Name  Crossmatch  
(Compatibility Testing)

Principle
A compatibility test or crossmatch is a lab procedure to determine before transfusion if there is serologic compatibility between a blood donor and an intended recipient. Each compatibility test is a unique experiment in which unknown serums are tested with unknown RBC for in vitro detection of antibodies. Negative results are taken to indicate compatibility. The crossmatch routine is as simple as possible and although no single crossmatch detects all antibodies, it is capable of detecting significant incompatibility when performed correctly.

Clinical Significance
The purposes of compatibility testing are to detect: irregular antibodies; errors in ABO grouping, and clerical errors in patient identification and result recording.

Time Frame
An uncomplicated crossmatch should be completed within one hour. Students should strive toward being able to perform multiple procedures.

Specimen
Fresh clot tube (cells and serum) less than 72 hours old.

Reagents
Blood bank reagent rack
0.85% saline

Procedure
Refer to Immunohematology procedure cards.

Results
Any degree of agglutination or hemolysis in the crossmatch tubes during any phase indicates incompatibility and the blood should not be given. If agglutination or hemolysis occurs in the screen cells tubes, this indicates the presence of an atypical antibody and further testing must be done.
General Information
Compatibility testing consists of a series of procedures performed by the Blood Bank before transfusion to ensure the proper selection of blood for the patient. These procedures should include the following:

1. A review of the Blood Bank records for results of previous testing to check for the recipient's ABO/D type and for any unexpected red blood cell antibody that may have been previously identified.
2. ABO/D type, antibody screen on each recipient sample sent for compatibility testing.
3. ABO/D type on the blood donor.
4. Major crossmatch.

Careful technique and complete concentration are necessary in testing, since incorrect results can directly endanger the life of the recipient.

The AABB Standards and the FDA require the testing of the donor's cells with the recipient's serum (major crossmatch) by a method that will demonstrate agglutinating, coating, and hemolyzing antibodies, which shall include the antiglobulin method. Antihuman globulin reagent for the antiglobulin test shall meet FDA standards. Testing donor serum with recipient red blood cells ("minor crossmatch") need not be included, since donor serum must be tested initially for hemolyzing, agglutinating, and coating antibodies with reagent red blood cells meeting FDA standards.

The crossmatch will detect the following:
1. Most recipient antibodies directed against antigens on the donor red blood cells.

The crossmatch will not:
1. Guarantee normal donor cell survival.
2. Prevent recipient immunization.
3. Detect all ABO grouping errors.
4. Detect D typing errors.
5. Detect all unexpected red blood cell antibodies in recipient serum. Clerical errors are more common than technical ones in a Blood Bank or Transfusion Service. Non-technical mistakes, such as inadequate or incorrect identification of the recipient or donor, usually are caused by not adhering to established protocols.
Preliminary Testing

The following are imperative before crossmatching:
1. A review of Blood Bank records for results of previous testing.
2. ABO grouping.
3. D typing with anti-D. Special care must be taken in testing the recipient who may have received transfusions of an ABO group or D type different from his own, since transfused cells may give misleading results.
4. The screening of recipient sample for unexpected antibodies. This may be performed at the same time as the crossmatch. Identify the antibody if the screen is positive.

Technical Factors

Technical factors must be considered in the performance of a crossmatch. These include:
1. Donor red blood cells for crossmatching must be obtained from a sealed segment of tubing integral with the container.
2. The cells used for crossmatching may be saline-washed.
3. A 3% to 5% cell suspension is usually recommended.
4. 12 x 75 mm tubes
5. The supernatant must be examined for hemolysis against a white background before resuspending the centrifuged cells.
6. An optical aid such as a magnifying lens, mirror, or microscope is advised for the reading of agglutination.
7. Hemolysis or agglutination at any stage of the crossmatch indicates an incompatibility.
8. The person performing the test should be familiar with incubation, centrifugation, antiglobulin test, sources of error, and reading of hemolysis and agglutination.
9. All test tubes should be labeled before use with unit and recipient identification.

Incompatible Crossmatch

When incompatibility is seen in an early phase of a crossmatch, the testing should be completed to give information as to temperatures and media where reactions occur, the variability of these reactions, and the percentage of incompatible donors. These clues will aid in choosing correct conditions for antibody identification.

It is preferable to determine the cause of the incompatibility rather than to continue blindly. If the need for transfusion is too urgent for this course of action, many random units may
be crossmatched. If possible, attempts to identify the antibody should be started while the crossmatch is being completed.
Students are to repeat forward type on patient using cells directly from clot and write those results above the ones obtained in the first typing.

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2 Unit Crossmatch

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Properly labeled serum tube
Properly labeled cell suspension

Donor 1
+ labeled with donor unit #
+ cell suspension

Donor 2
+ labeled with donor unit #
+ cell suspension

PI

AC