



Gina Folk
MSHS, MLS (ASCP)^{CM}, SBB^{CM}


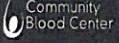

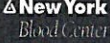



**Community
Blood Center**

**Just When U
Think U Got It**




Zhh


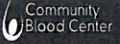



    

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CBC Case



- Sample submitted for antibody identification
- Patient information:
 - 39 year old female
 - African ethnicity
 - Currently pregnant with history of prior pregnancy
 - Group O Rh positive
- Hospital reported:
 - 3-4+ reactivity in GEL with all cells except auto control
 - Prewarmed tube testing showed 1+ reactivity with cells that are S+
 - Possible cold autoantibody and anti-S. Results aren't conclusive


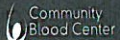



    

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ABO/Rh						
ABO Group				Rh Type		
	Anti-A	Anti-B	A ₁ Cells	B Cells	Anti-D	Control
IS	0	0	4+	4+	3+	0

Direct Antiglobulin Test			
Poly	IgG	C'	Saline
(0) ^v	(0) ^v	(0) ^v	(0)

- IRL types patient as O Rh positive.
- DAT is negative.


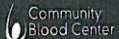



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Antibody Screen Testing

		Rh					Kell		Duffy		Kidd		Lewis		MNS				Plasma Results	
		D	C	E	c	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	M	N	S	s	5' RT	PEG IAT
I	R ₁ R ₁	+	+	0	0	+	0	+	0	+	0	+	0	+	+	0	+	0	2+	@
II	R ₂ R ₂	+	0	+	+	0	0	+	0	+	0	+	0	+	+	0	+	2+	@	
III	rr	0	0	0	+	+	+	+	0	+	0	0	0	0	+	0	+	2+W	@	
Auto																		0	(0) ^v	

@= agglutinated after washing and prior to antiglobulin addition.

- Typically associated with carryover reactivity due to colder reacting antibodies or IgM antibodies.

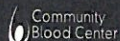






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Cold Antibody Screen Testing

		Rh					Kell		Duffy		Kidd		Lewis		MNS				Plasma Results			
		D	C	E	c	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	M	N	S	s	30' RT	30' 4 C		
I	R ₁ R ₁	+	+	0	0	+	0	+	0	+	0	+	0	+	+	0	+	0	+	0	2+	3+
II	R ₂ R ₂	+	0	+	+	0	0	+	0	0	+	0	+	0	+	+	0	+	+	0	2+ ^W	3+
III	rr	0	0	0	+	+	+	+	0	+	0	0	+	0	+	0	+	0	+	1+	2+ ^S	
Auto																				r	2+	

- Cold autoantibody present in patient's plasma

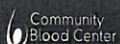


5

Prewarm Testing

		Rh					Kell		Duffy		Kidd		Lewis		MNS				Plasma Results				
		D	C	E	c	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	M	N	S	s	5' RT	PEG IAT	Prewarm PEG IAT		
I	R ₁ R ₁	+	+	0	0	+	0	+	0	+	0	+	0	+	+	0	+	0	+	0	2+	@	(0) ✓
II	R ₂ R ₂	+	0	+	+	0	0	+	0	0	+	0	+	0	+	+	0	+	+	0	2+	@	(0) ✓
III	rr	0	0	0	+	+	+	+	0	+	0	0	0	0	+	0	+	0	+	+	2+W	@	(0) ✓
Auto																					0	(0) ✓	

- Plasma reactivity circumvented by prewarmed testing

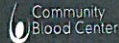


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Plasma Testing Against "Cold" Rares

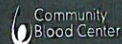


		Rh					Kell		Duffy		Kidd		Lewis		MNS				Plasma Results				
		D	C	E	c	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	M	N	S	s	5' RT	LISS 37C	IAT		
4	Vel-	+	+	0	0	+	0	+	+	0	0	+	+	0	+	0	+	+	+	+	2+	1+ ^w	(0) ^v
5	I-	+	0	0	+	+	0	+	+	+	0	+	0	+	+	+	+	+	+	+	2+	1+ ^w	1+
6	Ge-	+	+	0	+	+	+	+	0	+	+	+	0	+	+	0	+	+	+	+	1+	1+	(0) ^v
7	Tj(a-)	+	+	0	0	+	0	+	+	+	+	+	0	+	+	+	+	+	+	+	1+	0	1+



