

# Complex Serology

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**NHS**

Blood and Transplant

# The Tool kit



*Transfusion*  
STILL MATTERS



Group

	Rh	C	D	E	c	e	C <sup>+</sup>	P1	K	k	Le <sup>a</sup>	Le <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other
1	R <sub>1</sub> <sup>+</sup> R <sub>1</sub>	+	+	0	+	+	+	+	+	0	+	+	0	0	
2	R <sub>2</sub> R <sub>2</sub>	+	+	+	0	0	+	+	+	0	+	0	0	+	
3	rr	0	0	0	+	+	0	+	+	+	+	+	+	0	

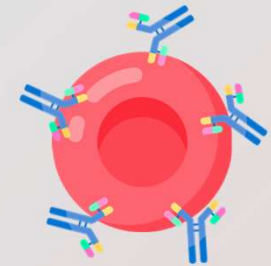
Screen



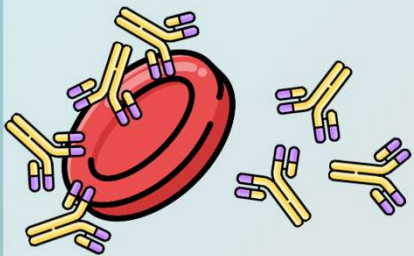
Panel (IAT, Enz IAT)  
(1, 2, R1R1, R2R2, DTT)



LISS tube



DAT



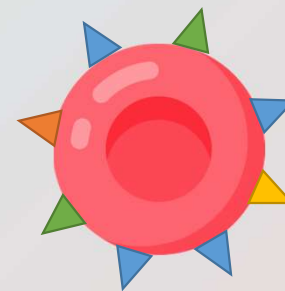
Adsorption  
Elution



Inhibition  
Neutralisation



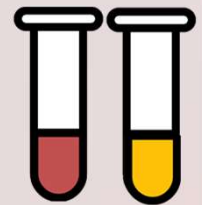
Rare cell



Phenotype



Genotyping



Donath  
Landsteiner

# Case 1

- 54 YO Female patient
  - O neg rr K neg
  - History of pregnancy and transfusion
  - 3 Cell screen positive



	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	En IAT
1	R <sub>1</sub> *R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		3	3
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		3	3
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	4	3
4	r'r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		3	3
5	r''r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		3	3
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		3	3
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		2	3
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	3	3
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		3	3
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0	Cob+	3	3
																	Auto	0	
																	Weak control	3	3

IgG	IgA	IgM	C3c	C3d	Cft
0	0	0	0	0	0

Group

Screen

Panel (IAT, En IAT)  
(1, 2, R1R1, R2R2, DTT)

LISS tube

DAT

Adsorption Elution

Inhibition Neutralisation

Rare cell

Phenotype

Genotyping

Donath Landsteiner

## What's next?

# Case 1

- 54 YO Female patient
  - O neg rr K neg
  - History of pregnancy and transfusion
  - Myeloma - Isatuximab



	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	En IAT
1	R <sub>1</sub> *R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		3	3
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		3	3
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	4	3
4	r'r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		3	3
5	r''r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		3	3
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		3	3
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		2	3
8	rr	+	0	0	+	0	0	0	+	+	0	+	0	0	0	+	Cob+	3	3
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		3	3
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0	Cob+	3	3
																	Auto	0	
																	Weak control	3	3

IgG	IgA	IgM	C3c	C3d	Cft
○	○	○	○	○	○

Group

Screen

Panel (IAT, En IAT)  
(1, 2, R1R1, R2R2, DTT)

LISS tube

DAT

Adsorption Elution

Inhibition Neutralisation

Rare cell

Phenotype

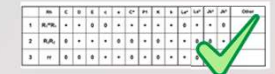
Genotyping

Donath Landsteiner

## What's next?

# Case 1

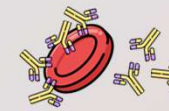
- 54 YO Female patient
  - O neg rr K neg
  - History of pregnancy and transfusion
  - Myeloma - Isatuximab



Panel (IA, Em, IAT)  
(1, 2, R1R1, R2R2, DTT)

LISS tube

DAT



Adsorption  
Elution

Inhibition  
Neutralisation

Rare cell



Phenotype

Genotyping

Donath  
Landsteiner

# Resolved?

	Rh	M	N	S	s	Pl	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	AI	Em IAT	DTT	Sn	BS	US	
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		3	3	0	0	0		
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		3	3	0	W	0		
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	4	3	0	0	W		
4	r'r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		3	3	0	0	0		
5	r'r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		3	3	0	0	0		
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		3	3	0	W	0		
7	rr	0	+	0	+	1	0	+	+	0	+	0	+	+	0	0		2	3	0	0	0		
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	3	3	0	W	0		
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		3	3	0	0	0		
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0	Cob+	3	3	0	0	W		
																	Auto	0						
																	Weak control	3	3	3	3	3		

IgG	IgA	IgM	C3c	C3d	Cft
○	○	○	○	○	○

# Case 2

- 32 YO Female patient with Sickle Cell Disorder
  - Patient presents with Crises
  - Partial exchange 6 days ago
  - Hb 43g/L, after exchange it was 80g/L



Group

ABO	A	B	AB	O	Anti-A	Anti-B	Anti-AB	Anti-O	Other
1	+	-	+	-	+	-	-	-	
2	-	+	-	-	-	+	-	-	
3	+	+	+	-	-	-	+	-	
4	-	-	-	+	-	-	-	+	

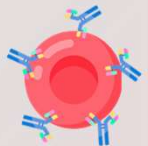
Screen



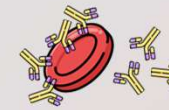
Panel (IAT, Enz IAT)  
(1, 2, R1R1, R2R2, DTT)



LISS tube



DAT



Adsorption  
Elution



Inhibition  
Neutralisation



Rare cell



Phenotype



Genotyping



Donath  
Landsteiner

# What's next?

# Case 2

- 32 YO Female patient with Sickle Cell Disorder
- Patient presents with Crises
  - Partial exchange 6 days ago
  - After exchange it was 80g/L; now = Hb 43g/L
  - O pos Ro K neg, Screen = panreactive



