

Case Study – WR

- Patient: WR, 93 y/o female
- No blood bank history

Forward Typing			Rh Typing	Reverse Typing	
Anti-A	Anti-B	Anti-A,B	Anti-D	A ₁ Cells	B Cells
4+	0	4+	4+	0	0

- What is the appropriate next step when investigating any ABO discrepancy?

Case Study – WR

Forward Typing			Rh Typing	Reverse Typing	
Anti-A	Anti-B	Anti-A,B	Anti-D	A1 Cells	B Cells
4+	0	4+	4+	0	0
15' RT Incubation				0	2+



- Select the type to investigate
 - Reverse typing
- Possible Resolution:
 - Increase incubation time
 - Perform test at IAT
 - Decrease incubation temperature

- 15' RT incubation
 - Antibody screen control

Screening Cells	15' RT
I	0
II	0
III	0
Auto	0

Case Study – WR

- Conclusion
 - A Positive
 - Group O and auto control non reactive
- Patient 93 y/o
 - Weak Anti-B in plasma
 - Extended incubation enhances antibody uptake



Case Study – AE

- 36 year old female
- Diagnosis: Pregnancy #3
- Medications: Pre-natal vitamins
- Transfusion History: No transfusions

Case Study – AE

	Forward Type		Rh Type		Reverse Type	
	Anti-A	Anti-B	Anti-D	D Ctrl	A ₁ cells	B cells
Patient	0	0	4+	0	0	3+



Screening Cell	IS	PEG/IAT
I	0	0✓
II	0	0✓
III	0	0✓



Case Study – AE

	Forward Type			Rh Type		Reverse Type		
	Anti-A	Anti-B	Anti-A,B	Anti-D	D Ctrl	A ₁ cells	A ₂ cells	B cells
Patient	0	0		4+	0	0		3+
RT 30'	0	0	0	4+	0	0	0	4+



