Identification of the multiple combinations of antibodies to red blood cells

1sth TRANSFUSION SCIENTIFIC SEMINAR IN VILNIUS

16th OCTOBER 2025

National Reference Laboratory of immunohematology

NRL of immunohematology is part of Institute of Haematology and Blood Bank in Prague

Internal samples (patients of hematologic disorders)

External samples (complicated samples from the Czech rep. and Slovakia)

The basic testing for detection the antibodies to red blood cells

Cold antibodies (4°C and room temperature)

Warm antibodies (3-cells or 4-cells screening tests)

- Gel column agglutination tests (Bio-Rad, Grifols)
- Capture „Solid phase“ (Immucor/Werfen)

DAT

Autocontrol

Additional examination

Tube test

Identification of the antibodies to RBC

Bio-Rad panel (0,8% ID-DiaPanel 11 and ID-DiaPanel P 11)

Grifols panel (0,8% IDENTISER

Capture (Capture-R ID, Captur

Immucor Panocell 16 and Pano

Makropanel 16 (Sanquin) (2-4

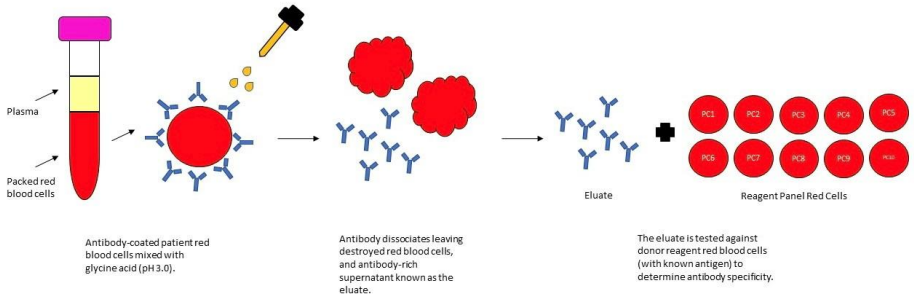
Custom panel

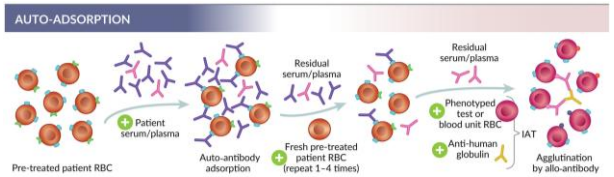
ioupe	C	c_	Cw	D	E	e_	P	M	N	S	s_	Lua	Lub	Lea	Leb	K	k_	Kpa	Kpb	Fya	Fyb	Jka	Jkb
4	-	+	-	-	-	+	+	+	-	+	+	-	+	-	+	-	+	-	+	+	+	-	+
5	-	+	-	-	-	+	+	+	+	-	+	-	+	-	+	+	+	-	+	+	+	-	+
10	-	+	-	-	-	+	-	+	-	-	+	-	+	+	-	-	+	-	+	-	+	-	+
23	+	-	+	+	-	+	+	+	+	-	+	-	+	-	+	-	+	-	+	-	+	+	+
25	+	+	-	-	-	+	+	+	-	+	+	-	+	-	+	-	+	-	+	-	+	-	+
30	+	+	-	Dw1	-	+	+	+	+	+	+	-	+	+	-	-	+	-	+	+	+	-	+
57	+	-	-	+	-	+	-	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
63	-	+	-	-	-	+	-	+	+	-	+	-	+	-	+	-	+	-	+	+	-	+	-
121	-	+	-	-	-	+	+	-	+	-	+	+	+	-	+	+	+	-	+	-	+	+	+
92	-	+	-	+	+	-	+	+	+	+	+	-	+	+	-	+	+	-	+	-	+	+	+
102	-	+	-	-	+	+	+	+	+	-	+	-	+	-	-	-	+	-	+	+	-	-	+
109	-	+	-	+	-	+	-	+	-	+	+	-	+	-	+	-	+	+	+	-	+	+	+
148	+	+	-	+	-	+	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	+	-
153	+	-	-	+	-	+	+	+	-	+	-	-	+	-	+	-	+	-	+	+	-	+	-

	C	c_	Cw	D	E	e_	P	M	N	S	s_	Lua	Lub	Lea	Leb	K	k_	Kpa	Kpb	Fya	Fyb	Jka	Jkb
23	+	-	+	+	-	+	+	+	+	-	+	-	+	-	-	-	+	-	+	-	+	+	+
92	-	+	-	+	+	-	+	+	+	+	+	-	+	+	-	+	+	-	+	-	+	+	+
5	-	+	-	-	-	+	+	+	+	-	+	-	+	-	+	+	+	-	+	+	+	-	+
10	-	+	-	-	-	+	-	+	-	-	+	-	+	+	-	-	+	-	+	-	+	-	+
121	-	+	-	-	-	+	+	-	+	-	+	+	+	-	+	+	+	-	+	-	+	+	+
153	+	-	-	+	-	+	+	+	-	+	-	-	+	-	+	-	+	-	+	+	-	+	-

Special immunohematological assays

- Antibody characteristics
- Neutralization
- Adsorption – alloadsorption and autoadsorption
- Elution acid





1st case study

Combination of alloantibodies 7/2025

Patient: Female

Diagnosis: Dyspnoe, Anaemia

Blood Group: A RhD positive

Multitransfused patient

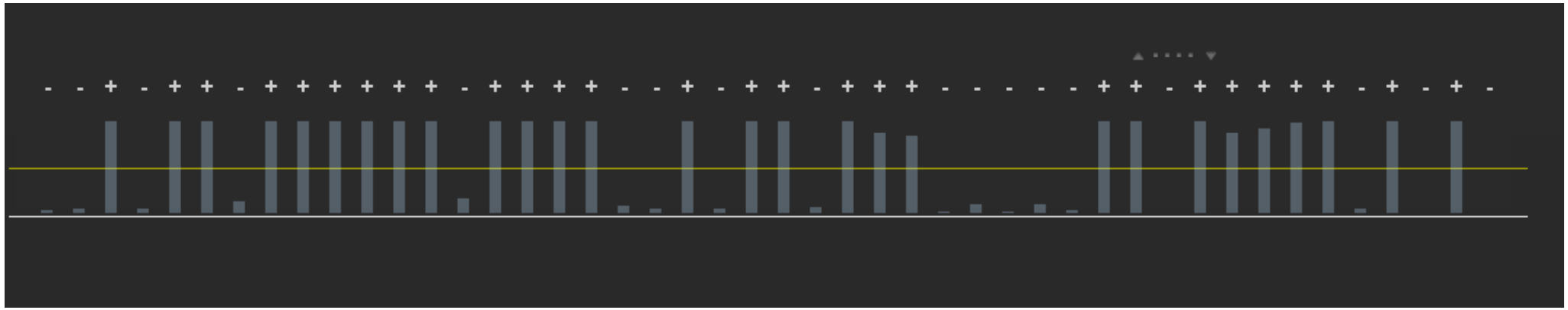
Serology typing of antigens: double population

Predicted genotype

Results

RHD	Exon03	Exon10	Exon5	psi
RHCE	C	c	e	E W
Kell	KEL2(k)			KEL1(K)
Kidd	JK1(A)	JK2(B)		
Duffy	FY1(A)			FY2(B) FYX FYnull
MN	MNS1(M)	MNS2(N)		
Ss	MNS4(s)			MNS3(S) U+var(NY) U+var(P2)
Dombrock	DO1(A)	DO2(B)		

D	C	c	E	e	Cw	K	k	Fya	Fyb	Jka	Jkb	M	N	S	s	Doa	Dob
+	+	+	-	+	-	-	+	+	-	+	+	+	+	-	+	+	+



Basic screening test

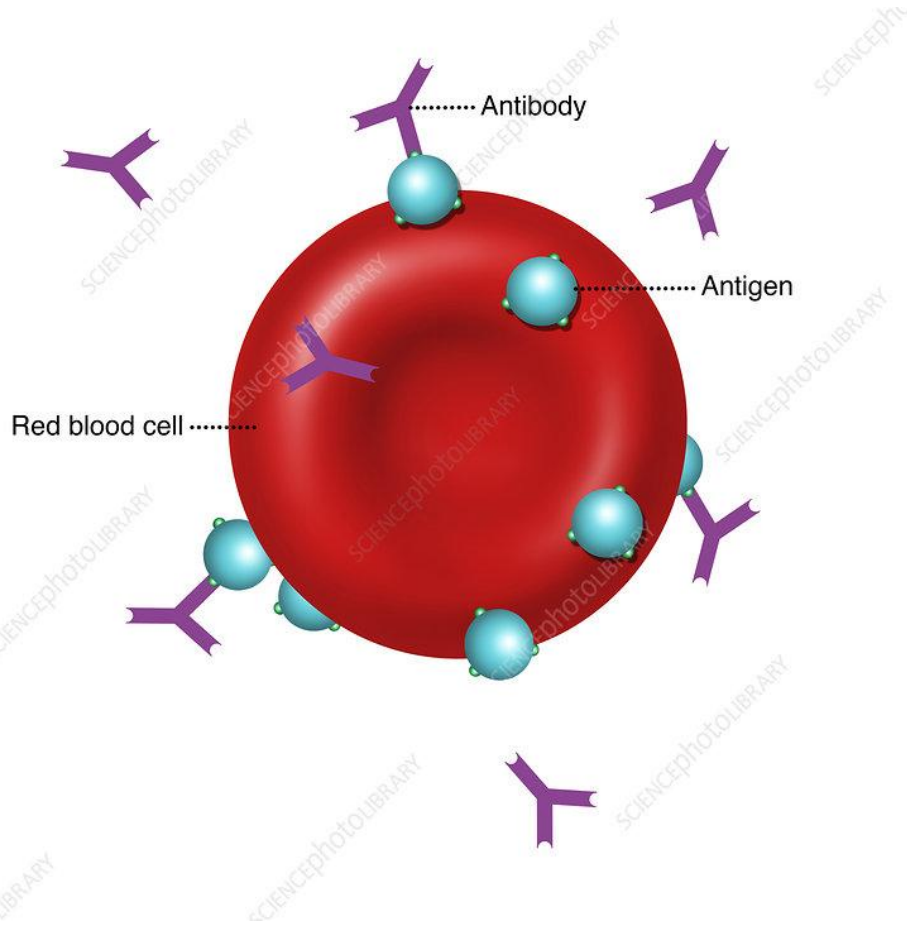
Cold antibody screen	
Diana 1 cell	Negative
Diana 2 cell	Negative
Autocontrol	Negative
Cord blood	Negative