Group



Screen



Panel (IAT, Enz-IAT)  
(1, 2, R1R1, R2R2, DTT)



LISS tube



DAT



Adsorption  
Elution



Inhibition  
Neutralisation



Rare cell



Phenotype



Genotyping



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Landsteiner

	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	K	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	EnzIAT
1	R <sub>1</sub> ^wR <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		4	4
2	R <sub>1</sub> R <sub>2</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		4	4
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	4	4
4	r <sup>+</sup> r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		4	4
5	r <sup>+</sup> r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		4	4
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		4	4
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		4	4
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	4	4
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+	Cob+	4	4
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0	Cob+	4	4
																	Auto	2	
																	Weak control	3	3

IgG	IgA	IgM	C3c	C3d	Ctl
4	○	○	○	○	○

# What's next?

# Case 2

- 32 YO Female patient with Sickle Cell Disorder
- Patient presents with Crises
  - Partial exchange 6 days ago
  - After exchange it was 80g/L; now = Hb 43g/L
  - O pos Ro K neg, Screen = panreactive
  - Panel = Panreactive (IAT/Enz IAT)



Lot Number	Rh	C	D	E	c	e	C <sup>w</sup>	K	Jk <sup>a</sup>	Jk <sup>b</sup>
R405 3597	R <sub>1</sub> R <sub>1</sub>	+	+	0	0	+	0	0	+	0
	rr	0	0	0	+	+	0	+	0	+

Group

Screen

Panel (IAT, Enz IAT)  
(1, 2, R1R1, R2R2, DTT)

LISS tube

DAT

Adsorption/Elution

Inhibition/Neutralisation

Rare cell

Phenotype

Genotyping

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	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	Enz IAT	EluME	AA1	AA2
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		4	4	2	2	0
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		4	4	2	0	0
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	4	4	2	0	0
4	r'r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		4	4	2	2	0
5	r'r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		4	4	2	2	0
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		4	4	2	2	0
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		4	4	2	0	0
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	4	4	2	2	0
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		4	4	2	2	0
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	0	+	Cob+	4	4	2	0	0
																	Auto	2				
																	Weak control	3	3	3	3	

IgG	IgA	IgM	C3c	C3d	Ctl
4	0	0	0	0	0

## What's next?



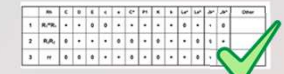
# Case 2

- 32 YO Female patient with Sickle Cell Disorder
- Patient presents with Crises
  - Partial exchange 6 days ago
  - After exchange it was 80g/L; now = Hb 43g/L
  - O pos Ro K neg, Screen = panreactive
  - Panel = Panreactive (IAT/Enz IAT); anti-Jkb adsorption

Cell	ID	ABO	C	D	E	c	e	Cw	M	N	S	s	PI	Lua	Lub	Lea	Leb	K	k	Kpa	Kpb	Fya	Fyb	Jka	Jkb	Rarity	Additional types	IAT
1	NZ2382	O	0	+	0	+	+	0	0	+	0	0	+	0	+	0	+	0	+	0	+	0	+	+	0	U		0
2	NZ2401	O	0	0	0	0	+	+	0	+	0	+	+	0	0	+	0	0	+	0	+	+	+	+	0	Lu(a-b-)*	AnWj - HLA+	4
3	NZ2385	O	0	+	+	+	+	0	+	+	0	+	+	0	+	0	+	0	+	0	+	0	+	0	+	Yta-	HLA+	4
4	NZ2036	O	0	+	+	+	0	0	+	0	0	+	+	0	+	0	+	0	+	+	0	+	+	+	+	Kpb-		4
5	NZ2378	O	0	0	0	0	+	+	0	+	0	0	+	0	+	0	+	+	0	+	+	0	+	+	+	Kna-	HLA+	4
6	NZ2402	O	+	+	0	+	+	0	+	0	+	+	+	0	+	0	+	0	+	0	+	0	+	0	+	Vel-		4
7	NZ2408	O	0	+	+	+	+	0	+	+	0	+	+	0	+	0	+	0	+	0	+	0	+	0	+	Jsb-		4
8	NZ2403	O	+	+	0	0	+	+	0	+	0	+	+	0	+	0	+	0	+	0	+	+	0	0	+	Co(a-b+)		4
9	NZ2311	O	+	+	0	+	+	0	+	+	+	+	+	0	+	0	+	0	+	0	+	+	0	0	+	Wra+	Vel+	4
10	NZ2363	O	0	0	0	0	+	+	0	+	0	0	0	0	+	0	0	0	+	0	+	0	+	+	0	Ch-		4
11	NZ2279	O	0	0	0	0	+	+	0	0	+	0	+	0	+	0	+	+	0	+	0	+	+	+	0	Rg-		4
12	NZ2314	O	0	0	+	+	+	+	0	+	0	0	+	+	0	+	0	0	+	0	+	+	+	-	+	Bombay		4
13	NZ2433	O	0	0	+	+	+	+	0	0	+	+	w	0	+	0	0	0	+	0	+	+	w	+	+	D+ cord \$		4
14	NZ2434	O	0	0	0	0	+	+	0	0	+	0	0	0	+	0	0	0	+	0	+	w	0	+	0	D- cord \$		4
15	NZ9999																								weak	control	3	



Group



Screen



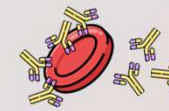
Panel (IAT, Enz IAT) (1, 2, R1R1, R2R2, DTT)