Screening cell	RT 30'
I	0
II	0
Auto	0

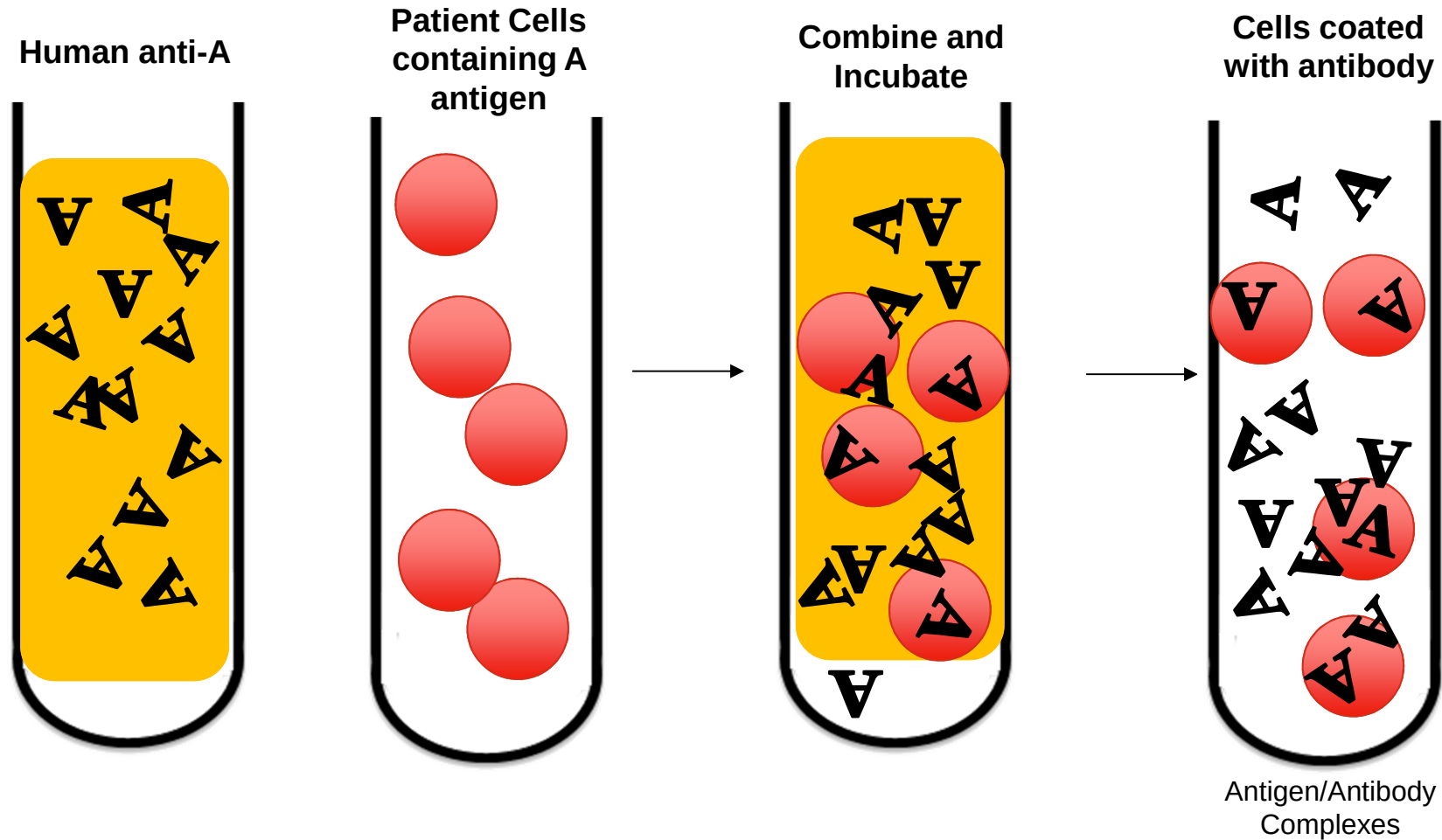


Adsorption Testing

- Remove autoantibody from serum (warm/cold autoantibody)
- Separate antibody specificities (anti-Kp^b from anti-c)
- Confirm presence of an antigen (weak A or B subgroup)



Adsorption Mechanics

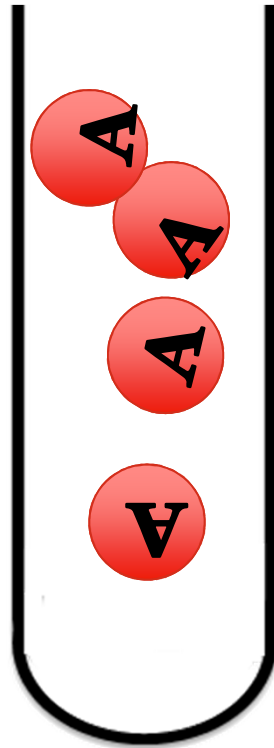


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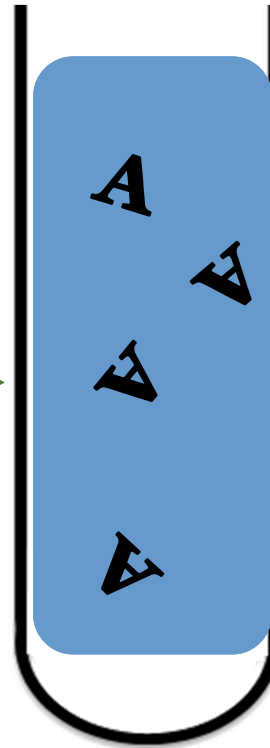
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Case Study – AE Elution

Washed cells
coated with
antibody



Eluate containing
antibody



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Case Study – AE Eluate Testing

	A cells	A cells	O cells
Test Eluate	1+	1+	0
Test Last Wash	0	0	0
+ Control Eluate (A cells)	1+	1+	0
+ Control LW	0	0	0
- Control Eluate (O cells)	0	0	0
- Control LW	0	0	0



Case Study – AE

- Conclusion
 - A Positive
- Patient
 - Weak A antigen expression
 - Adsorption/Elution confirms antigen presence