Direct antiglobulin test	+
Anti-IgG	Weak +
Anti-IgA	neg
Anti-IgG	neg
Anti-C3c	neg
Anti-C3d	neg
Control	neg

Indirect antiglobulin test 37°C			
Diana 4	Papain	Bromelin	NAT
I Fy^{ab}	negative		++
II Fy^{bb} SS	negative		++
III Fy^{ab} Kk	+		++
IV Fy^{aa} Ss	negative		negative
Autocontrol		negative	+

Possible alloantibodies

- anti-E
- anti-K
- anti-Cw
- anti-Fy^{b}
- anti-S



Identification Panel 11 Identisera Diana

Rh		Rh-hr						Kell				Duffy		Kidd		Lewis		P	MNS				Luth.	Colt.	Xg	SPECIAL TYPE		RESULT	
		D	C	E	c	e	C^w	K	k	Kp^a	Js^a	Fy^a	Fy^b	Jk^a	Jk^b	Le^a	Le^b	P_1	M	N	S	s	Lu^a	Co^b	Xg^a			NAT	37°
CCDee	R_1R_1	+	+	0	0	+	0	+	+	0	nt	+	+	0	+	0	0	0	+	0	+	+	0	0	+		1	++	++
Ccddee	r'r	0	+	0	+	+	0	0	+	0	nt	0	+	+	+	0	+	+	0	+	0	+	0	0	0		2	++	−
ccDee	R0r	+	0	0	+	+	0	0	+	0	nt	+	0	+	0	0	+	0	+	0	0	+	0	0	+		3	(+)	−
ccddEe	r''r	0	0	+	+	+	0	0	+	0	nt	+	+	+	0	+	0	0	+	0	0	+	0	+	+		4	++	−
ccDEE	R_2R_2	+	0	+	+	0	0	0	+	0	0	+	0	0	+	0	+	+	0	+	+	+	0	0	+		5	+	−
C^wCDee	$R_1{}^wR_1$	+	+	0	0	+	+	0	+	0	nt	+	0	+	0	0	+	+	+	0	0	+	0	0	0		6	(+)	−
ccddee	rr	0	0	0	+	+	0	+	+	0	nt	+	0	+	+	0	+	+	0	+	0	+	0	0	+		7	++	++
ccddee	rr	0	0	0	+	+	0	0	+	+	nt	0	+	+	0	0	0	+	0	+	0	+	0	0	0		8	++	−
ccddee	rr	0	0	0	+	+	0	0	+	0	nt	0	+	0	+	0	+	+	+	0	+	0	+	0	+		9	++	−
ccddee	rr	0	0	0	+	+	0	0	+	0	nt	+	0	0	+	+	0	0	+	0	+	0	0	0	+	Yt(b+)	10	(+)	−
CCDee	R_1R_1	+	+	0	0	+	0	0	+	0	nt	0	+	+	0	0	+	+	+	+	+	0	0	0	+		11	++	−

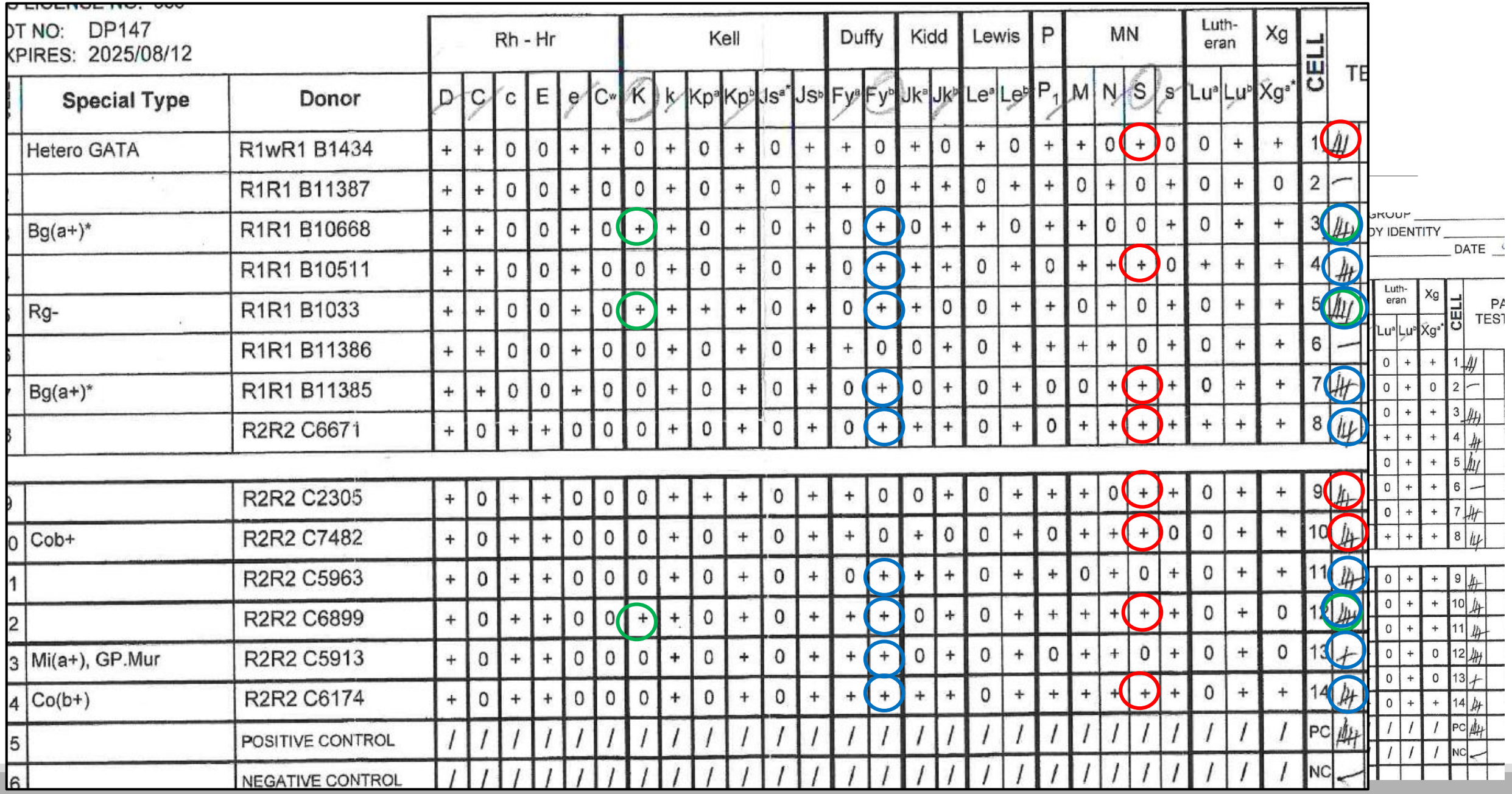
1. Ca

Results - Ready ID

Sample ID	Interp
Sibova	Comp

Sample ID	Interp
Sibova	Comp

Donor	Rh - Hr						Kell						Duffy		Kidd		Lewis		P	MN				Luth-eran		Xg	CELL	TE
	D	C	c	E	e	C^w	K	k	Kp^a	Kp^b	Js^{a*}	Js^b	Fy^a	Fy^b	Jk^a	Jk^b	Le^a	Le^b	P_1	M	N	S	s	Lu^a	Lu^b	Xg^{a*}		
RzR1 A4194	+	+	0	+	+	0	0	+	0	+	0	+	0	+	+	+	0	+	+	+	0	+	+	0	+	0	1	
R1wR1 B7828	+	+	0	0	+	+	0	+	0	+	0	+	+	+	+	+	0	+	+	+	+	0	+	0	+	+	2	
R2R2 C7333	+	0	+	+	0	0	+	+	0	+	0	+	+	+	+	+	0	+	+	+	0	0	+	+	+	+	3	
Ror D2052	+	0	+	0	+	0	0	+	0	+	0	+	0	0	+	0	0	0	+	0	+	0	+	0	+	+	4	—
r'r E646	0	+	+	0	+	0	+	+	0	+	0	+	0	+	0	+	0	0	+	+	+	+	0	0	+	+	5	
r"r F1038	0	0	+	+	+	0	0	+	0	+	0	+	+	+	+	0	+	0	0	+	+	+	+	0	+	+	6	
rr N4573	0	0	+	0	+	0	0	+	+	+	0	+	+	+	+	0	0	+	+	+	+	+	+	0	+	+	7	
rr G1673	0	0	+	0	+	0	+	+	0	+	0	+	0	+	+	0	0	+	0	+	+	0	+	0	+	0	8	
rr H2183	0	0	+	0	+	0	0	+	0	+	0	+	+	0	0	+	0	+	+	0	+	0	+	0	+	0	9	—
rr H2116	0	0	+	0	+	0	0	+	0	+	0	+	+	0	0	+	0	+	+	0	+	0	+	0	+	+	10	—
rr G1614	0	0	+	0	+	0	+	+	0	+	0	+	+	+	0	+	+	0	+	+	+	0	+	+	0	+	11	
rr N5228	0	0	+	0	+	0	0	+	0	+	0	+	0	+	0	+	0	+	+	+	0	+	0	0	+	+	12	
rr N4966	0	0	+	0	+	0	0	+	0	+	0	+	0	+	0	+	0	+	0	+	+	0	+	0	+	0	13	
R1R2 A4554	+	+	+	+	+	0	0	+	0	+	0	+	+	0	0	+	0	+	0	+	0	0	+	0	+	+	14	—
POSITIVE CONTROL	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	PC	
NEGATIVE CONTROL	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	NC	—