LISS tube



DAT



Adsorption Elution



Inhibition Neutralisation



Rare cell



Phenotype



Genotyping

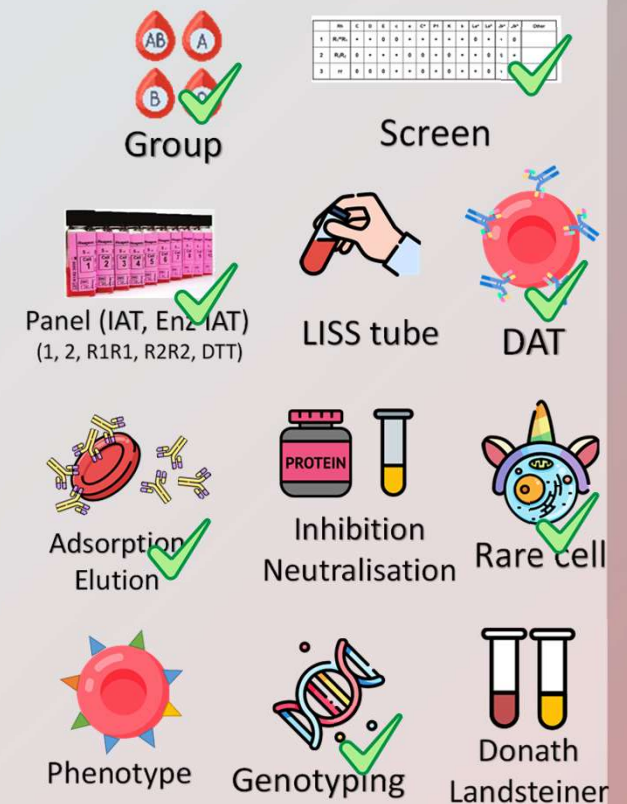


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What's next?

# Case 2

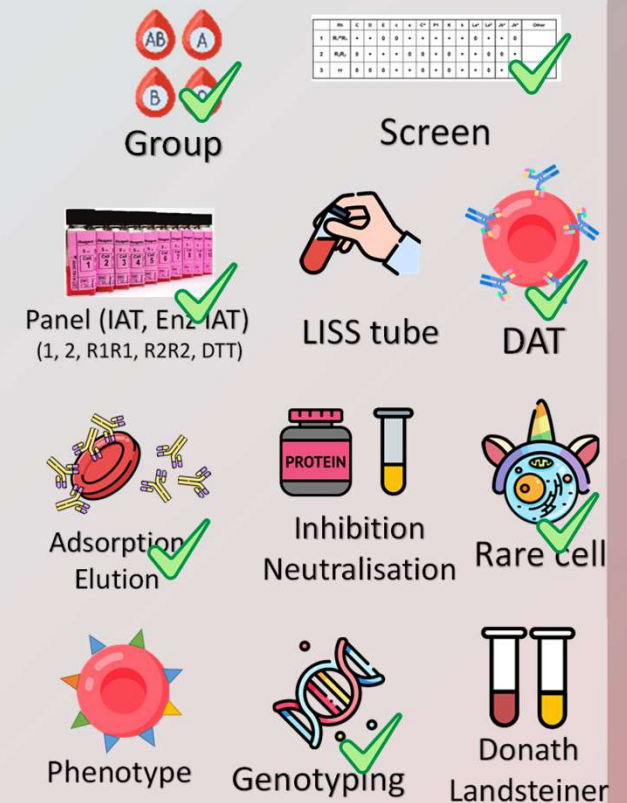
- 32 YO Female patient with Sickle Cell Disorder
- Patient presents with Crises
  - Partial exchange 6 days ago
  - After exchange it was 80g/L; now = Hb 43g/L
  - O pos Ro K neg, Screen = panreactive
  - Panel = panreactive (IAT/Enz IAT); anti-Jkb adsorption
  - Rare cell ?anti-U
- Patient RBC Genotype
  - *JK\*01* = Positive
  - *JK\*02* = Negative
  - *GYPB\*03* = Negative
  - *GYPB\*04* = Negative
- Predicted phenotype = ?



## What's next?

# Case 2

- 32 YO Female patient with Sickle Cell Disorder
- Patient presents with Crises
  - Partial exchange 6 days ago
  - After exchange it was 80g/L; now = Hb 43g/L
  - O pos Ro K neg, Screen = panreactive
  - Panel = panreactive (IAT/Enz IAT); anti-Jkb adsorption
  - Rare cell ?anti-U
- Patient RBC Genotype
  - *JK\*01* = Positive
  - *JK\*02* = Negative
  - *GYPB\*03* = Negative
  - *GYPB\*04* = Negative
- Predicted phenotype = Jk (a+, b-); S-, s-, U-

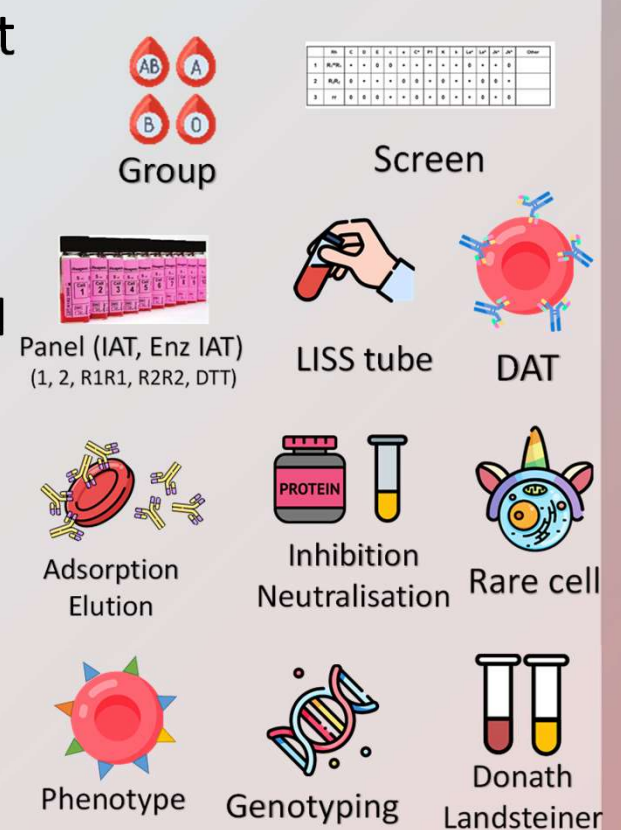


# Resolved?

# Case 3



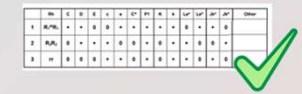
- 68 YO male patient; revision of total hip replacement
  - No underlying conditions
  - Group O pos, antibody screen neg, 2 units issued by EI
  - Halfway through 2<sup>nd</sup> = rigors, foreboding feeling of impending doom, haemoglobin urea; transfusion stopped and investigation undertaken
  - What tests should be performed?



