

# Procedures for compatibility testing: emergency & elective

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- Compatibility test procedures
- Pre transfusion testing protocols
- Individual procedures
- Column Agglutination Technology (CAT)
- Emergency protocols

# Compatibility testing

- This is the final check on ABO compatibility between donor & recipient
- To detect any antibody on the patient's serum (acting at RT &/ or 37° C) just before transfusion.

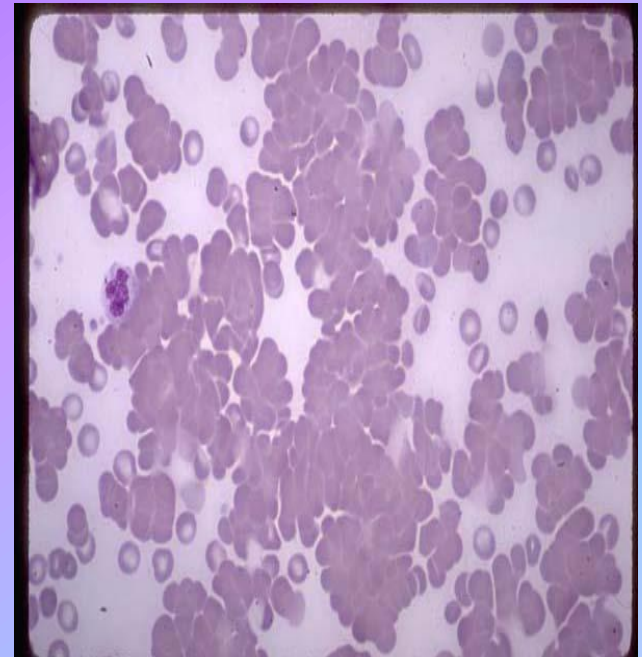
# Compatibility testing

- Set of procedures required before blood can be issued as being compatible
- To make sure that there are no Ab present in patient serum which react with donor red cells
- Technical procedure s/b simple & accurate



# Compatibility testing

- Receiving Pt sample & check any previous record
- Performing ABO & Rh group on patient sample
- Performing antibody screening
- Final compatibility, cross match test b/w patient serum & donor red cells
- Proper labeling & issue



# Probability of safe transfusion

<b>PROCEDURE</b>	<b>COMPATIBILITY</b>	
	Individual (%)	Cumulative(%)
None	64.4	64.4
ABO grouping	35.0	99.4
Rh typing	0.4	99.8
Antibody screening	0.14	99.94
Crossmatching	0.01	99.95
Autotransfusion	100	100

# Request for blood

- 5- 10 ml of patient blood s/b collected into dry tube for compatibility testing
- Clearly labeled with patient name, hospital reference number & ward
- Request form should provide following information about name, age, sex, diagnosis, B. grp., presence of any Ab, previous Tx & reaction, number & type of product required
- Sample s/b stored at 4 C for 7 days
- For repeat CT 2/3 days

# Blood grouping of recipient

- Previous transfusion record: blood group, unexpected Ab, problem in X match & Tx reaction
- ABO & Rh grouping
- Antibody screening of recipient blood (with pooled O cells)
- Auto control



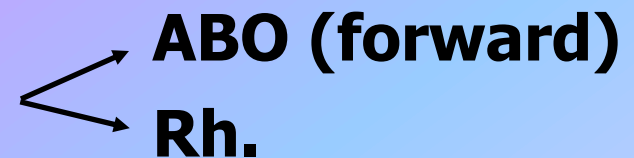
# ABO/Rh. Test of donor blood

## Grouping Lab

- First & foremost step to make it safe (immunological safety)
- Forward & reverse grouping (their correlation)
- Weak D / D<sub>u</sub>