DT NO: DP147
XPIRES: 2025/08/12

	Special Type	Donor	Rh - Hr						Kell						Duffy		Kidd		Lewis		P	MN				Luth-eran		Xg	CELL	TE
			D	C	c	E	e	C^w	K	k	Kp^a	Kp^b	Js^{a*}	Js^b	Fy^a	Fy^b	Jk^a	Jk^b	Le^a	Le^b	P_1	M	N	S	s	Lu^a	Lu^b	Xg^{a*}		
1	Hetero GATA	R1wR1 B1434	+	+	0	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	+	+	0	+	0	0	+	+	1	
2		R1R1 B11387	+	+	0	0	+	0	0	+	0	+	0	+	+	0	+	+	0	+	+	0	+	0	+	0	+	0	2	
3	Bg(a+)*	R1R1 B10668	+	+	0	0	+	0	+	+	0	+	0	+	0	+	0	+	+	0	+	+	0	0	+	0	+	+	3	
4		R1R1 B10511	+	+	0	0	+	0	0	+	0	+	0	+	0	+	+	+	0	+	0	+	+	+	0	+	+	+	4	
5	Rg-	R1R1 B1033	+	+	0	0	+	0	+	+	+	+	0	+	0	+	+	0	0	+	+	0	+	0	+	0	+	+	5	
6		R1R1 B11386	+	+	0	0	+	0	0	+	0	+	0	+	+	0	0	+	0	+	+	+	+	0	+	0	+	+	6	
7	Bg(a+)*	R1R1 B11385	+	+	0	0	+	0	0	+	0	+	0	+	0	+	0	+	0	+	0	0	+	+	+	0	+	+	7	
8		R2R2 C6671	+	0	+	+	0	0	0	+	0	+	0	+	0	+	+	+	0	+	0	+	+	+	+	+	+	+	8	
9		R2R2 C2305	+	0	+	+	0	0	0	+	+	+	0	+	+	0	0	+	0	+	+	+	0	+	+	0	+	+	9	
10	Cob+	R2R2 C7482	+	0	+	+	0	0	0	+	0	+	0	+	+	0	+	0	0	+	0	+	+	+	0	0	+	+	10	
11		R2R2 C5963	+	0	+	+	0	0	0	+	0	+	0	+	0	+	+	+	0	+	+	0	+	0	+	0	+	+	11	
12		R2R2 C6899	+	0	+	+	0	0	+	+	0	+	0	+	+	+	0	+	0	+	+	+	+	+	+	0	+	0	12	
13	Mi(a+), GP.Mur	R2R2 C5913	+	0	+	+	0	0	0	+	0	+	0	+	+	+	0	+	0	+	0	+	+	0	+	0	+	0	13	
14	Co(b+)	R2R2 C6174	+	0	+	+	0	0	0	+	0	+	0	+	+	+	+	+	0	+	+	+	+	+	+	0	+	+	14	
15		POSITIVE CONTROL	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	PC	
16		NEGATIVE CONTROL	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	NC	

GROUP
DY IDENTITY
DATE

Luth-eran		Xg	CELL	PA TEST
Lu^a	Lu^b	Xg^{a*}		
0	+	+	1	
0	+	0	2	
0	+	+	3	
+	+	+	4	
0	+	+	5	
0	+	+	6	
0	+	+	7	
+	+	+	8	
0	+	+	9	
0	+	+	10	
0	+	+	11	
0	+	0	12	
0	+	0	13	
0	+	+	14	
/	/	/	PC	
/	/	/	NC	

The results

The patient is immunized by anti-K, anti-S and anti-Fyb

Anti-K, anti-S and anti-Fy(b)

2nd case study

Combination of alloantibodies 8/2025

Patient: male

Diagnosis: Hip osteoporosis

Serological typing: CCD.ee Cw- K-

External laboratory detected antibody anti-E reacts weakly only in enzyme tests

DAT negative

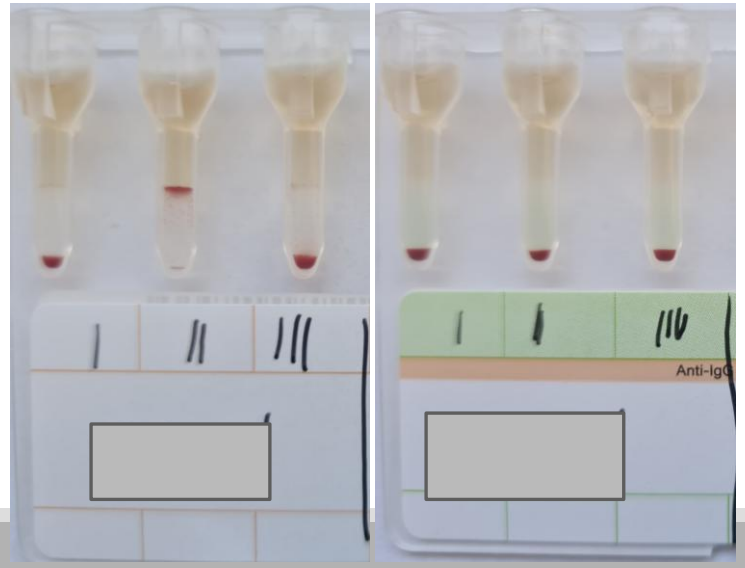
Autocontrol negative

Some of the crossmatch were positive with CCD.ee! Why?

Initial Immunohematological examination

Grifols

Bio-Rad



- Immucor/Werfen

Results - Screen

Sample ID	Interp.	Flags	Screen 1	Screen 2	Screen 3	Pos Ctrl
	Positive	*	0	1+	0	4+

CAPTURE-R READY-SCREEN (3)
Master List

E700

IMMUCOR, INC. Norcross, GA 30071 USA
US LICENSE NO: 886
LOT NO: E700
EXPIRES: 2025/09/09

	Rh - Hr						Kell						Duffy		Kidd		Lewis		P	MN				Luth-eran		Xg		
Donor	D	C	c	E	e	C^w	K	k	Kp^a	Kp^b	Js^{a*}	Js^b	Fy^a	Fy^b	Jk^a	Jk^b	Le^a	Le^b	P_1	M	N	S	s	Lu^a	Lu^b	Xg^{a*}		
R1wR1 B11264	+	+	0	0	+	+	+	+	0	+	0	+	0	+	+	+	+	0	+	+	+	+	0	0	+	+	–	
R2R2 C6404	+	0	+	+	0	0	0	+	0	+	0	+	+	0	0	+	0	+	+	+	+	0	+	0	+	+	+	
rr N2678	0	0	+	0	+	0	0	+	+	+	0	+	0	+	+	0	+	0	+	+	+	+	+	0	+	+	/	
Positive Control																												

Identification Capture-R Ready-ID panel

Results - Ready ID

LOT NO: ID495
EXPIRES: 2025/09/23

CELL	Special Type	Donor	Rh - Hr						Kell						Duffy		Kidd		Lewis		P	MN				Luth-eran		Xg	CELL	P TES
			D	C	c	E	e	C^w	K	k	Kp^a	Kp^b	Js^{a*}	Js^b	Fy^a	Fy^b	Jk^a	Jk^b	Le^a	Le^b	P_1	M	N	S	s	Lu^a	Lu^b	Xg^{a*}		
1		RzR1 A4034	+	+	0	+	+	0	0	+	0	+	0	+	+	+	+	0	0	+	+	0	+	0	+	0	+	+	1	
2		R1wR1 B8930	+	+	0	0	+	+	0	+	0	+	0	+	0	+	+	0	0	+	+	0	+	0	+	0	+	+	2	
3	Co(b+)	R2R2 C5559	+	0	+	+	0	0	0	+	0	+	0	+	0	+	0	+	0	+	0	+	+	0	+	+	+	0	3	
4		Ror D2852	+	0	+	0	+	0	0	+	0	+	0	+	0	0	+	0	0	+	+	+	+	0	+	0	+	+	4	
5		r'r E973	0	+	+	0	+	0	0	+	0	+	0	+	+	0	+	+	0	0	+	+	0	+	0	0	+	+	5	
6		r''r F869	0	0	+	+	+	0	0	+	0	+	0	+	+	0	+	0	0	+	+	0	+	0	+	0	+	+	6	
7	Co(a-)* Co(b+)	rr N3391	0	0	+	0	+	0	0	+	0	+	0	+	+	+	+	+	+	0	+	0	+	0	+	0	+	+	7	!
8		rr G1968	0	0	+	0	+	0	+	+	0	+	0	+	0	+	+	+	0	+	0	+	+	0	+	+	+	0	8	
12		rr N3975	0	0	+	0	+	0	0	+	0	+	0	+	0	+	+	+	0	+	+	+	0	+	0	0	+	+	12	
13		rr G2099	0	0	+	0	+	0	+	+	0	+	0	+	+	+	+	+	0	+	+	+	0	+	+	0	+	+	13	
14	Mi(a+), GP.Mur	R1R2 A4554	+	+	+	+	+	0	0	+	0	+	0	+	+	0	0	+	0	+	0	+	0	0	+	0	+	+	14	
15		POSITIVE CONTROL	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	PC	
16		NEGATIVE CONTROL	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	NC	

Genotyping FluoGene Rare

Order No.: 502-25 **Order Date:** 22.08.2025
Analysis: RBC-Rare 1.8

Analysis Data

Lot No.	R851224S-1
Expiry Date	30.11.2026
Tray ID	R851224S 01 Rare 00
Job	4448

Summary Result Assignment

System	Genotype	Predicte 1					
Kell	*KEL*02*	KEL: -1,					
	*KEL*01.01/02*	KEL: 1,2					
	*KEL*01.01*	KEL: 1,-					
Dombrock	*DO*02*	DO: -1,2					
Lutheran	*LU*02*	LU: -1,2					
Yt	*YT*01*	YT: 1,-2					
Diego	*DI*02.04*	DI: -1,2,-3,4	DI(a-b+),Wr(a-b+)				
Knops	*KN*01*	KN: 1,-2	Kn(a+b-)				
Colton	*CO*01.01*	CO: 1,-2	Co(a+b-)				
Landsteiner-Wiener	*LW*05*	LW: 5,-7	LW(a+b-)				

System	Genotype	Predicted Phenotype 1	Predicted Phenotype 2	Associated SNPs
Kell	*KEL*02*	KEL: -1,2,-3,4,-6,7	K-k+,Kp(a-b+),Js(a-b+)	841C, 1790T
	*KEL*01.01/02*	KEL: 1,2,-3,4,-6,7	K+k+,Kp(a-b+),Js(a-b+)	841C, 1790T
	*KEL*01.01*	KEL: 1,-2,-3,4,-6,7	K+k-,Kp(a-b+),Js(a-b+)	841C, 1790T
Dombrock	*DO*02*	DO: -1,2,4,5	Do(a-b+),Hy+,Jo(a+)	323G, 350C, 793G
Lutheran	*LU*02*	LU: -1,2	Lu(a-b+)	230G
Yt	*YT*01*	YT: 1,-2	Yt(a+b-)	1057C
Diego	*DI*02.04*	DI: -1,2,-3,4	Di(a-b+),Wr(a-b+)	1972G, 2561C
Knops	*KN*01*	KN: 1,-2	Kn(a+b-)	4681G
Colton	*CO*01.01*	CO: 1,-2	Co(a+b-)	134C
Landsteiner-Wiener	*LW*05*	LW: 5,-7	LW(a+b-)	299A