What's next?

# Case 3

- 68 YO male patient; revision of total hip replacement
  - No underlying conditions
  - Group O pos, antibody screen neg, 2 units issued by EI
  - Halfway through 2<sup>nd</sup> = rigors, foreboding feeling of impending doom, haemoglobin urea; transfusion stopped and investigation undertaken
  - What tests should be performed?
- Pre and post samples
  - Group and screen; Panel (IAT and Enz IAT)
  - DAT; If positive – elution
  - XM against units



What's next?

# Case 3

- 68 YO male patient; revision of total hip replacement
  - No underlying conditions
  - Group O pos, antibody screen neg, 2 units issued by EI
  - Halfway through 2<sup>nd</sup> = rigors, foreboding feeling of impending doom, haemoglobin urea; transfusion stopped and investigation undertaken
  - Which is?????
- Pre and post samples
  - Group = O pos; Screen = negative; IAT and Enz IAT = negative



	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	Enz IAT	IAT	Enz IAT	Eluate
1	R1 <sup>+</sup> R1	0	+	0	+	0	0	0	+	0	+	0	+	0	+			0	0	0	0	0
2	R1 <sup>+</sup> R1	+	0	+	0	4	0	+	+	0	+	0	+	0	+			0	0	0	0	0
3	R2 <sup>+</sup> R2	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	0	0	0	0	0
4	r <sup>+</sup> r	0	+	0	+	0	0	0	+	0	0	+	+	0	+			0	0	0	0	0
5	r <sup>+</sup> r	+	0	+	0	0	0	0	+	0	0	+	+	0	0			0	0	0	0	0
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0			0	0	0	0	0
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	0			0	0	0	0	0
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0		Cob+	0	0	0	0	0
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0			0	0	0	0	0
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	0			0	0	0	0	0
																		Auto	0	0	0	0
																		Weak control	3	3	3	3
																			PRE	PRE	PRE	PRE

IgG	IgA	IgM	C3c	C3d	CHI
0/2	0/0	0/0	0/0	0/0	0

Pre 1	4
Pre 2	0
Post 1	4
Post 2	0

## What's next?

# Case 3

- 68 YO male patient; revision of total hip replacement
  - No underlying conditions
  - Group O pos, antibody screen neg, 2 units issued by EI
  - Halfway through 2<sup>nd</sup> = rigors, foreboding feeling of impending doom, haemoglobin urea; transfusion stopped and investigation undertaken
  - Which is?????
- Pre and post samples
  - Group = O pos; Screen = negative; IAT and Enz IAT = negative



	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	Enz IAT	IAT	Enz IAT	Eluate
1	R1 <sup>+</sup> R1	0	+	0	+	0	0	0	+	0	+	0	+	0	+	0		0	0	0	0	0
2	R1 <sup>+</sup> R1	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		0	0	0	0	0
3	R2 <sup>+</sup> R2	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Daa-b+	0	0	0	0	0
4	r <sup>+</sup> r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		0	0	0	0	0
5	r <sup>+</sup> r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		0	0	0	0	0
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		0	0	0	0	0
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		0	0	0	0	0
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	0	0	0	0	0
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		0	0	0	0	0
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0	Cob+	0	0	0	0	0
																	Auto	0	0	0	0	0
																	Weak control	3	3	3	3	3
																		PRE	PRE	PRE	PRE	PRE

Group

Screen

Panel (IAT, Enz IAT) (1, 2, R1R1, R2R2, DTT)

LISS tube

DAT

Adsorption/Elution

Inhibition/Neutralisation

Rare cell

Phenotype

Genotyping

Donath Landsteiner

IgG	IgA	IgM	C3c	C3d	CHI
0/2	0/0	0/0	0/0	0/0	0

Pre 1	4	Wp 4
Pre 2	0	Wp 4
Post 1	4	Wp 0
Post 2	0	Wp 0

# Resolved?

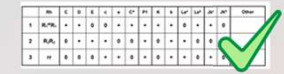
# Case 4



- 60 yo male patient with MDS
  - Attending for routine Tx – Hb = 54g/L
- Grouping normal, screen giving variable reactivity



Group



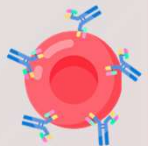
Screen



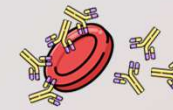
Panel (IAT, Enz IAT)  
(1, 2, R1R1, R2R2, DTT)



LISS tube



DAT



Adsorption  
Elution



Inhibition  
Neutralisation



Rare cell



Phenotype



Genotyping



Donath  
Landsteiner

# What's next?



# Case 4

- 60 yo male patient with MDS
  - Attending for routine Tx – Hb = 54g/L
- Group fine, screen giving variable reactivity



	Rh	M	N	S	s	Pf	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	Enz IAT
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		1	0
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		W	0
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	2	0
4	r'r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		1	0
5	r'r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		2	0
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		2	0
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		W	0
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	W	0
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		1	0
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0	Cob+	W	0
																	Auto	0	
																	Weak control	3	3

Group

Screen

Panel (IAT, Enz IAT) (1, 2, R1R1, R2R2, DTT)

LISS tube

DAT

Adsorption Elution

Inhibition Neutralisation

Rare cell

Phenotype

Genotyping

Donath Landsteiner

## What's next?

# Case 4

- 60 yo male patient with MDS
  - Attending for routine Tx – Hb = 54g/L
- Group fine, screen giving variable reactivity
- Not resolved with LISS and phenotype pos generally



	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	Enz IAT	LISS
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		1	0	1
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		2	0	2
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	2	0	1
4	r'r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		1	0	1
5	r'r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		2	0	2
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		2	0	1
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		2	0	2
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	2	0	0
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		1	0	1
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0	Cob+	2	0	2
																	Auto	0	0	
																	Weak control	3	3	
Patient		+	+	+	+			+	+				+	+	+	+				