## Cross Match Lab

- Repeat / verification test



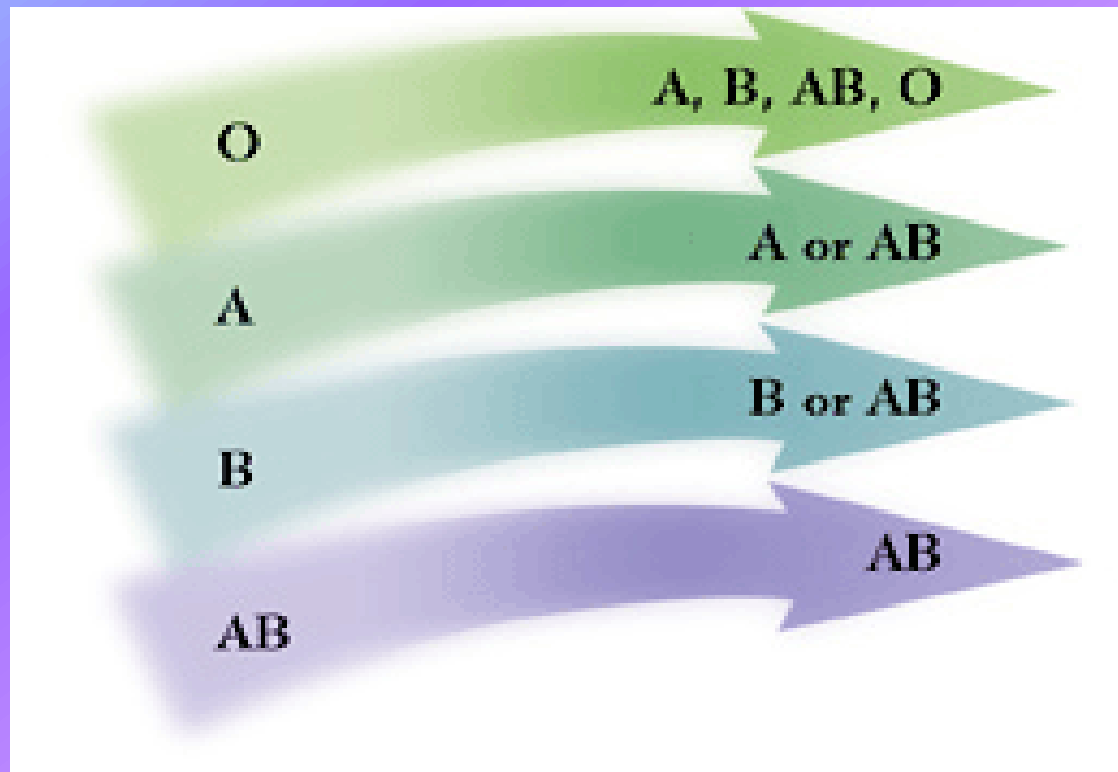
# Donor's Blood for Antibodies

- Donor's with h/o pregnancy / transfusion.
- Pooled O cells at RT / pooled O cells at 37° C/  
pooled O cells with IAT
- Screening need not be as sensitive as that for patient's sample (IAT - Optional)
- Significant for FFP / CPP, especially in infants




























# Selecting blood for patients

- Request should include reason of Tx so that most suitable unit can be selected
- In general oldest unit (FIFO) s/b issued first but following exception
  - Neonates receiving exchange Tx
  - Pt of sickle cell anemia & thalassaemia
  - Massive transfusion
  - Compromised heart & brain circulation
  - Issued to another hospital include with variety of expiry dates

# Compatibility



**DONOR****RECIPIENT**

	O-	O+	B-	B+	A-	A+	AB-	AB+
AB+								
AB-								
A+								
A-								
B+								
B-								
O+								
O-								

# Techniques of compatibility

- Routine procedure
  - Saline RT & 37 C
  - Bovine albumin 37 C
  - Enzyme 37 C
  - Antiglobulin test 37 C



# Saline technique

- 2 drops of recipient serum + 1 drop of 2-5% saline cell suspension of donor red cell
- Incubation for 30-60(AABB & DGHS) minutes at RT
- Immediate spin method:  
incubation of 5-10 minutes(DGHS) & centrifugation at 1000 rpm for 15-20 (AABB)/ 1 minute(DGHS)
- No agglutination: compatible
- Negative s/b confirmed under microscope
- Advantages:

# Enzyme/albumin technique

- 2 drop of patient serum, 1 drop of papain cystein enzyme/ bovine albumin & 1 drop of 2-5% washed saline suspension of donor red cell
- Incubate at 37 C for 15-30 minutes (AABB)  
Centrifugation at 1000 rpm for 1 minute
- No agglutination: compatible
- Advantages



# Antiglobulin technique

- IAT used to detect clinically significant IgG antibodies
- Patient serum + donor red cells, incubate at 37 C for 30-60 minutes & then wash
- Add 1 drop of AHG reagent & centrifuge at 1000 rpm for 1 minute
- No agglutination: compatible
- Advantages & principle

# Use of LISS

- Low ionic strength solution allows reduction in incubation time(10-15 minutes) with little loss of sensitivity
- Serum to cell ratio must be kept to unity(2 drops of serum & 2 drops of LISS suspended red cells)

# COLUMN AGGLUTINATION TECHNOLOGY(1)

- Antigen-Antibody Reaction.
- Agglutination - Haemagglutination.
- Chamber and Column in a micro tube.
- Column has a medium - Gel
- Six micro tubes in a Card
- ABO & Rh typing; Other blood groups; Antibody Screening; Compatibility.