Dia - Dib + Wra - Wrb + Yta + Ytb - Lua - Lub + Kpa - Kpb + Jsa - Jsb + Coa + Cob - Kna + Knb -

Verification of alloantibody anti-Co(b) by gel column aglutination assay

Makropanel 16		NAT	Bromelin_NAT
RBC No. 2	CCD.ee Co^{b+}	(+)	+
RBC No. 9	ccddee Co^{b+}	(+)	++

Anti-E, anti-Co^{b}

Colton blood group system

Phenotypes	Most population %
Co(a+b-)	90
Co(a-b+)	0,5
Co(a+b+)	9,5
Co(a-b-)	<0,01

Clinical significance of alloantibodies anti-Co

- Transfusion reaction:
- No to moderate/delayed/hemolytic
- HDFN: Mild
- Co^b is poor immunogen, and anti-Co^b is rarely found as a single specificity

3th case study

3. Combination of alloantibodies

Patient: female

Diagnosis: Disease of the blood and blood-forming organs

Initial information: Ccee Cw-K- M+N+ S-s+

Bio-Rad	IAT	Enzyme
I	+	+++
II	+	+++
III	negative	+++

DAT: ++

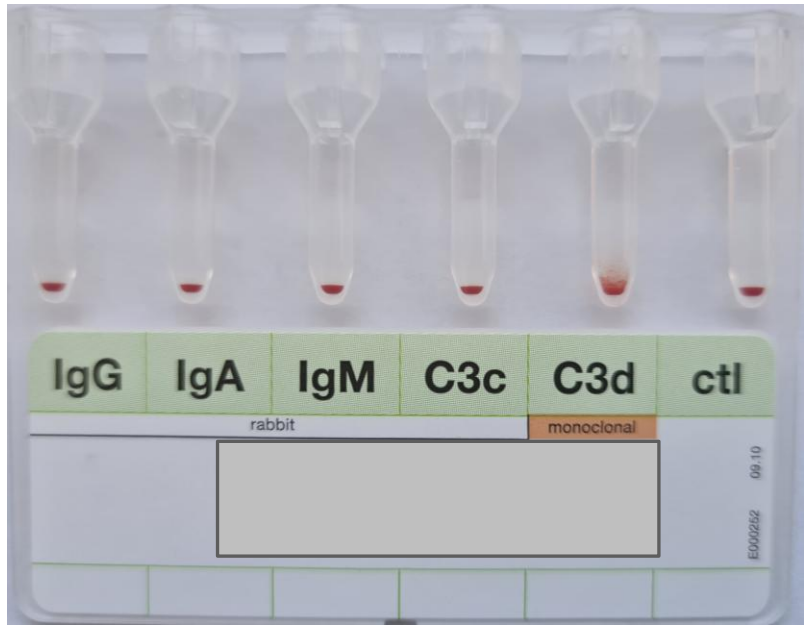
History of the transfusion:

2022	2024	2025
5 TU	10 TU	4 TU

Initial Immunohematological examination

DAT +

Cold antibody screen	
Diana 1 cell	negative
Diana 2 cell	negative
Autocontrol	negative
Cord blood	negative

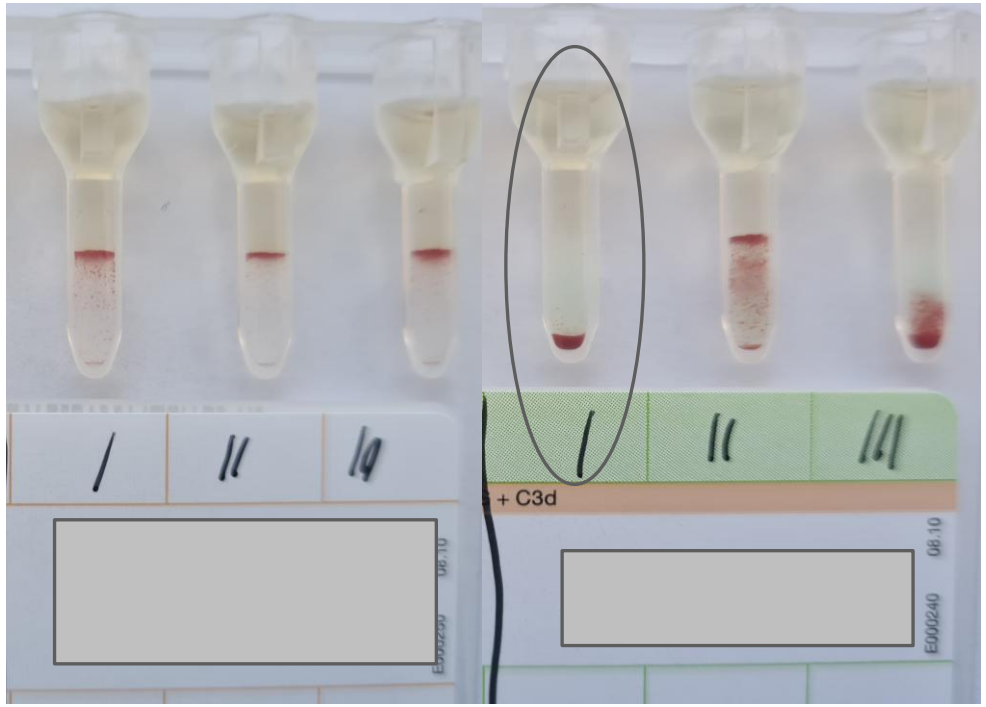


Fy(a)	Fy(b)	Jk(a)	Jk(b)	P	Le(a)	Le(b)	Lu(a)	Lu(b)
+	+	-	+	+	-	+	-	+

Gel column agglutination tests

GRIFOLS

BIO-RAD



Autocontrol	
NAT	**Enzyme**
+	++++

Patient can develop alloantibodies

Anti-E

Anti-K

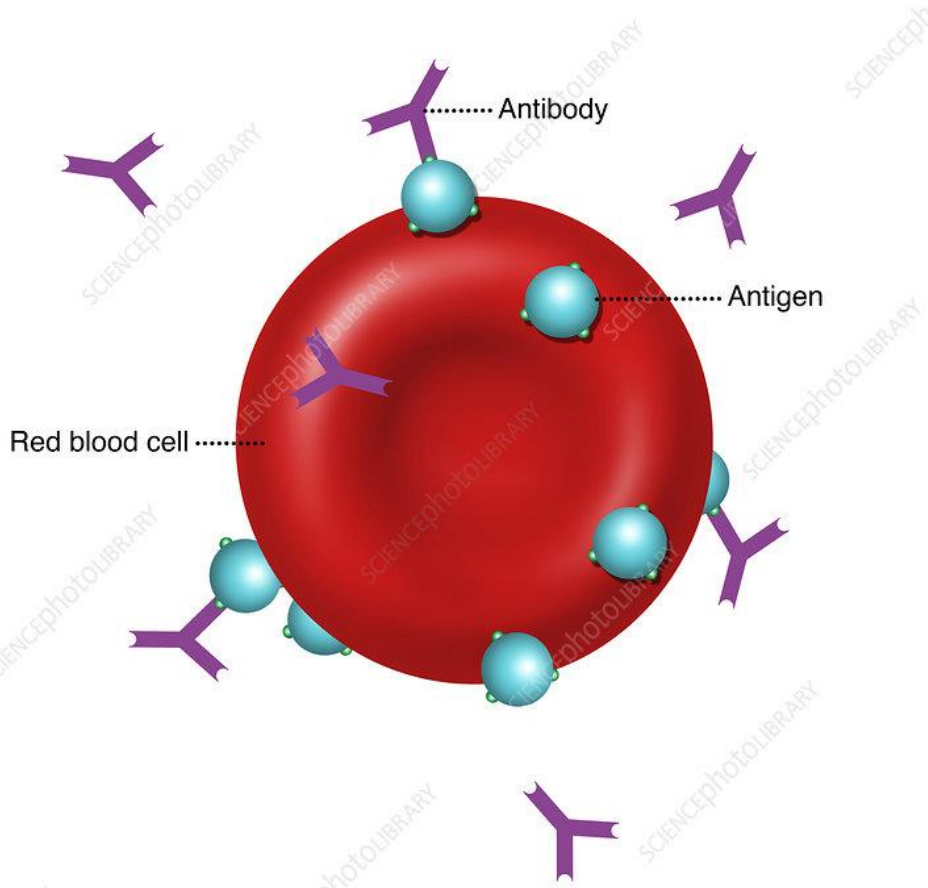
Anti-Cw

Anti-S

Anti-Jka

Anti-Lea

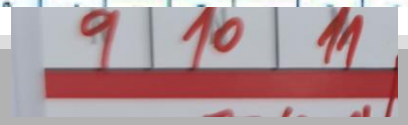
Anti-Lua



Identification panel IDENTISERA 11 Grifols

Identisera Diana/Extend-Identisera Diana P/Extend P

VIAL	Donor No.	Rh	Rh-hr						Kell				Duffy		Kidd		Lewis		P	MNS				Luth.	Colt.	Xg	SPECIAL TYPE		RESU	
			D	C	E	c	e	C^w	K	k	Kp^a	Js^a	Fy^a	Fy^b	Jk^a	Jk^b	Le^a	Le^b	P$_1$	M	N	S	s	Lu^a	Co^b	Xg^a			NAT	EN
1	2008617	CCDee R$_1$R$_1$	+	+	0	0	+	0	+	+	0	nt	+	0	+	0	0	+	+	+	+	0	+	0	0	0		1	++	+
2	2008618	Ccddee r'r	0	+	0	+	+	0	0	+	0	nt	+	0	+	0	+	0	0	+	0	+	0	0	0	+		2	++	++
3	2008619	ccDee R$_0$r	+	0	0	+	+	0	0	+	0	nt	+	+	0	+	0	+	+	+	+	+	0	0	0	+		3	++	++
4	2007831	ccddEe r''r	0	0	+	+	+	0	0	+	0	nt	+	0	+	0	0	0	+	+	+	0	+	0	0	+		4	+	++
5	2008620	ccDEE R$_2$R$_2$	+	0	+	+	0	0	0	+	0	nt	0	+	+	+	0	+	0	0	+	0	+	0	0	0		5	+	++
6	2008245	C^{w}CDee R$_1^w$R$_1$	+	+	0	0	+	+	0	+	0	nt	+	0	0	+	0	+	+	0	+	+	+	0	0	+		6	−	+
7	2008340	ccddee rr	0	0	0	+	+	0	+	+	0	nt	0	+	0	+	0	+	+	0	+	+	+	0	+	+		7	−	++
8	2008342	ccddee rr	0	0	0	+	+	0	0	+	0	nt	0	+	0	+	0	+	+	+	0	0	+	+	0	0		8	−	+
9	2008005	ccddee rr	0	0	0	+	+	0	0	+	+	nt	+	0	+	+	0	+	0	+	+	0	+	0	+	+		9	−	+
10	2008527	ccddee rr	0	0	0	+	+	0	0	+	0	nt	+	+^{w}	+	0	+	0	+	+	0	+	0	0	0	0	Bg(a+)	10	++	+++
11	2007974	CCDee R$_1$R$_1$	+	+	0	0	+	0	0	+	0	nt	0	+	+	+	+	0	+	+	0	+	0	0	0	+		11	+	++
12	2007574																													