Case Study – TC

- Patient: TC, 71 y/o male
- Knee replacement surgery
- Hemoglobin: 12.3 g/dL
- Medications: Acetaminophen
- Transfusion History: Pt reports he received some blood after a motor vehicle accident many years ago
- Physician ordered 2 units pRBCs

Case Study – TC

- ABO/Rh

Forward Typing		Rh Typing	Reverse Typing	
Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
4+	0	3+	0	4+

- Interpretation
 - A Positive

Case Study – TC

■ Antibody Screen

Blood Group System		Rh					Kell		Duffy		Kidd		Lewis		P	MNSs				Lutheran		IS	PEG IAT
		D	C	c	E	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	P ₁	M	N	S	s	Lu ^a	Lu ^b		
I	R1R1	+	+	0	0	+	0	+	0	+	+	+	0	+	+	+	0	+	+	0	+	0	0✓
II	R2R2	+	0	+	+	0	0	+	+	+	0	+	0	0	+	+	0	+	0	+	0	0✓	
III	rr	0	0	+	0	+	+	+	+	0	0	+	0	+	0	0	+	+	0	0	+	0	0✓
																			Patient Cells		0	0✓	



Case Study – TC

- Crossmatches

	Anti-A,B	IS	PEG/IAT
Donor 1	0	0	0✓
Donor 2	0	0	1+

- What are possible reasons for the incompatibility?
 - Antibody to a low frequency antigen
 - Donor unit exhibits a positive Direct Antiglobulin Test
 - An ABO incompatible unit was selected

Case Study – TC

- Donor 2: DAT

Anti-IgG

1+



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Case Study – TC

- Additional Crossmatch

	Anti-A	Anti-B	IS	PEG/IAT
Donor 3	+4	0	0	0✓

- Conclusion

- ABO/RH – A positive
- No antibodies identified
- Crossmatch compatible units ready for transfusion

Case Study – PO

- 75 year old female
- Pre-op total knee replacement
- Current meds: Coumadin, vitamins
- No known transfusion history
- Order: type and hold for 2 units

Case Study – PO

	Front Type		Rh	Reverse Type	
Interp.	Anti-A	Anti-B	Anti-D	A ₁ cells	B Cells
A Positive	4+	0	3+	0	4+

Blood Group System		Rh						MNSs				P	Lewis		Kell		Duffy		Kidd		Lutheran		IS	PEG/IAT
		D	C	E	c	e	C ^w	M	N	S	s	P ₁	Le ^a	Le ^b	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Lu ^a	Lu ^b		
1	R ₁ R ₁	+	+	0	0	+	+	0	+	0	+	+	0	+	0	+	+	0	+	0	0	+	0	1+
2	R ₂ R ₂	+	0	+	+	0	0	+	0	+	0	0	+	0	+	+	0	+	0	+	0	+	0	0✓
3	rr	0	0	0	+	+	0	+	+	0	+	0	0	+	0	+	+	+	+	+	0	+	0	0✓
																				Auto		0	0✓	



Case Study – PO

- Selected Cell Testing

Blood Group System		Rh					MNSs					P	Lewis		Kell		Duffy		Kidd		Lutheran		PEG/IAT	
		D	C	E	e	s	Cv	M	N	S	s	P	Le^a	Le^b	K	k	Fy^a	Fy^b	Jk^a	Jk^b	Lu ^a	Lu ^b		
1	R ₁ R ₁	+	+	0	0	+	+	0	+	0	+	+	+	0	0	+	0	+	0	+	0	+	0✓	
2	R ₂ R ₂	+	0	+	+	0	0	+	0	+	0	0	0	+	0	+	+	0	+	0	0	+	0✓	
3	R ₁ R ₁	+	+	0	0	+	0	0	+	0	+	0	0	+	+	+	+	0	+	0	0	+	0✓	