Group

Screen

Panel (IAT, Enz IAT)  
(1, 2, R1R1, R2R2, DTT)

LISS tube

DAT

Adsorption Elution

Inhibition Neutralisation

Rare cell

Phenotype

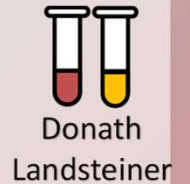
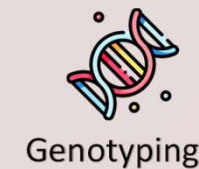
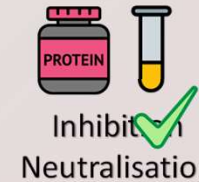
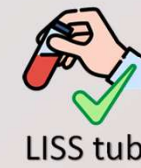
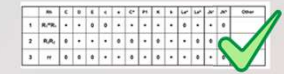
Genotyping

Donath Landsteiner

## What's next?

# Case 4

- 60 yo male patient with MDS
  - Attending for routine Tx – Hb = 54g/L
- Group fine, screen giving variable reactivity
- Reactivity resolved with AB serum inhibition
- What is the antibody?



	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	Enz IAT	LISS	ABR <sub>1/2</sub>	PBS
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		1	0	1	0	1
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		2	0	2	0	2
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	2	0	1	0	2
4	r'r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		1	0	1	0	1
5	r'r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		2	0	2	0	1
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		2	0	1	0	2
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		2	0	2	0	2
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	2	0	0	0	2
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		1	0	1	0	1
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0	Cob+	2	0	2	0	2
																	Auto	0	0			
																	Weak control	3	3			
	Paraset	+	+	+	+			+	+				+	+	+	+						

Resolved?

# Case 4

- 60 yo male patient with MDS
  - Attending for routine Tx – Hb = 54g/L
- Group fine, screen giving variable reactivity
- Reactivity resolved with AB serum inhibition
- What is the antibody = anti-Ch/Rg



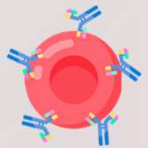
Screen



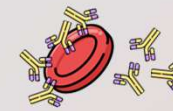
Panel (IAT, Enz IAT)  
(1, 2, R1R1, R2R2, DTT)



LISS tube



DAT



Adsorption  
Elution



Inhibition  
Neutralisation



Rare cell



Phenotype



Genotyping



Donath  
Landsteiner

	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	Enz IAT	LISS	ABR <sub>1/2</sub>	PBS
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		1	0	1	0	1
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		2	0	2	0	2
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	2	0	1	0	2
4	r <sup>h</sup> r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		1	0	1	0	1
5	r <sup>h</sup> r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		2	0	2	0	1
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		2	0	1	0	2
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		2	0	2	0	2
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	2	0	0	0	2
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		1	0	1	0	1
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0	Cob+	2	0	2	0	2
																	Auto	0	0			
																	Weak control	3	3			
Partner	+	+	+	+				+	+				+	+	+	+						

# Resolved?

# Case 5

- 4 YO presents with palor, anaemia, temperature following a history recurrent infection
- Hb = 55g/L
- O pos (R1R1 K neg);
- No history of Tx, medications or bleeding



	Rh	C	D	E	c	e	C <sup>w</sup>	M	N	S	s	P1	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other
1	R <sub>1</sub> <sup>w</sup> R <sub>1</sub>	+	+	0	0	+	+	+	0	+	+	+	+	+	0	0	+	+	0	0	+	○
2	R <sub>2</sub> R <sub>2</sub>	0	+	+	+	0	0	+	+	0	+	+	0	+	+	0	+	0	+	+	0	○
3	rr	0	0	0	+	+	0	+	0	+	0	+	0	+	0	0	0	+	+	0	0	○

What's next?

# Case 5

- 4 yo presents with palor, anaemia, temperature following a history recurrent infection (cold like virus).
- Hb = 55g/L
- O pos (R1R1 K neg); AB screen neg
- No history of Tx, medications or bleeding



IgG	IgA	IgM	C3c	C3d	Ctl
W11	0	0	0	0	0

	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	Inact
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		0
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		0
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	0
4	r'r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		0
5	r'r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		0
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		0
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		0
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	0
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		0
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0		0
																		Auto
																		Weak control
																		3

The diagram illustrates a transfusion testing workflow with the following steps and icons:

- Group:** Blood typing for AB, A, B, and O, marked with a green checkmark.
- Screen:** A grid representing antibody screening, also marked with a green checkmark.
- Panel (IAT, Enz IAT) (1, 2, R1R1, R2R2, DTT):** A rack of test tubes.
- LISS tube:** A hand holding a test tube.
- DAT:** A red blood cell with antibodies attached, marked with a green checkmark.
- Adsorption Elution:** A red blood cell with antibodies being treated, marked with a green checkmark.
- Inhibition Neutralisation:** A vial labeled 'PROTEIN' and a test tube.
- Rare cell:** A cell with a GFP marker.
- Phenotype:** A red blood cell with a starburst pattern.
- Genotyping:** A DNA double helix structure.
- Donath Landsteiner:** Two test tubes containing red and yellow liquids.

What's next?

# Case 5

- 4 yo presents with palor, anaemia, temperature following a history recurrent infection (cold like virus).
- Hb = 55g/L
- O pos (R1R1 K neg); AB screen neg
- No history of Tx, medications or bleeding
- Donath Landsteiner investigation
- What are the sampling requirements?