Identification panel DiaPanel 11

Rh-hr (Möglicher Genotyp / Probable Genotype / Genotype probable / Probabile genotipo / Genotipo probable / Genotipo provável)		Spender / Donor / Donneur / Donatore / Donante / Dador	Rh-hr						Kell						Duffy		Kidd		Lewis		P	MNS				Luth.		Xg		Spez. Antigene / Special types / Antigènes part. / Antigeni particolari / Otros Antígenos / Tipos especiais	
			D	C	E	c	e	Cʸ	K	k	Kpᵃ	Kpᵇ	Jsᵃ	Jsᵇ	Fyᵃ	Fyᵇ	Jkᵃ	Jkᵇ	Leᵃ	Leᵇ	P_1	M	N	S	s	Luᵃ	Luᵇ	Xgᵃ	♀ ♂		
CCC^{w}D.ee	$R_1{}^{w}R_1$	329657	+	+	0	0	+	+	0	+	0	+	nt	nt	+	0	0	+	0	+	+	+	0	0	+	0	+	+	N/A		1
CCD.ee	R_1R_1	489890	+	+	0	0	+	0	+	+	0	+	nt	nt	0	+	+	0	0	+	+	+	0	0	+	0	+	+	N/A	Co(b+)*	2
ccD.EE	R_2R_2	487656	+	0	+	+	0	0	0	+	0	+	nt	nt	+	0	+	0	0	+	+	+	0	+	+	0	+	+	N/A		3
Ccddee	r′r	401274	0	+	0	+	+	0	0	+	0	+	nt	nt	+	+	0	+	0	+	0	0	+	0	+	0	+	+	N/A		4
ccddEe	r″r	131214	0	0	+	+	+	0	0	+	0	+	nt	nt	+	0	+	+	+	0	+	+	0	+	0	0	+	+	N/A		5
ccddee	rr	669945	0	0	0	+	+	0	+	+	0	+	nt	nt	+	0	0	+	0	0	+	+	+	0	+	0	+	+	N/A		6
ccddee	rr	111818	0	0	0	+	+	0	0	+	0	+	nt	nt	0	+	+	0	0	+	0	0	+	+	0	0	+	+	N/A		7
ccD.ee	R_or	459068	+	0	0	+	+	0	+	+	0	+	nt	nt	0	0	+	+	0	+	+	+	0	0	+	0	+	0	N/A		8
ccddee	rr	716944	0	0	0	+	+	0	0	+	0	+	nt	nt	+	0	+	0	+	0	+	0	+	0	+	0	+	nt	N/A	HLA+*	9
ccddee	rr	542576	0	0	0	+	+	0	0	+	+	+	nt	nt	0	+	0	+	0	0	+	+	0	+	+	0	+	+	N/A		10
ccddee	rr	522413	0	0	0	+	+	0	0	+	0	+	nt	nt	0	+	+	+	0	+	+	+	0	+	0	+	+	+	N/A		11

Resu / Résult / Resulta
LISS/ Coombs
−
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Identification panel Cap

LOT NO: ID495
EXPIRES: 2025/09/23

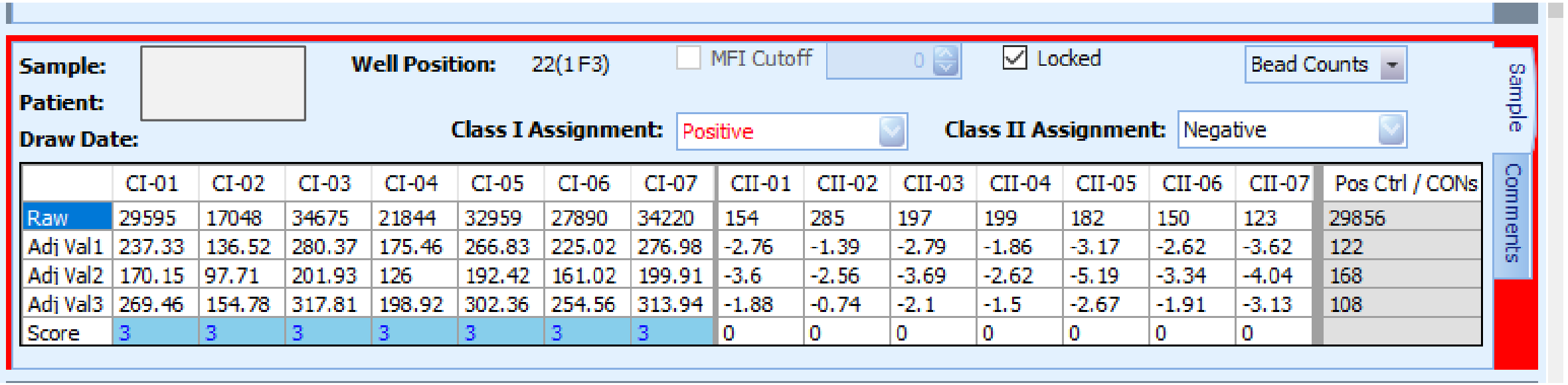
Sample ID
Sample ID

CELL	Special Type	Donor	Rh - Hr						Kell						Duffy		Kidd		Lewis		P	MN				Luth-eran		Xg	CELL	TE
			D	C	c	E	e	C^w	K	k	Kp^a	Kp^b	Js^{a*}	Js^b	Fy^a	Fy^b	Jk^a	Jk^b	Le^a	Le^b	P_1	M	N	S	s	Lu^a	Lu^b	Xg^{a*}		
1		RzR1 A4034	+	+	0	+	+	0	0	+	0	+	0	+	+	+	+	0	0	+	+	0	+	0	+	0	+	+	1	
2		R1wR1 B8930	+	+	0	0	+	+	0	+	0	+	0	+	0	+	+	0	0	+	+	0	+	0	+	0	+	+	2	
3	Co(b+)	R2R2 C5559	+	0	+	+	0	0	0	+	0	+	0	+	0	+	0	+	0	+	0	+	+	0	+	+	+	0	3	
4		Ror D2852	+	0	+	0	+	0	0	+	0	+	0	+	0	0	+	0	0	+	+	+	+	0	+	0	+	+	4	
5		r'r E973	0	+	+	0	+	0	0	+	0	+	0	+	+	0	+	+	0	0	+	+	0	+	0	0	+	+	5	
6		r"r F869	0	0	+	+	+	0	0	+	0	+	0	+	+	0	+	0	0	+	+	0	+	0	+	0	+	+	6	
7	Co(a-)*, Co(b+)	rr N3391	0	0	+	0	+	0	0	+	0	+	0	+	+	+	+	+	+	0	+	0	+	0	+	0	+	+	7	
8		rr G1968	0	0	+	0	+	0	+	+	0	+	0	+	0	+	+	+	0	+	0	+	+	0	+	+	+	0	8	
9		rr H945	0	0	+	0	+	0	0	+	0	+	0	+	+	0	+	0	0	+	+	+	0	+	+	0	+	+	9	
10	Di(a+)	rr N5041	0	0	+	0	+	0	0	+	0	+	0	+	0	+	0	+	+	0	+	+	+	0	+	0	+	0	10	
11		rr N4825	0	0	+	0	+	0	0	+	+	+	0	+	0	+	+	0	0	+	+	+	+	+	+	0	+	0	11	
12		rr N3975	0	0	+	0	+	0	0	+	0	+	0	+	0	+	+	+	0	+	+	+	0	+	0	0	+	+	12	
13		rr G2099	0	0	+	0	+	0	+	+	0	+	0	+	+	+	+	+	0	+	+	+	0	+	+	0	+	+	13	
14	Mi(a+), GP.Mur	R1R2 A4554	+	+	+	+	+	0	0	+	0	+	0	+	+	0	0	+	0	+	0	+	0	0	+	0	+	+	14	
15		POSITIVE CONTROL	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	PC	
16		NEGATIVE CONTROL	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	NC	

