully phenotyped donors.

The analysis of the pattern of agglutination provides identification of the antibody. The specificity of the antibody is confirmed by demonstrating the presence of the corresponding antigen on the patient's red cells.

### Auto-immune Hemolytic Anemia (AIHA):

1-Accrding to temperature at which the antibody is most active in vivo:

#### a- AIHA with cold reacting antibodies.

The antibodies are IgM, react with red cells best at temperature below 37°C(most active at 4°C). The reaction permits the fixation of destruction of the red cells by complement.

The clinical syndromes are – cold haemagglutination disease (CHAD)- which may be secondary to lymphproliferative disorders or to infections.

## b- AIHA with warm antibodies:

The antibodies are of IgG, which are most active at 37°C. The antibodies coat the red cells in vivo causing their sequestration in the spleen and liver (extra vascular haemolysis).

It may be associated with lymphproliferative diseases.

1- According to the cause:
   a- Primary or idiopathic- no apparent cause.
   b- Secondary, when an underlying disorder is discovered.

**Warm type:** SLE, CLL, Lymphomas, Drugs.

**Cold type:** Infection (Mycoplasma pneumonia, IMN, Syphilis).

Lymphomas, chronic cold agglutinin disease.

## Clinical features:

AIHA occur at **any age**. There is an anemia, mild jaundice, Raynaud's phenomenon, intravascular hemolysis and Moderate splenomegally.

## Laboratory diagnosis:

The Hb is low, with high **reticulocyte** count. The blood film shows polychromasia and in warm IgG haemolysis, spherocytes are present. The diagnosis is made by the presence of a positive direct antiglobulin test. The test carried out using a polyspecific SHG reagent.

## Blood grouping:

Difficulties in ABO typing in warm AIHA are rare.

In cold agglutinin disease the tests should be carried out at 37°C. At this temperature most ABO anti-sera react well while cold auto- antibodies are usually unreactive.

Own cell (auto control) is required during testing.