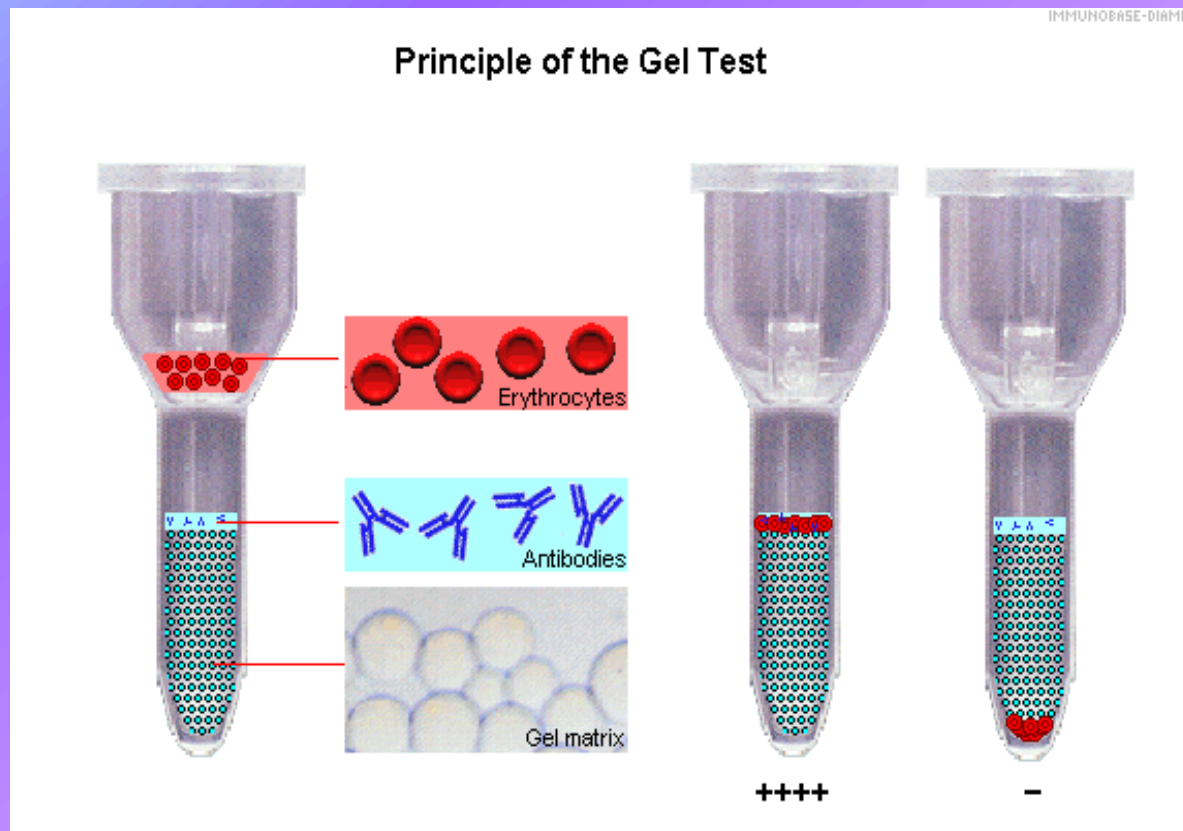
# COLUMN AGGLUTINATION TECHNOLOGY(2)

- Chamber for red cells/red cells+serum.
- Column medium- Separates agglutinate from unagglutinated red cells.
- Medium has specific antisera so that the cells/sensitized cells get trapped.