LOT NO: DP147
EXPIRES: 2025/08/12

CELL	Special Type	Donor	Rh - Hr						Kell						Duffy		Kidd		Lewis		P	MN				Luth-eran		Xg	CELL	PA TEST
			D	C	c	E	e	C^w	K	k	Kp^a	Kp^b	Js^a	Js^b	Fy^a	Fy^b	Jk^a	Jk^b	Le^a	Le^b	P_1	M	N	S	s	Lu^a	Lu^b	Xg^a		
1	Hetero GATA	R1wR1 B1434	+	+	0	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	+	+	0	+	0	0	+	+	1	
2		R1R1 B11387	+	+	0	0	+	0	0	+	0	+	0	+	+	0	+	+	0	+	+	0	+	0	+	0	+	0	2	
3	Bg(a+)*	R1R1 B10668	+	+	0	0	+	0	+	+	0	+	0	+	0	+	0	+	+	0	+	+	0	0	+	0	+	+	3	
4		R1R1 B10511	+	+	0	0	+	0	0	+	0	+	0	+	0	+	+	+	0	+	0	+	+	+	0	+	+	+	4	
5	Rg-	R1R1 B1033	+	+	0	0	+	0	+	+	+	+	0	+	0	+	+	0	0	+	+	0	+	0	+	0	+	+	5	
6		R1R1 B11386	+	+	0	0	+	0	0	+	0	+	0	+	+	0	0	+	0	+	+	+	+	0	+	0	+	+	6	
7	Bg(a+)*	R1R1 B11385	+	+	0	0	+	0	0	+	0	+	0	+	0	+	0	+	0	+	0	0	+	+	+	0	+	+	7	
8		R2R2 C6671	+	0	+	+	0	0	0	+	0	+	0	+	0	+	+	+	0	+	0	+	+	+	+	+	+	+	8	
9		R2R2 C2305	+	0	+	+	0	0	0	+	+	+	0	+	+	0	0	+	0	+	+	+	0	+	+	0	+	+	9	
10	Cob+	R2R2 C7482	+	0	+	+	0	0	0	+	0	+	0	+	+	0	+	0	0	+	0	+	+	+	0	0	+	+	10	
11		R2R2 C5963	+	0	+	+	0	0	0	+	0	+	0	+	0	+	+	+	0	+	+	0	+	0	+	0	+	+	11	
12		R2R2 C6899	+	0	+	+	0	0	+	+	0	+	0	+	+	+	0	+	0	+	+	+	+	+	+	0	+	0	12	
13	Mi(a+), GP.Mur	R2R2 C5913	+	0	+	+	0	0	0	+	0	+	0	+	+	+	0	+	0	+	0	+	+	0	+	0	+	0	13	
14	Co(b+)	R2R2 C6174	+	0	+	+	0	0	0	+	0	+	0	+	+	+	+	+	0	+	+	+	+	+	+	0	+	+	14	
15		POSITIVE CONTROL	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	PC	
16		NEGATIVE CONTROL	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	NC	

HLA testing



Sample:
Patient:
Draw Date:
Well Position: 22(1 F3)
MFI Cutoff 0
Locked
Bead Counts
Class I Assignment: Positive
Class II Assignment: Negative
Sample
Comments

	CI-01	CI-02	CI-03	CI-04	CI-05	CI-06	CI-07	CII-01	CII-02	CII-03	CII-04	CII-05	CII-06	CII-07	Pos Ctrl / CONs
Raw	29595	17048	34675	21844	32959	27890	34220	154	285	197	199	182	150	123	29856
Adj Val1	237.33	136.52	280.37	175.46	266.83	225.02	276.98	-2.76	-1.39	-2.79	-1.86	-3.17	-2.62	-3.62	122
Adj Val2	170.15	97.71	201.93	126	192.42	161.02	199.91	-3.6	-2.56	-3.69	-2.62	-5.19	-3.34	-4.04	168
Adj Val3	269.46	154.78	317.81	198.92	302.36	254.56	313.94	-1.88	-0.74	-2.1	-1.5	-2.67	-1.91	-3.13	108
Score	3	3	3	3	3	3	3	0	0	0	0	0	0	0	

Verification of combination of alloantibodies

	Bio-Rad	
	NAT	Bromelin/NAT
Ccee K- ss $Jk^{(a-b+)}$	negative	+++
cc**EE** ss Jk(a-b+)	+	+++
rr ss Jk(a+b-)	++	++
Ccee Jk(a+b+)	negative	++
rr Lu (a+b-)	(+)	++
rr Ss Jk(a-b+)	+	++
rr SS Jk(a-b+)	+	++
Ccee Le(a+b-) Jk^{bb}, ss, Lu^{bb}	negative	++
ccee Le(a+b-) Jk^{bb}, ss, Lu^{bb}	negative	++

Results

Anti-S

Anti-Jk(a)

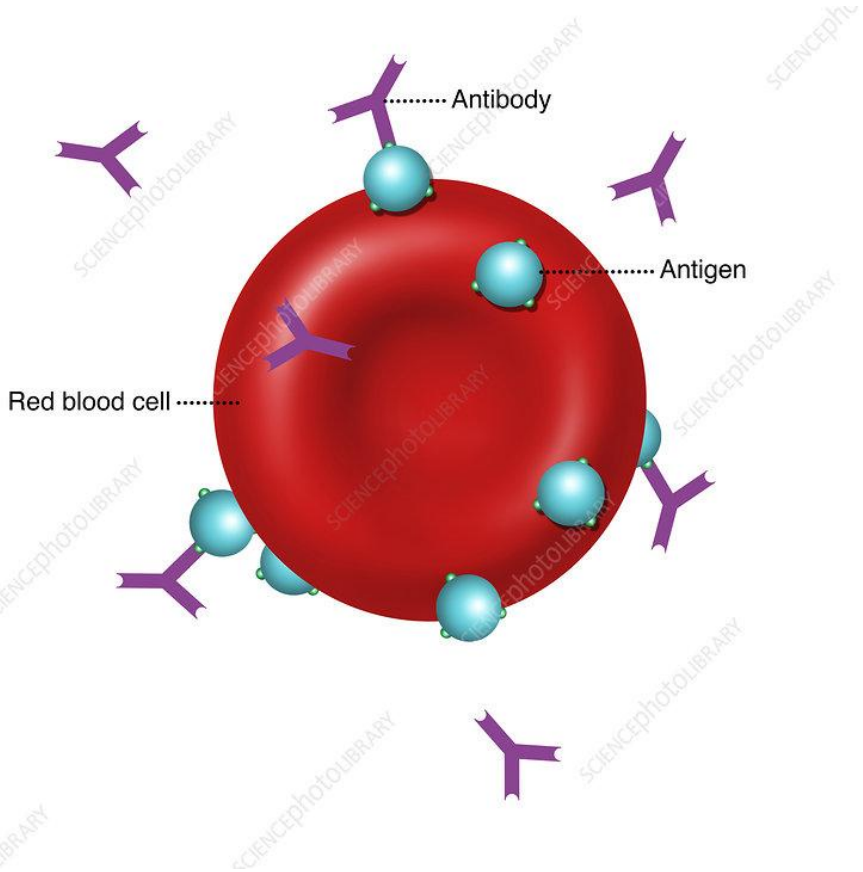
Anti-E

Suspected:

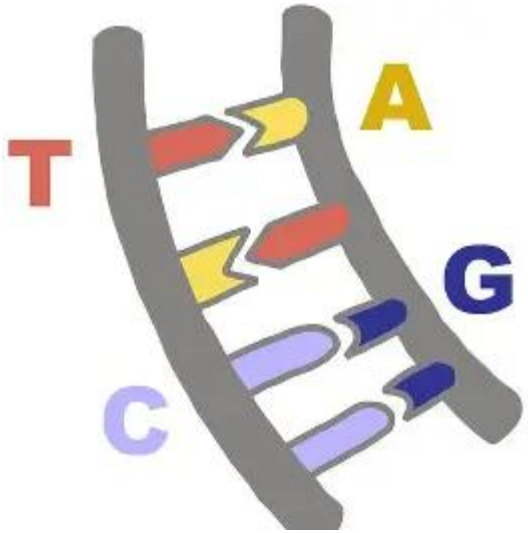
- Anti-Le(a)
- Anti-Lu(a)

Anti-HLA I. class strongly positive

Nonspecific reaction in the enzyme test



4th case study



Female sample

Diagnosis: malignant endometrial tumor

Antigens:

Ccee Cw- K-, M+N-, S-s+, P+, Le(a+b-), Jk(a+b+) Fy(a+b-), Lu(a-b+)

Xmatch: 2+

3-SCP (Bio-Rad) 2+

DAT: negative

Autocontrol: negative

SCREENING PROTILÁTEK

DIA MED				DIANA, NAT I.: ++		Chladové protilátky			
testy	SCR	NAT DTT		NAT II.	++	SCR I.	0	Novor.I	
NAT I.	-	I.		NAT III	++	SCR II.	0	Novor.II	
NAT II.		II.		NAT IV	+	SCR III	0	Novor.III	
NAT III		III.		PT I.	++	vl. ery	0	Novor.IV	
PT I.		BR I.		PT II.	+/−	Chladové aglutininy			
PT II.		BR II.		PT III.	+/−	A1		B	
PT III.		BR III.		PT IV.	+/−	0		Závěr:	

Identifikace protilátek/ Autoprotilátky

DIA MED					DIANA	
	NAT	PT	BR	4°C	NAT	PT
1.					++	+/−
2.					++	++
3.					++	++
4.					+	0
5.					++	+/−
6.					++	+/−
7.					++	+
8.					0	0
9.					++	+/−
10.					++	+/−
11.					++	+/−
Autoprotil.					neg	neg
Závěr						

Initial immunohematological results

DAT: negative

Cold antibodies: negative

Diana 4	PAP	Bromelin	NAT
I	+		++
II	neg		++
III	neg		++
IV	neg		++
autokontrola		Neg.	Neg.

Interp.	Flags	Screen 1	Screen 2	Screen 3	Pos Ctrl
Negative	*	0	0	0	3+

Identification panel Grifols

	Rh		Rh-hr						Kell				Duffy		Kidd		Lewis		P	MNS				Luth.	Colt.	Xg	SPECIAL TYPE		RESULTS	
			D	C	E	c	e	C^w	K	k	Kp^a	Js^a	Fy^a	Fy^b	Jk^a	Jk^b	Le^a	Le^b	P_1	M	N	S	s	Lu^a	Cp^a	Xg^a				
	CCDee	R_1R_1	+	+	0	0	+	0	+	+	0	nt	0	+	+	0	0	+	+	+	+	0	+	0	0	0		1	+	+
	Ccddee	r'r	0	+	0	+	+	0	0	+	0	nt	0	X	+	0	0	+	+	0	X	+	+	0	0	+		2	—	+
	ccDee	Rar	+	0	0	+	+	0	0	+	0	nt	0	+	0	+	0	+	+	+	+	0	+	0	0	+		3	(+)	+
	ccddEe	r''r	0	0	+	+	+	0	0	+	0	nt	0	+	0	+	0	+	+	+	0	0	+	0	0	+		4	+	+
	ccDEE	R_2R_2	+	0	+	+	0	0	0	+	0	nt	+	0	+	0	0	0	+	0	+	0	+	0	0	+	Bg(a+)	5	+	+
	C^{w}CDee	$R_1^wR_1$	+	+	0	0	+	+	0	+	0	nt	0	+	0	+	+	0	0	+	0	+	0	0	0	+		6	+	+
	ccddee	rr	0	0	0	+	+	0	+	+	0	nt	+	0	0	+	0	+	0	+	+	+	+	0	0	+		7	(+)	+
	ccddee	rr	0	0	0	+	+	0	0	+	+	nt	+	+	+	0	0	+	+	0	+	0	+	0	0	+		8	+	+
	ccddee	rr	0	0	0	+	+	0	0	+	0	nt	+	0	+	+	0	+	+	0	+	0	+	+	0	0		9	+	+
	ccddee	rr	0	0	0	+	+	0	0	+	0	nt	0	X	0	+	+	0	+^{w}	+	0	X	0	0	0	0		10	—	—
	CCDee	R_1R_1	+	+	0	0	+	0	0	+	0	nt	+	0	0	+	0	+	0	+	0	+	0	+	0	+	Lu(b-)	11	+	+
	ccddee	rr	0	0	0	+	+	0	+	+	0	nt	+	+	+	0	0	+	0	+	0	+	0	0	+	+		12		
	ccDEE	R_2R_2	+	0	+	+	0	0	0	+	0	nt	0	+	0	+	0	+	+	+	+	+	0	0	0	+		13		
	CCDee	R_1R_1	+	+	0	0	+	0	0	+	0	nt	+	+	0	+	+	0	0	0	+	0	+	0	0	0		14		
	ccddee	rr	0	0	0	+	+	0	0	+	0	nt	0	+	+	0	+	0	+	+	+	+	0	0	0	+		15		
																												AC		