Case Study – PO

Unit Number	IS	PEG/AHG	Unit ABO				Special Requirements	Interpretation
			Anti-A	Anti-B	Anti-D	Interp.		
12RE4568	0	1+	4+	0		A	NA	Incompatible
55EE78965	0	0✓	4+	0		A	NA	Compatible



Case Study – PO

Blood Group System		Rh						MNSs				P	Lewis		Kell		Duffy		Kidd		Lutheran		PEG/IAT
		D	C	E	c	e	C ^W	M	N	S	s	P	Le ^a	Le ^b	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Lu ^a	Lu ^b	
1	R ₁ R ₁	+	+	0	0	+	+	0	+	0	+	+	0	+	0	+	+	0	+	0	0	+	0✓
2	R ₁ R ₁	+	+	0	0	+	0	+	0	+	+	0	0	+	0	+	+	+	0	+	0	+	0✓
3	R ₁ R ₁	+	+	0	0	+	0	+	+	+	0	0	+	0	+	+	0	+	+	+	0	+	0✓
4	R ₂ R ₂	+	0	+	+	0	0	+	0	+	0	0	+	0	+	+	0	+	0	+	0	+	0✓
5	R ₂ R ₂	+	0	+	+	0	0	+	0	0	+	+	0	+	0	+	+	+	+	+	0	+	2+
6	r'r	0	+	0	+	+	0	0	+	+	0	0	0	+	0	+	+	0	+	0	0	+	0✓
7	r''r	0	0	+	+	+	0	0	+	+	+	+	0	+	+	0	0	+	+	+	0	+	1+
8	rr	0	0	0	+	+	0	+	+	0	+	0	0	+	0	+	+	+	+	+	0	+	0✓
9	rr	0	0	0	+	+	0	0	+	0	+	0	0	+	0	+	0	+	0	+	0	+	0✓
10	rr	0	0	0	+	+	0	+	+	+	+	0	+	+	0	+	+	+	+	0	0	+	0✓



Case Study – PO

		Rh						MNSs				P	Lewis		Kell		Duffy		Kidd		Lutheran		PEG/IAT
		D	C	E	e	s	C'	M	N	S	s	P₁	Le^a	Le^b	K	k	Fy^a	Fy^b	Jk^a	Jk^b	Lu^a	Lu^b	
1	R ₁ R ₁	+	+	0	0	+	+	0	+	0	+	+	0	+	0	+	+	0	+	0	0	+	1+
5	R ₂ R ₂	+	0	+	+	0	0	+	0	0	+	+	0	+	0	+	+	+	+	+	0	+	2+
7	r ⁺ r	0	0	+	+	+	0	0	+	+	+	+	0	+	+	0	0	+	+	+	0	+	1+
2	R ₁ R ₁	+	+	0	0	+	0	+	0	+	+	0	0	+	0	+	+	+	0	+	0	+	0✓
3	R ₁ R ₁	+	+	0	0	+	0	+	+	+	0	0	+	0	+	+	0	+	+	+	0	+	0✓
4	R ₂ R ₂	+	0	+	+	0	0	+	0	0	+	+	0	+	0	+	+	+	+	+	0	+	0✓
6	r ⁺ r	0	+	0	+	+	0	0	+	+	0	0	0	+	0	+	+	0	+	0	0	+	0✓
8	rr	0	0	0	+	+	0	+	+	0	+	0	0	+	0	+	+	+	+	+	0	+	0✓
9	rr	0	0	0	+	+	0	0	+	0	+	0	0	+	0	+	0	+	0	+	0	+	0✓
10	rr	0	0	0	+	+	0	+	+	+	+	0	+	+	0	+	+	+	+	0	0	+	0✓