Transfusion  
STILL MATTERS



Group



Screen



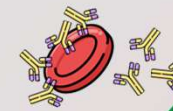
Panel (IAT, Enz IAT)  
(1, 2, R1R1, R2R2, DTT)



LISS tube



DAT



Adsorption  
Elution



Inhibition  
Neutralisation



Rare cell



Phenotype



Genotyping



Don't  
Landsteiner

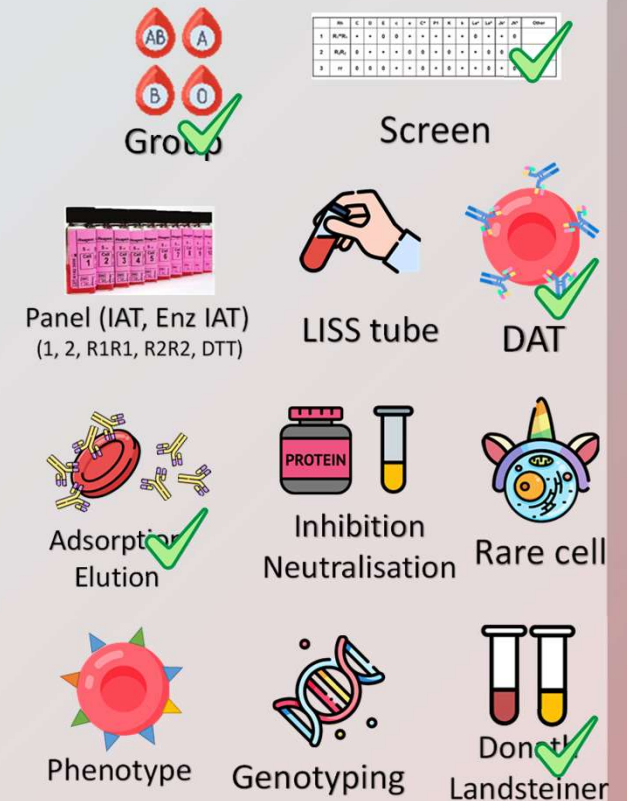
What's next?

# Case 5

- 4 yo presents with palor, anaemia, temperature following a history recurrent infection (cold like virus).



- Hb = 55g/L
- O pos (R1R1 K neg); AB screen neg
- No history of Tx, medications or bleeding
- Donath Landsteiner investigation
- Sampling requirements – Serum sample kept and warm separated
- How do you perform the test?



What's next?

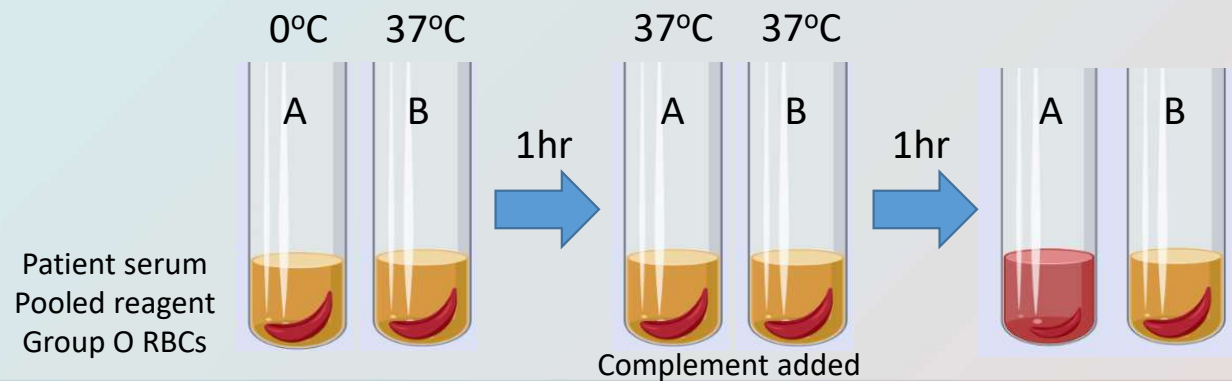
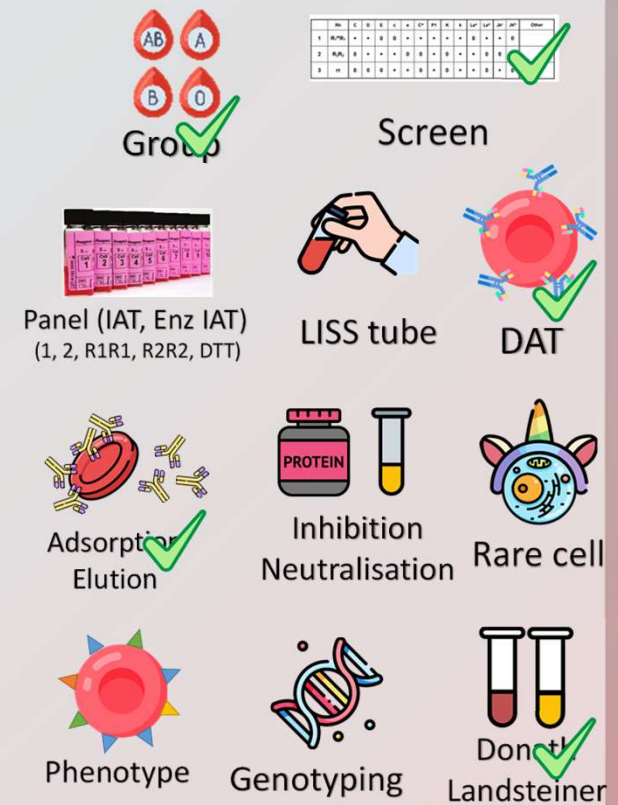


# Case 5

• 4 yo presents with palor, anaemia, temperature following a history recurrent infection (cold like virus).



- Hb = 55g/L
- O pos (R1R1 K neg); AB screen neg
- No history of Tx, medications or bleeding
- Donath Landsteiner investigation
- Sampling requirements – Serum sample kept and warm separated
- How do you perform the test?



What's next?

# Case 5

• 4 yo presents with palor, anaemia, temperature following a history recurrent infection (cold like virus).