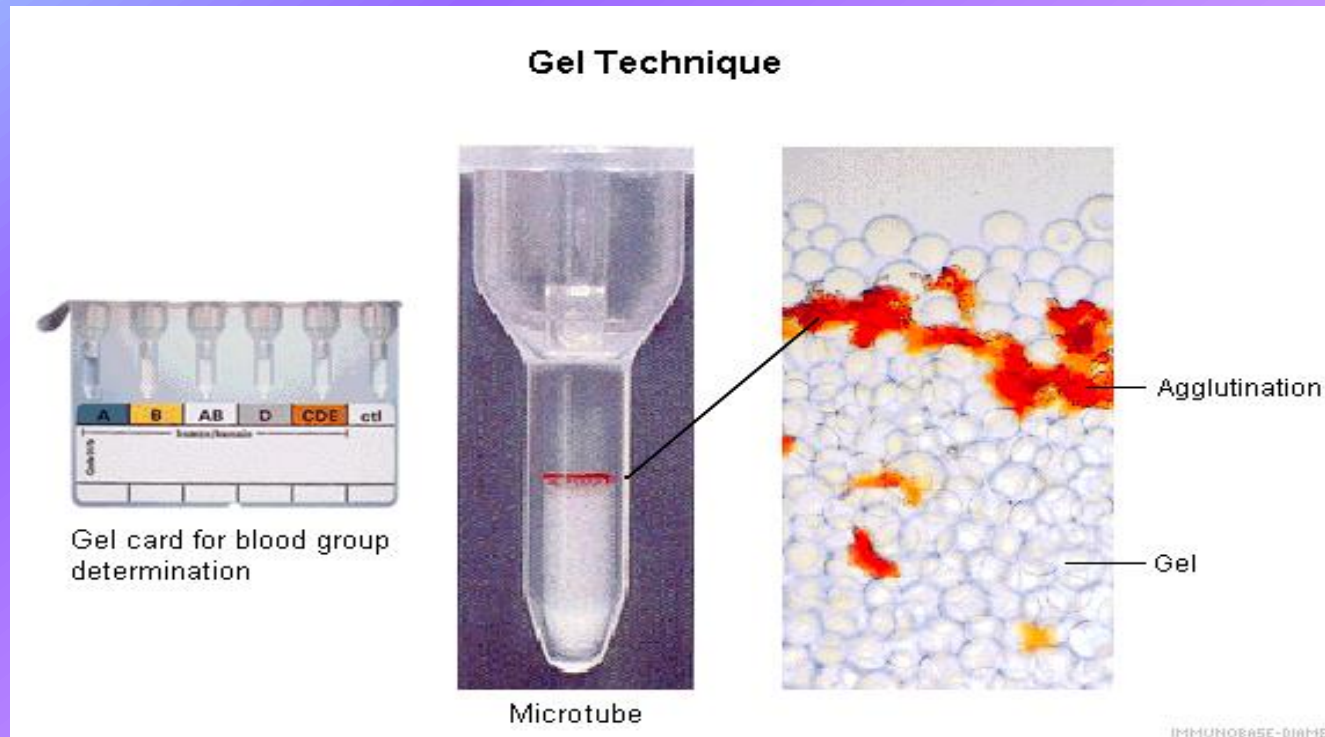
# Procedure(8)

- 10 micro liter of donor cells in 1 ml LISS to make 1% suspension.
- 50 micro liter suspension.
- Patients serum - 25 micro Lt.
- Incubate at 37° C for 15 min.
- Centrifuge at 85 'g' for 10 min.
- Read Results

# COLUMN AGGLUTINATION TECHNOLOGY(3)



# COLUMN AGGLUTINATION TECHNOLOGY(4)



# COLUMN AGGLUTINATION TECHNOLOGY(5)

- IAT Technique
- Cells before serum
- Incubation - sensitized cells.
- Centrifugation where gel acts as sieve where agglutinated cells get trapped while unagglutinated cells pass through



# Advantages(6)

- Time reduction - 30 minutes
- Objective results
- small sample volume - pediatric samples
- Standard volume
- No wash phase in IAT
- No requirement for sensitized cells
- Cards can be discarded - reduced glass ware

# Advantages(7)

- Results can be read up to 48 Hrs (fridge)
- Shelf life of 1 Year at room temperature.
- Sensitive
- Reproducible(can be photocopied for record keeping)

# Emergency Protocols

- Patient identification, accurate specimen labeling
- Request from physician - urgent - omit X-match
- Label - compatibility not done
- Compatibility should be completed
- Gp O Rh neg. can be stored in the emerg./OT

# Emergency Protocols

- ABO gp. not known/<5 min. - Gp. O Rh. Neg. cells
- ABO gp. Known/15 min. - Gp. specific components
- 30 min. - Type and immed. spin
- 60 min - Type and major X-match

# Minor X match

- When donor serum is not screened for irregular antibodies with screening cell panel & at the time of issuing whole blood
- Donor serum is X matched with recipient red cell for both IgG & IgM antibodies

# Massive transfusion

- When no. of units transfused in 24 hrs exceeds pt blood volume, CT reduced to checking ABO & Rh type of unit
- If pt is known all antibody reactive at 37 C, blood s/b neg. for that antigen
- Clearly labeled Uncross matched blood

# Pretransfusion testing of neonate

- Infant (age < 4 months)
- ABO & Rh grouping with infant red cells
- DAT on infant red cell
- Maternal serum s/b screened for irregular Ab

# Pretransfusion testing of neonate

- Compatibility testing is done with maternal serum & unit which is compatible for both maternal & infant blood is issued



# Issuing of blood

- Cross match report s/b sent with blood included donor Id, B. gp, collection & expiry date, Pt name & Id, B. gp, interpretation of X match, date & time of issue

# Issuing of blood

- Label attached to unit contain: Donor Id, B. gp, nonreactive for TTD, Pt name, Id, B. gp., interpretation of X match, Collection & expiry date

**EAST BERKSHIRE DISTRICT.**

Name  
Hospital      Ward      Hospital Number  
Blood Group      Rhesus

**COMPATIBLE**  
with

Donor No.      Donor Group      Rhesus  
Date      Signature

**KEEP IN SPECIAL REFRIGERATOR ONLY**  
HARLOW H2521

Thank You  
&  
Questions ?