Case Study – PO

Blood Group System		Rh						MNSs				P	Lewis		Kell		Duffy		Kidd		Lutheran		Ficin/37	Ficin/IAT
		D	C	E	c	e	C ^w	M	N	S	s	P ₁	Le ^a	Le ^b	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Lu ^a	Lu ^b		
1	R ₁ R ₁	+	+	O	O	+	+	O	+	O	+	+	O	+	O	+	+	O	+	O	O	+	2+	3+
2	R ₁ R ₁	+	+	O	O	+	O	+	O	+	+	O	O	+	O	+	+	+	O	+	O	+	<i>O</i>	<i>O</i> ✓
3	R ₁ R ₁	+	+	O	O	+	O	+	+	+	O	O	+	O	+	+	O	+	+	+	O	+	<i>O</i>	<i>O</i> ✓
4	R ₂ R ₂	+	O	+	+	O	O	+	O	+	O	O	+	O	+	+	O	+	O	+	O	+	<i>O</i>	<i>O</i> ✓
5	R ₂ R ₂	+	O	+	+	O	O	+	O	O	+	+	O	+	O	+	+	+	+	+	O	+	4+	4+
6	r'r	O	+	O	+	+	O	O	+	+	O	O	O	+	O	+	+	O	+	O	O	+	<i>O</i>	<i>O</i> ✓
7	r''r	O	O	+	+	+	O	O	+	+	+	+	O	+	+	O	O	+	+	+	O	+	3+	4+
8	rr	O	O	O	+	+	O	+	+	O	+	O	O	+	O	+	+	+	+	+	O	+	<i>O</i>	<i>O</i> ✓
9	rr	O	O	O	+	+	O	O	+	O	+	O	O	+	O	+	O	+	O	+	O	+	<i>O</i>	<i>O</i> ✓
10	rr	O	O	O	+	+	O	+	+	+	+	O	+	+	O	+	+	+	+	O	O	+	<i>O</i>	<i>O</i> ✓
																				Auto		<i>O</i>	<i>O</i> ✓	



Case Study – PO

- Resolution:
 - A Positive
 - Anti-P1 at Ficin 37C/IAT and PEG/IAT



Case Study – SY

- Patient: 60 y/o female
- Diagnosis: Gastrointestinal bleeding
- Medications: Not available
- No record of patient at hospital

Case Study – SY

- ABO/Rh

Forward Typing		Rh Typing	Reverse Typing	
Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
0	4+	3+	4+	0

- Interpretation
 - B Positive



Case Study – SY

■ Antibody Screen

Blood Group System		Rh					Kell		Duffy		Kidd		Lewis		P	MNSs				Lutheran		IS	Gel IAT
		D	C	c	E	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	P ₁	M	N	S	s	Lu ^a	Lu ^b		
I	R1R1	+	+	0	0	+	0	+	0	+	+	+	0	+	+	+	0	+	+	0	+	0	2+
II	R2R2	+	0	+	+	0	0	+	+	+	+	0	+	0	0	+	+	0	+	0	+	0	1+
III	rr	0	0	+	0	+	+	+	+	0	0	+	0	+	0	0	+	+	0	0	+	0	3+
	Patient Cells																					0	0✓

■ Interpretation

■ Positive



Case Study – SY

Blood Group System		Rh					Kell		Duffy		Kidd		Lewis		P	MNSs				Lutheran		Gel IAT
		D	C	c	E	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	P ₁	M	N	S	s	Lu ^a	Lu ^b	
1	R1R1	+	+	0	0	+	+	+	+	0	+	+	0	+	+	0	+	0	+	0	+	1+
2	R1R1	+	+	0	0	+	+	+	+	+	+	+	0	+	+	+	0	0	+	+	0	w+
3	R2R2	+	0	+	+	0	0	+	0	+	0	+	0	+	+	+	0	+	+	0	+	2+
4	R2R2	+	0	+	+	0	0	+	+	0	+	0	+	0	+	+	+	+	+	0	+	3+
5	rr	0	0	+	0	+	0	+	+	+	0	+	+	0	+	0	+	0	+	0	+	w+
6	rr	0	0	+	0	+	0	+	+	0	+	+	0	+	+	0	+	0	+	+	+	1+

What testing should be performed to identify the reactivity?