- Hb = 55g/L
- O pos (R1R1 K neg); AB screen neg
- No history of Tx, medications or bleeding
- Donath Landsteiner investigation
- Sampling requirements – Serum sample, warm separated
- How do you perform the test:

Transfusion  
STILL MATTERS



Group ✓

AB	A	B	O	Screen	✓
+	+	+	+	+	+
+	+	+	+	+	+
+	+	+	+	+	+

Screen



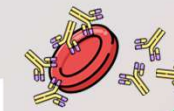
Panel (IAT, Enz IAT)  
(1, 2, R1R1, R2R2, DTT)



LISS tube



DAT ✓



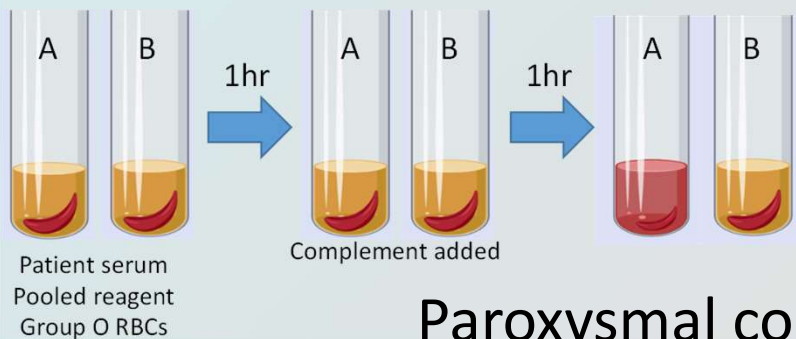
Adsorption  
Elution ✓



Inhibition  
Neutralisation



Rare cell



Donath Landsteiner Test				
	Pooled		Paparised	
	0°	37°	0°	37°
Haemolysis?	Yes	No	Yes	No

Paroxysmal cold haemoglobinuria



Phenotype



Genotyping



Don't  
Landsteiner ✓

Resolved?

# Case 6

- 32 YO female patient – recently delivered had has experienced PPH
  - A pos – It was her 3rd pregnancy and there were no previous problems in pregnancy,
  - AB screen neg previously, but now positive



	Rh	C	D	E	c	e	C <sup>w</sup>	M	N	S	s	P1	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other
1	R <sub>1</sub> <sup>w</sup> R <sub>1</sub>	+	+	0	0	+	+	+	0	+	+	+	+	+	0	0	+	+	0	0	+	0
2	R <sub>2</sub> R <sub>2</sub>	0	+	+	+	0	0	+	+	0	+	+	0	+	+	0	+	0	+	+	0	0
3	rr	0	0	0	+	+	0	+	0	+	0	+	0	+	0	+	0	0	+	+	0	3+

	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	Co-IAT
1	R <sub>1</sub> <sup>w</sup> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		0	0
2	R <sub>2</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		0	0
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	0	0
4	r <sup>w</sup> r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		3	5
5	r <sup>w</sup> r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		3	5
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		4	5
7	rr	0	+	0	+	1	0	+	+	0	+	0	+	+	0	+		4	5
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	4	5
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		4	5
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0		4	5
																		Auto	0
																		Weak control	3

Group

Screen

Panel (IAT, En IAT)  
(1, 2, R1R1, R2R2, DTT)

LISS tube

DAT

Adsorption Elution

Inhibition Neutralisation

Rare cell

Phenotype

Genotyping

Donath Landsteiner

What's next?

# Case 6

- 32 YO female patient
  - Recently delivered had has experienced PPH
  - A pos – It was her 3rd pregnancy and there were no previous problems in pregnancy,
  - AB screen neg previously, but now positive



	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	Co-IAT
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		0	0
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		0	0
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	0	0
4	r <sup>r</sup>	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		3	5
5	r <sup>r</sup>	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		3	5
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		4	5
7	rr	0	+	0	+	1	0	+	+	0	+	0	+	+	0	0		4	5
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	4	5
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		4	5
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0	Cob+	4	5

	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT
1	R1wR1	0	+	0	+	3	0	0	+	0	0	+	0	+	0	+	HLA+	0
2	R1wR1	+	0	+	0	0	0	0	+	0	0	+	+	0	+	0		0
3	R1RZ	+	+	0	+	0	0	0	+	0	0	+	+	0	0	+		0
4	RZr <sup>a</sup>	+	+	0	+	0	0	0	+	0	+	0	0	+	+	0		0
5	Ror	0	+	0	+	3	0	0	+	0	0	+	0	0	+	0		4
6	R1R1	+	+	0	+	0	0	+	0	0	0	+	+	0	0	+		0
7	R1R1	+	0	+	0	0	0	+	+	0	0	0	0	w	+	0		0
8	R1r <sup>a</sup>	0	+	0	+	2	0	0	+	+	0	0	0	+	0	+	HLA+ Bga+	0
9	R1R1	+	0	+	+	3	+	0	+	0	0	+	w	0	0	+		0
10	R1R1	0	+	+	0	1	0	0	+	0	0	+	w	0	0	+		0

Rh and K type = R1R2 K neg – What would you transfuse?

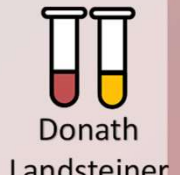
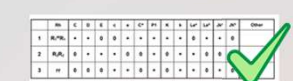
# What's next?

# Case 7



- Case 7
- 77 YO male patient man with CLL –
  - Regularly transfused every 2 weeks
  - B pos; antibody screen positive

	Rh	M	N	S	s	Pf	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	EnIAT	
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		3	3	
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		3	3	
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	3	3	
4	r'r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		3	3	
5	r'r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		3	3	
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		3	3	
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		3	3	
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	3	3	
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		3	3	
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0		3	3	
																		Auto	4	
																		Weak control	3	3



What's next?

# Case 7



- Case 7
- 77 YO male patient man with CLL –
  - Regularly transfused every 2 weeks
  - B pos; antibody screen positive

	Rh	M	N	S	s	Pf	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Le <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	EnIAT	
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		3	3	
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		3	3	
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	3	3	
4	r'r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		3	3	
5	r'r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		3	3	
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		3	3	
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		3	3	
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	3	3	
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		3	3	
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	+	0		3	3	
																		Auto	4	
																		Weak control	3	3

R1r, K neg

IgG	IgA	IgM	C3c	C3d	Cti
4	0	1	0	3	0

# What's next?

# Case 7

- 77 YO male patient man with CLL –
  - Regularly transfused every 2 weeks
  - B pos R1r K neg; antibody screen positive
  - Eluate is Pan-reactive – 3+, normal result for the patient



Lot Number	Rh	C	D	E	c	e	C <sup>w</sup>	K	Jk <sup>a</sup>	Jk <sup>b</sup>
R405 3597	R <sub>1</sub> R <sub>1</sub>	+	+	0	0	+	0	0	+	0
	rr	0	0	0	+	+	0	+	0	+

