

#### Group A, B, Oh No! When there is an ABO typing discrepancy CYNTHIA CRUZ, MLS(ASCP)<sup>CM</sup> American Red Cross Reference



## **Objectives**

- To correlate the forward ABO typing with the reverse ABO typing
- Determine where the discrepancy is observed
- Identify methods for resolving ABO discrepancies



#### Why an ABO/Rh review? It's Blood Bank 101!

- What color is Anti-A
  - Blue
- What color is Anti-B?
  - Yellow

- What color is Anti-D?
  - Clear
- What color is the Rh control?
  - Clear



# Expected Results for ABO/RH

Anti-A	Anti-B	Anti-D	A <sub>1</sub> Cells	<b>B</b> Cells	ABO/RH
0	0	1-4+	1-4+	1-4+	O Rh pos
0	0	0*	1-4+	1-4+	O Rh neg
1-4+	0	1-4+	0	1-4+	A Rh pos
1-4+	0	0*	0	1-4+	A Rh neg
0	1-4+	1-4+	1-4+	0	B Rh pos
0	1-4+	0*	1-4+	0	B Rh neg
1-4+	1-4+	1-4+	0	0	AB Rh pos**
1-4+	1-4+	0*	0	0	AB Rh neg

- The stuff no one will tell you!
  - Rh = D typing of the patient/unit. D typing=Rh
  - Anti-D repeat and Weak D testing.



# So, what IS an ABO discrepancy?



 When the results of the forward grouping, the patient's red cells, do not correspond with the reverse typing, the patient's plasma/serum.



# Before we start panicking, let's double check it wasn't tech error!

- Was there a sample mix up? Is it a common name? Double check records!
- Was my red cell suspension to heavy or too light?
  3-5% RBC Suspension
- Did I add my reagents?
- Was my patient sample okay? Fibrin clots, hemolysis.
- Did I follow the manufacturer's instructions?
- Did I interpret the reactions correctly?



#### What causes real ABO discrepancies?

Forward	Reverse
Weak/Missing Red Cell Reactivity	*Missing/Weak plasma reactivity
-ABO subgroups; Transplantation; Malignancy	-Age related (<4 months old and elderly patients)
Extra Red Cell Reactivity	*Extra Serum Reactivity
-Acquired B antigen; B(A) phenomenon	-Cold autoantibody; cold alloantibody
Mixed-Field Red Cell Reactivity	
-Recent Transfusion; Chimerism	



# How can we try to solve them? The most common ABO discrepancies seen in our lab.



- 88 year old; Hispanic Male
- 7.3 Hgb/22.4 Hct
- Unknown diagnosis and medications
- No record of transfusion history reported by hospital
- Negative gel DAT and negative gel antibody screen



 Hospital Reports: Patient's red cells type as group A forward and group O in reverse.

Anti-A	Anti-B	Anti-D	A <sub>1</sub> Cells	B Cells	ABO/RH
4+	0	4+	2+	4+	NTD



- Red Cross Tech:
  - DAT with polyspecific antisera and saline control are negative.

4ºC 15" Antibody Screen						
Cells Tested	Reactions					
Screening Cell I	3+					
Screening Cell II	3+					
Screening Cell III	3+					
Auto Control	3+					



	Anti-A	Anti-B	Anti-D	A <sub>1</sub> Cells	A <sub>2</sub> Cells	B Cells	O Cells	Auto Ctrl
IS	4+	0	4+	W+	W+	3+	0	0
4°C	4+	0	4+	2+	2+	4+	3+	2+
PW	4+	0	4+	0	0	3+	0	0

- What is a prewarm?
  - The prewarm technique is when the red cells and the plasma are warmed separately at 37C before testing.
- What about RESt?
  - Rabbit Erythrocyte Stroma is used to adsorb cold reactive autoagglutins.
  - Not used for ABO typing because Anti-B will be completely or partially adsorbed out.



#### **Case Study 1: Conclusion**

Patient is group A, Rh positive.





- 63 year old; Caucasian Male
- Hgb 6.5
- Has cancer but no medication list provided
- Multiple transfusions in the last 3 months



- Hospital Reports:
  - Forwards as group A and reverse types as group AB
  - Rh negative

Anti-A	Anti-B	Anti-D	Anti-D Ctrl	A <sub>1</sub> Cells	B Cells	ABO/RH
4+	0	0/0	0	0	0	NTD



• Red Cross Tech:

	Anti-A	Anti-B	Anti-D	A <sub>1</sub> Cells	A <sub>2</sub> Cells	B Cells	O Cells	Auto Ctrl.
IS	4+	0	0/0	0	0	W+	0	0
RT	4+	0	0/0	0	0	2+	0	0

- Solution:
- Extending the room temperature incubation time, will help enhance the antigen-antibody binding.



#### **Case Study 2: Conclusion**

Patient is group A, Rh negative.





- 46 year old, female
- Pre-op
- Hospital Reports:

Anti-A	Anti-B	Anti-D	A <sub>1</sub> Cells	B Cells	ABO/RH
4+	0	4+	2+	4+	NTD



- Red Cross Tech:
  - ABO Testing

Anti-A	Anti-B	Anti-D	A <sub>1</sub> Cells	B Cells	ABO/RH
4+	0	3+	2+	4+	NTD

 Anti-M was identified during investigation at IS and IgG using the PeG additive.





Tested our reverse cells and found out they were

M+.



- Solution:
  - Find reverse cells that type as M-; so the unexpected alloantibody does not interfere with the reverse typing.



• Solution:

#### Repeat ABO with M- reagent red cells

Anti-A	Anti-B	Anti-D	A <sub>1</sub> Cells	B Cells	ABO/RH
4+	0	4+	0	4+	A+



### **Case Study 3: Conclusion**

- Patient is group A, Rh positive.
  - The M antigen present on the original reverse cells is what interfered with the patient's ABO reverse typing.





# What if the ABO cannot be resolved?

#### Patients:

 If the ABO cannot be resolved, the patient needs to be transfused with Group O red blood cells.

#### Donors:

- The discrepancy must be resolved before the unit is released for general inventory (before it is shipped to a hospital).
- If it cannot be resolved, that unit is destroyed



## More common ABO discrepancies

- Donor Units:
  - A. Hospital confirms donor red cell that is labeled as group O, Rh positive.
    - In gel, donor types as group O, Rh negative.

#### Weak D positive

B. Hospital confirms a unit labeled as group A, Rh positive.

In gel, donor types as group AB, Rh positive with a positive Rh control.

#### Wash segments



Sammary

ABO discrepancy recognition AND resolution is imperative in the blood bank.

ABO discrepancies can present themselves as a front type problem, reverse type problem, or combination of both.