Capture R-ID

Interp.	Flags	R-ID 1	R-ID 2	R-ID 3	R-ID 4	R-ID 5	R-ID 6	R-ID 7	R-ID 8
Complete	*	0	0	0	0	0	0	0	0
Interp.	**Flags**	**R-ID 9**	**R-ID 10**	**R-ID 11**	**R-ID 12**	**R-ID 13**	**R-ID 14**	**Pos Ctrl**	**Neg Ctrl**
Complete	*	0	0	0	0	0	0	4+	0

Searching for the antibody

	Bio-Rad	
	NAT	Bromelin/NAT
rr K- ss Fy^{bb}	++	++
R1r SS Fy^{aa}	++	++
CCw	++	++
R1r Lu^{aa} ss Fy^{aa}	++	++
rr K+ ss Fy^{bb}	++	++
ccEE	++	++
Ccee M-N+	++	++

Donor ID	Interp.	Flags	IgG XM	Ind Ctrl
133 uh	Incompatible	*D	3+	4+
22 uh	Incompatible	*D	3+	4+
52 uh	Incompatible	*D	2+	4+
70 uh	Incompatible	*D	3+	4+

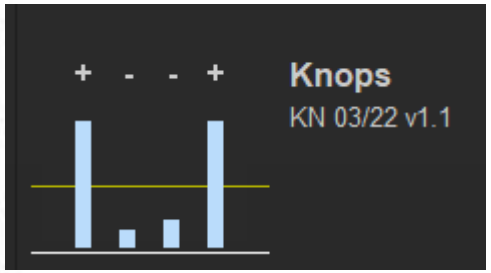
Female patient´s Genotype

Summary Result Assignment

System	Genotype	Predicted Phenotype 1	Predicted Phenotype 2	HLU	Filter Freq.	Filter Comb.	Add
Kell	*KEL*02*	KEL: -1,2,-3,4,-6,7	K-k+,Kp(a-b+),Js(a-b+)				
	*KEL*01.01/02*	KEL: 1,2,-3,4,-6,7	K+k+,Kp(a-b+),Js(a-b+)				
	*KEL*01.01*	KEL: 1,-2,-3,4,-6,7	K+k-,Kp(a-b+),Js(a-b+)				
Dombrock	*DO*01/02*	DO: 1,2,4,5	Do(a+b+),Hy+,Jo(a+)				
Lutheran	*LU*02*	LU: -1,2	Lu(a-b+)				
Yt	*YT*01*	YT: 1,-2	Yt(a+b-)				
Diego	*DI*02.04*	DI: -1,2,-3,4	Di(a-b+),Wr(a-b+)				
Knops	*KN*02*	KN: -1,2	Kn(a-b+)				
Colton	*CO*01.01*	CO: 1,-2	Co(a+b-)				
Landsteiner-Wiener	*LW*05*	LW: 5,-7	LW(a+b-)				

HLU = highest allele category in result

Filter = selected allele categories

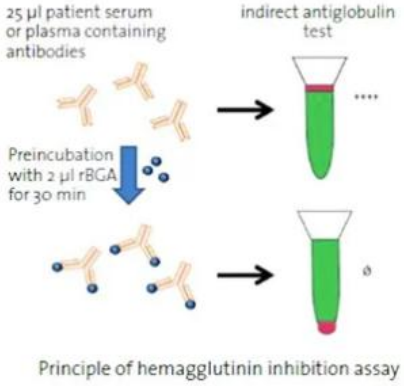


Overview | History | **Result** | Property

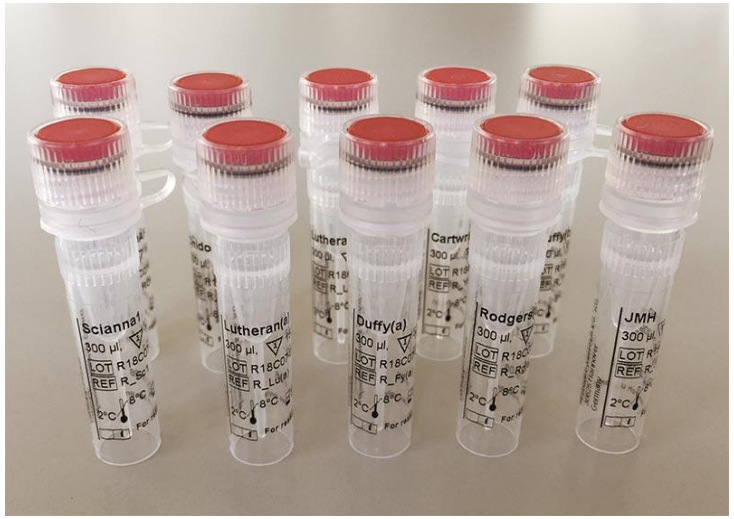
System	Genotype	Predicted Phenotype 1	Predicted Phenotype 2	Associated SNPs
Kell	*KEL*02*	KEL: -1,2,-3,4,-6,7	K-k+,Kp(a-b+),Js(a-b+)	841C, 1790T
	*KEL*01.01/02*	KEL: 1,2,-3,4,-6,7	K+k+,Kp(a-b+),Js(a-b+)	841C, 1790T
	*KEL*01.01*	KEL: 1,-2,-3,4,-6,7	K+k-,Kp(a-b+),Js(a-b+)	841C, 1790T
Dombrock	*DO*01/02*	DO: 1,2,4,5	Do(a+b+),Hy+,Jo(a+)	323G, 350C, 793G, 793G>A
Lutheran	*LU*02*	LU: -1,2	Lu(a-b+)	230G
Yt	*YT*01*	YT: 1,-2	Yt(a+b-)	1057C
Diego	*DI*02.04*	DI: -1,2,-3,4	Di(a-b+),Wr(a-b+)	1972G, 2561C
Knops	*KN*02*	KN: -1,2	Kn(a-b+)	4681G>A
Colton	*CO*01.01*	CO: 1,-2	Co(a+b-)	134C
Landsteiner-Wiener	*LW*05*	LW: 5,-7	LW(a+b-)	299A

Suspected allo-anti-Kn(a)

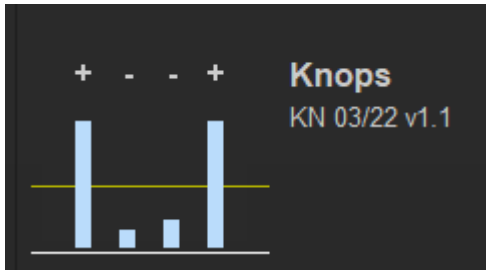
Neutralisation by recombinant blood group antigens



Principle of hemagglutinin inhibition assay



Family testing - Son



Typování erytrocytárních antigenů:

Fya + Fyb - Jka + Jkb - M + N + S - s + P + Lea + Leb - Lua - Lub +

Fenotyp erytrocytů potvrzen genotypovou predikcí [RBC_FG]:

Dia - Dib + Wra - Wrb + Yta + Ytb - Lua - Lub + Kpa - Kpb + Jsa - Jsb + Coa + Cob - Kna - Knb +

System	Genotype	Predicted Phenotype 1	Predicted Phenotype 2	Associated SNPs
Kell	*KEL*02*	KEL: -1,2,-3,4,-6,7	K-k+,Kp(a-b+),Js(a-b+)	841C, 1790T
	*KEL*01.01/02*	KEL: 1,2,-3,4,-6,7	K+k+,Kp(a-b+),Js(a-b+)	841C, 1790T
	*KEL*01.01*	KEL: 1,-2,-3,4,-6,7	K+k-,Kp(a-b+),Js(a-b+)	841C, 1790T
Dombrock	*DO*01/02*	DO: 1,2,4,5	Do(a+b+),Hy+,Jo(a+)	323G, 350C, 793G, 793G>A
Lutheran	*LU*02*	LU: -1,2	Lu(a-b+)	230G
Yt	*YT*01*	YT: 1,-2	Yt(a+b-)	1057C
Diego	*DI*02.04*	DI: -1,2,-3,4	Di(a-b+),Wr(a-b+)	1972G, 2561C
Knops	*KN*02*	KN: -1,2	Kn(a-b+)	4681G>A
Colton	*CO*01.01*	CO: 1,-2	Co(a+b-)	134C
Landsteiner-Wiener	*LW*05*	LW: 5,-7	LW(a+b-)	299A

Family - Daughter

Krevní skupina:

Krevní skupina A Rh(D) positivní

Typování erytrocytárních antigenů:

Fya + Fyb + Jka + Jkb + M + N - S - s + P + Lea - Leb + Lua - Lub +

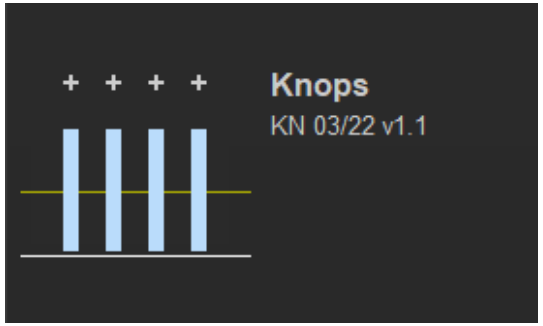
Fenotyp Rh-Kell,Cw:

ccEeCw-K-

Fenotyp erytrocytů potvrzen genotypovou predikcí [RBC_FG]:

Dia - Dib + Wra - Wrb + Yta + Ytb - Lua - Lub + Kpa - Kpb + Jsa - Jsb + Coa + Cob - Kna +

Knb +



System	Genotype	Predicted Phenotype 1	Predicted Phenotype 2	Associated SNPs
Kell	*KEL*02*	KEL: -1,2,-3,4,-6,7	K-k+,Kp(a-b+),Js(a-b+)	841C, 1790T
	*KEL*01.01/02*	KEL: 1,2,-3,4,-6,7	K+k+,Kp(a-b+),Js(a-b+)	841C, 1790T
	*KEL*01.01*	KEL: 1,-2,-3,4,-6,7	K+k-,Kp(a-b+),Js(a-b+)	841C, 1790T
Dombrock	*DO*01/02*	DO: 1,2,4,5	Do(a+b+),Hy+,Jo(a+)	323G, 350C, 793G, 793G>A
Lutheran	*LU*02*	LU: -1,2	Lu(a-b+)	230G
Yt	*YT*01*	YT: 1,-2	Yt(a+b-)	1057C
Diego	*DI*02.04*	DI: -1,2,-3,4	Di(a-b+),Wr(a-b+)	1972G, 2561C
Knops	*KN*01/02*	KN: 1,2	Kn(a+b+)	4681G, 4681G>A
Colton	*CO*01.01*	CO: 1,-2	Co(a+b-)	134C
Landsteiner-Wiener	*LW*05*	LW: 5,-7	LW(a+b-)	299A

Knops

Incidence Kn(a) 98,8% and Kn(b) 4,4%

Table 1. Knops Blood Group Antigen Frequency in Different Populations and Ethnic Groups.

	Kn^a	Kn^b	McC^a	SI1	Yk^a	McC^b	SI2	KCAM	KDAS
Caucasian Americans	98.8%	4.4%	98.5%	97.8%	89.8%	<0.1%	<0.01%		
African Americans	98.8%			53.5%					
Black people		<0.01%				45%	80%	20%	
Europeans									39.3%
South Asians									67.7%
Africans									95.8%

Alloantibodies anti-Kn(a) and anti-Kn(b)

- No complement activation
- No cause hemolysis
- No cause HDN
- Anti-Kn(a) may cover other alloantibodies to red blood cells

- Knops blood groups system reacts with screening cells of gel cards
- Does not react in tube tests and in Capture assay
- Positive reaction in Capture Xmatch assay

- Weak or negative reaction in enzyme tests

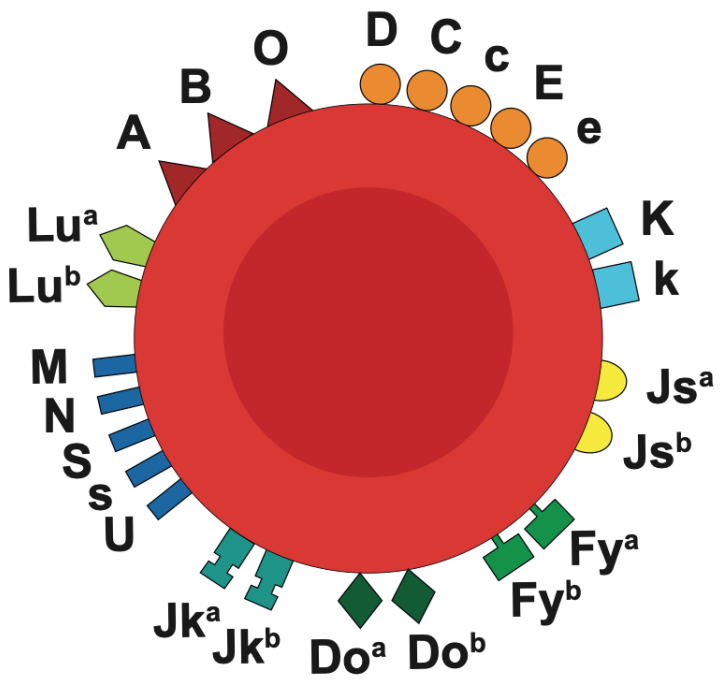
Conclusion

Availability of various combinations of antigens of red blood cells

Genotype of red blood cells antigens

Available genotype assays

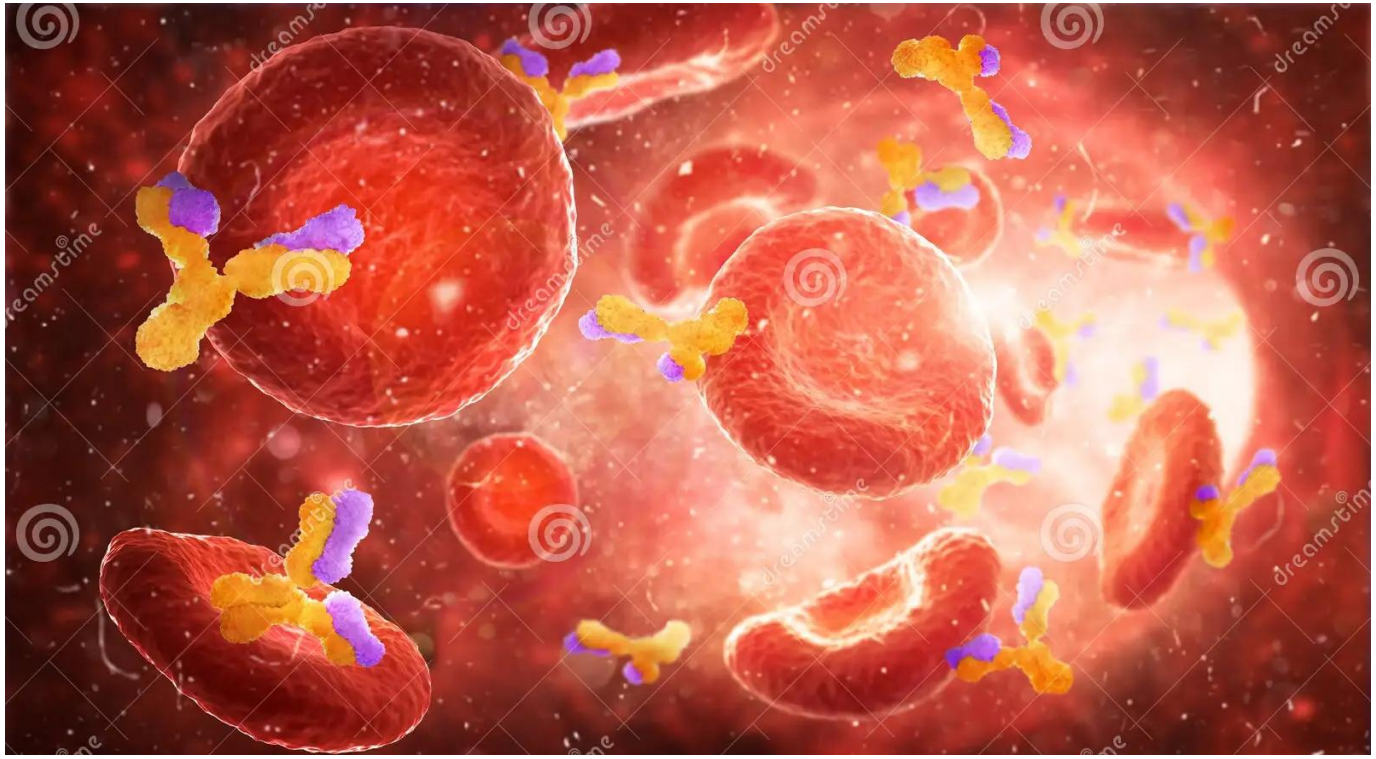
Specialized assays



SUPPLEMENTAL UNCONFIRMED TYPINGS

LOT: ID489

IRATION: 2025/06/03 Capture-R Ready ID

Extended Typings
+; U+; Co(a+); Wr(a-); Mg-; Co(b-); Bg(a-); Di(a-); Mi(a-)
+; U+; Co(a+); Wr(a-); Mg-; Co(b-); Bg(a-); Di(a-); Mi(a-)
j(a+); Vel+; Yt(a+); Di(b+); U+; Co(a+); Wr(a-); Mg-; Vw-; Co(b-); Bg(a-); Di(a-); Dantu-;
+; U+; Co(a+); Wr(a-); Mg-; Co(b-); Bg(a-); Di(a-); He-; Mi(a-)
j(a+); Vel+; Yt(a+); Di(b+); U+; Co(a+); Wr(a-); Mg-; Vw-; Co(b-); Bg(a-); Di(a-); Dantu-;
j(a+); Vel+; Yt(a+); Di(b+); U+; Co(a+); Wr(a-); Mg-; Vw-; Co(b-); Bg(a-); Di(a-); Mi(a-)
+; U+; Co(a+); Wr(a-); Mg-; Co(b-); Bg(a-); Di(a-); Mi(a-)
+; Di(b+); U+; Co(a+); Wr(a-); Mg-; Co(b-); Bg(a-); Di(a-); Mi(a-)
-); Vel+; Di(b+); U+; Co(a+); Wr(a-); Mg-; Co(b-); Bg(a-); Di(a-); Mi(a-)
+; U+; Co(a+); Wr(a-); Mg-; Co(b-); Bg(a-); Di(a-); Mi(a-)
+; Di(b+); U+; Co(a+); Wr(a-); Mg-; Co(b-); Bg(a-); Di(a-); Mi(a-)
j(a+); Vel+; Di(b+); U+; Co(a+); Wr(a-); Mg-; Co(b-); Bg(a-); Di(a-); Mi(a-)
e+; Tj(a+); Vel+; Yt(a+); Di(b+); U+; Co(a+); Wr(a-); Mg-; Vw-; Co(b-); Bg(a-); Di(a-); antu-; Mi(a-); Do(a+); Do(b+); Hy+; Jo(a+); LW(a+); LW(b-)
e+; Tj(a+); Vel+; Yt(a+); Di(b+); U+; Co(a+); Wr(a-); Mg-; Co(b-); Bg(a-); Di(a+); Sc:1; Do(a+); Do(b+); Hy+; Jo(a+); LW(a+); LW(b-)

Thank you for your attention