	Rh	M	N	S	s	P1	Lu <sup>a</sup>	K	k	Kp <sup>a</sup>	Lo <sup>a</sup>	Le <sup>b</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>a</sup>	Jk <sup>b</sup>	Other	IAT	EnIAT	AA1	AA2
1	R <sub>1</sub> R <sub>1</sub>	0	+	0	+	0	0	0	+	0	+	0	0	+	0	+		3	3	2	0
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	4	0	+	+	0	+	0	+	0	+	0		3	3	2	2
3	R <sub>2</sub> R <sub>2</sub>	0	+	0	+	3	0	0	+	0	0	+	0	+	+	0	HLA+ Doa-b+	3	3	0	0
4	r <sup>1</sup> r	0	+	0	+	0	0	0	+	0	0	+	+	0	+	+		3	3	2	1
5	r <sup>2</sup> r	+	0	+	0	0	0	0	+	0	0	+	+	0	0	+		3	3	3	2
6	rr	+	0	0	+	2	0	+	0	0	0	+	0	+	0	+		3	3	2	1
7	rr	0	+	0	+	1	0	+	+	0	+	0	0	+	+	0		3	3	0	0
8	rr	+	0	0	+	0	0	0	+	+	0	+	+	0	0	+	Cob+	3	3	3	2
9	rr	0	+	+	0	4	0	0	+	0	0	+	0	+	0	+		3	3	1	0
10	rr	+	0	0	+	4	+	0	+	0	0	+	+	0	0	+	Cob+	3	3	2	2
																	Auto	4			
																	Weak control	3	3	3	

IgG	IgA	IgM	C3c	C3d	Cti
4	0	1	0	3	0

Group

Screen

Panel (IAT, EnIAT)  
(1, 2, R1R1, R2R2, DTT)

LISS tube

DAT

Adsorption Elution

Inhibition Neutralisation

Rare cell

Phenotype

Genotyping

Donath Landsteiner

## What's next?

# Case 7

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Lot Number	Rh	C	D	E	c	e	C <sup>w</sup>	K	Jk <sup>a</sup>	Jk <sup>b</sup>
R405 3597	R <sub>1</sub> R <sub>1</sub>	+	+	0	0	+	0	0	+	0
	rr	0	0	0	+	+	0	+	0	+

Group

Screen

Panel (IAT, Elu IAT)  
(1, 2, R1R1, R2R2, DTT)

LISS tube

DAT

Adsorption Elution

Inhibition Neutralisation

Rare cell

Phenotype

Genotyping

Donath Landsteiner

	Rh	M	N	P1	Lu <sup>a</sup>	Kp <sup>a</sup>	Fy <sup>a</sup>	Fy <sup>b</sup>	Jk <sup>b</sup>	Other	IAT	Elu IAT	AA1	AA2
1	R <sub>1</sub> R <sub>1</sub>	0	0	0	0	0	0	0	+		3	3	2	0
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	+	+	0	0		3	3	2	2
3	R <sub>2</sub> R <sub>2</sub>	0	0	0	0	0	0	+	0	HLA+ Dca-b+	3	3	0	0
4	r'r	0	+	0	0	0	+	+	+		3	3	2	1
5	r'r	+	0	+	0	0	+	+	0		3	3	3	2
6	rr	+	0	+	2	0	0	+	0		3	3	2	1
7	rr	0	+	+	1	0	+	0	0		3	3	0	0
8	rr	+	0	+	0	0	+	+	0	Cob+	3	3	3	2
9	rr	0	+	0	4	0	0	+	0		3	3	1	0
10	rr	+	0	+	4	+	0	+	0	Cob+	3	3	2	2
										Auto	4			
										Weak control	3	3	3	

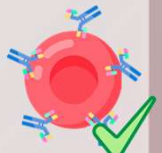
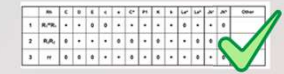
IgG	IgA	IgM	C3c	C3d	Cti
4	0	1	0	3	0

## What's next?



# Case 7

- 77 YO male patient man with CLL –
  - Regularly transfused every 2 weeks
  - B pos R1r K neg; antibody screen positive
  - Eluate is Pan-reactive – 3+, normal result for the patient
  - Anti-Jka; ?anti-M; ?anti-Fya
  - Genotype
    - GYPA\*01/GYPA\*02 = Negative/Positive
    - FY\*01/FY\*02 = Negative/Positive
    - JK\*01/JK\*02 = Negative/Positive



Panel (IAT, En IAT)  
(1, 2, R1R1, R2R2, DTT)

LISS tube

DAT



Adsorption  
Elution

Inhibition  
Neutralisation

Rare cell



Phenotype

Genotyping

Donath  
Landsteiner

# Resolved?

	Rh	M	N	P1	Lu*	Kp*	Fyp	Jkb	Other	IAT	EnIAT	AA1	AA2
1	R <sub>1</sub> R <sub>1</sub>	0	0	0	0	0	0	+		3	3	2	0
2	R <sub>1</sub> R <sub>1</sub>	+	0	+	0	+	+	0		3	3	2	2
3	R <sub>2</sub> R <sub>2</sub>	0	0	0	0	0	0	0	HLA+ Dca-b+	3	3	0	0
4	r'r	0	+	0	0	0	+	+		3	3	2	1
5	r'r	+	0	+	0	0	+	0		3	3	3	2
6	rr	+	0	+	2	0	0	+		3	3	2	1
7	rr	0	+	+	1	0	+	0		3	3	0	0
8	rr	+	0	+	0	0	+	+	Cob+	3	3	3	2
9	rr	0	+	0	4	0	0	+		3	3	1	0
10	rr	+	0	+	4	+	0	0	Cob+	3	3	2	2
									Auto	4			
									Weak control	3	3	3	

IgG	IgA	IgM	C3c	C3d	Cti
4	0	1	0	3	0

# Complex Serology

Matt Hazell – Senior Clinical Scientist (HSST)  
Red Cell Immunohaematology NHSBT



@MattHazellRCI



**NHS**

Blood and Transplant