Case Study – SY

- Phenotype
 - Autocontrol: Negative
 - No record of transfusion
 - Critical to watch for mixed field

C	c	E	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	M	N	S	s
+	+	0	+	0	+	0	+	+	+	0	+	0	+



Case Study – SY

- Patient is negative for **E**, **K**, **Fy^a**, **M**, and **S**
- Test two phenotypically similar cells
 - Reactive → High incidence antibody
 - Non-reactive → Multiple antibodies

Blood Group System		Rh					Kell		Duffy		Kidd		Lewis		P	MNSs				Lutheran		Gel IAT
		D	C	c	E	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	P	M	N	S	s	Lu ^a	Lu ^b	
1	R1R1	+	+	0	0	+	0	+	0	+	+	+	0	+	+	0	+	0	+	0	+	0✓
2	rr	0	0	+	0	+	0	+	0	+	+	0	+	0	0	0	+	0	+	+	+	0✓



Case Study – SY

Blood Group Systemr		Rh					Kell		Duffy		Kidd		Lewis		P	MNSs				Lutheran		GEL IAT
		D	C	c	E	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	P ₁	M	N	S	s	Lu ^a	Lu ^b	
1	R2R2	+	0	+	+	0	0	+	0	+	+	+	0	+	+	0	+	0	+	0	+	0✓
2	RzR2	+	w	+	+	0	0	+	0	+	+	0	0	0	+	0	+	0	+	0	+	0✓
3	rr	0	0	+	0	+	+	+	0	+	+	+	+	0	0	0	+	0	+	0	+	0✓
4	rr	0	0	+	0	+	+	+	0	+	0	+	0	+	+	0	+	0	+	0	+	0✓
5	rr	0	0	+	0	+	0	+	+	0	+	0	+	0	0	0	+	0	+	0	+	1+
6	rr	0	0	+	0	+	0	+	+	0	+	+	0	+	0	0	+	0	+	0	+	1+
7	rr	0	0	+	0	+	0	+	0	+	+	0	+	0	+	+	0	0	+	0	+	0✓
8	rr	0	0	+	0	+	0	+	0	0	0	+	+	0	+	+	0	0	+	0	+	0✓
9	rr	0	0	+	0	+	0	+	0	+	0	+	+	0	+	0	+	+	0	0	+	2+
10	rr	0	0	+	0	+	0	+	0	+	+	0	0	+	0	0	+	+	0	0	+	2+



Case Study – SY

- Conclusion
 - ABO/RH – B Positive
 - Antibody ID
 - Anti-Fy^a at PEG/IAT
 - Anti-S at PEG/IAT
 - Transfusion Recommendations
 - Transfuse B or O positive units negative for Fy^a and S antigens



Case Study – GI

- 56 year old female
- GI Bleed
- Current meds: None
- Transfusion History:
 - Transfused 2 days ago
- Blood Bank History
 - A positive

Case Study – GI

	Front Type		Rh	Reverse Type	
Interp.	Anti-A	Anti-B	Anti-D	A ₁ cells	B Cells
A Positive	4+	0	4+	0	4+

Blood Group System		Rh					MNSs					P1	Lewis		Kell		Duffy		Kidd		Lutheran		IS	PEG/IAT
		D	C	E	c	e	M	N	S	s	P1	Le ^a	Le ^b	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Lu ^a	Lu ^b			
1	R ₁ R ₁	+	+	0	0	+	+	+	0	+	+	0	+	+	+	0	+	0	+	0	+	0	0✓	
2	R ₂ R ₂	+	0	+	+	0	+	0	+	+	+	+	0	0	+	+	0	+	0	0	+	0	0✓	
																			Auto		0	3+		

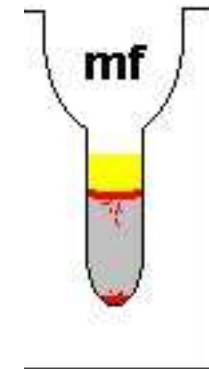
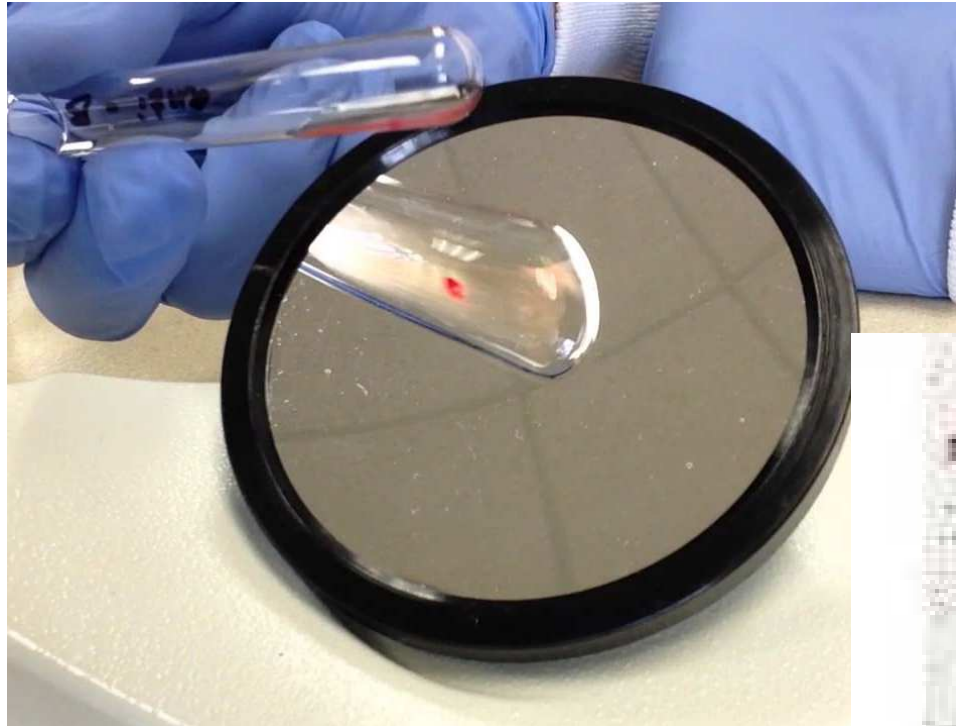


Case Study – GI

	Poly	IgG	C3d	Control
Positive IgG DAT	<i>2+mf</i>	<i>2+mf</i>	<i>0✓</i>	<i>0</i>



Case Study – GI



Mixed Field



Mixed Field Agglutination (Pre-transfusion)



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Elution Indications

- Investigation of a positive DAT result
 - Autoantibodies
 - Recently transfused patients
 - Hemolytic Disease of the Fetus and Newborn (HDFN)



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Case Study – GI

	Rh					MNSs				Lewis		P	Kell		Duffy		Kidd		Lutheran		Eluate/PEG/IAT	Last Wash
	D	C	E	c	e	M	N	S	s	Le^a	Le^b	P1	K	k	Fy ^a	Fy^b	Jk^a	Jk^b	Lu^a	Lu^b		
1	0	0	0	+	+	+	0	+	+	0	+	+	+	+	0	+	+	0	+	+	0✓	0✓
2	+	+	0	+	+	+	0	+	0	+	0	+	+	0	+	0	+	+	0	+	3+	0✓
3	+	+	0	0	+	+	+	0	+	+	0	+	0	+	+	0	0	+	0	+	3+	0✓
4	+	+	+	0	+	+	+	+	0	0	+	0	0	+	0	+	+	+	0	+	0✓	0✓
5	+	0	0	+	+	0	+	+	0	0	+	+	0	+	0	0	+	0	0	+	0✓	0✓
6	+	0	+	+	0	0	+	0	+	0	+	+	0	+	+	0	+	0	0	+	4+	0✓
7	+	+	0	0	+	+	+	0	+	0	+	0	0	+	0	+	0	+	0	+	0✓	0✓
8	+	w	+	+	0	0	+	0	+	+	0	+	0	+	0	+	+	0	0	+	0✓	0✓



Questions?



**Presentation
Finished.**

Any questions?



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References

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