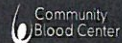
Plasma Testing with Selected Cells

		Rh					Kell		Duffy		Kidd		Lewis		MNS				Plasma Results			
		D	C	E	c	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	M	N	S	s	5' RT	PEG IAT		
1	R ₁ R ₁	+	+	0	0	+	0	+	+	+	+	+	0	+	0	+	0	+	0	2+	@	
2	R ₂ R ₂	+	0	+	+	0	+	+	0	+	0	+	0	0	+	0	+	0	+	1+ ^w	@	
3	R ₀	+	0	0	+	+	0	+	+	0	0	+	0	0	+	+	+	0	0	2+ ^s	@	
4	R ₁ R ₁	+	+	0	0	+	+	+	+	+	0	+	+	0	+	0	+	0	+	2+	@	
5	R ₁ R ₁	+	+	0	0	+	0	+	+	+	+	0	+	0	0	+	0	+	+	1+	@	
8	R ₀ U-	+	0	0	+	+	0	+	0	0	+	0	0	+	0	+	0	0	0	0	0	(0) ^v



Additional Testing

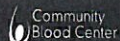
		Rh					Kell		Duffy		Kidd		Lewis		MNS				Plasma Results		
		D	C	E	c	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	M	N	S	s	5' RT	PEG IAT	
6	rr U ^{var}	0	0	0	+	+	0	+	0	0	+	0	0	W	+	+	0	0	0	0	(0)✓
7	R ₂ R ₂ U-	+	0	+	+	0	+	0	+	+	+	0	+	+	0	0	0	0	0	0	(0)✓
9	R ₁ r U-	+	+	0	+	+	0	+	0	0	+	+	0	+	+	+	0	0	0	0	(0)✓
10	R ₀ U-	+	0	0	+	+	0	+	0	0	+	0	0	+	0	+	0	0	0	0	(+)



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Patient Phenotype

	Rh					Kell	Duffy		Kidd		MNS				
	D	C	E	c	e	K	Fy ^a	Fy ^b	Jk ^a	Jk ^b	M	N	S	s	U
Pt. Cells	+	0	0	+	+	0	0	0	+	0	+	+	0	+	+

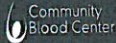
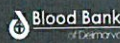


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Prewarm Testing with Selected Cells

		Rh					Kell		Duffy		Kidd		Lewis		MNS				Plasma Results				
		D	C	E	c	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	M	N	S	s	5' RT	PEG IAT	* IAT		
1	R ₁ R ₁	+	+	0	0	+	0	+	+	+	+	+	+	0	+	0	+	0	+	0	2+	@	(0) ✓
2	R ₂ R ₂	+	0	+	+	0	+	+	0	+	+	0	+	0	0	+	0	+	+	1+W	@	(0) ✓	
3	R ₀	+	0	0	+	+	0	+	+	0	0	+	0	0	+	+	+	+	0	2+S	@	(0) ✓	
4	R ₁ R ₁	+	+	0	0	+	+	+	+	+	0	+	+	0	+	0	+	0	+	0	2+	@	(0) ✓
5	R ₁ R ₁	+	+	0	0	+	0	+	+	+	+	0	+	0	0	+	0	+	0	1+	@	(0) ✓	
8	R ₀ U-	+	0	0	+	+	0	+	0	0	+	0	0	+	0	+	0	0	0	0	0	(0) ✓	

* = strict prewarming technique 30' at 37C

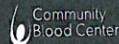
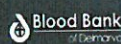


Plasma Testing with Enzyme Treated Cells

		Rh					Kell		Duffy		Kidd		Lewis		MNS				Plasma Results			
		D	C	E	c	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	M	N	S	s	DTT-Tx 5' RT	DTT-Tx PEG IAT		
1	R ₁ R ₁	+	+	0	0	+	0	+	0	+	0	+	0	+	+	0	+	0	+	0	3+	@
2	R ₂ R ₂	+	0	+	+	0	0	+	0	0	+	0	+	0	+	+	0	+	+	0	3+	@
3	rr	0	0	0	+	+	+	+	0	+	0	0	0	0	0	+	0	+	+	0	3+	@

		Rh					Kell		Duffy		Kidd		Lewis		MNS				Plasma Results		
		D	C	E	c	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	M	N	S	s	Ficin-TX 30' 37 C	Ficin-TX PEG IAT	
1	R ₂ R ₂	+	0	+	+	0	0	+	+	+	0	+	0	+	0	+	0	+	0	2+	(0) ✓
2	R ₀ r	+	0	0	+	+	0	+	0	0	+	0	+	+	+	0	+	0	2+	(0) ✓	
3	rr	0	0	0	+	+	0	+	+	0	0	+	0	0	+	+	0	+	2+	(0) ✓	
4	R ₁ R ₁	+	+	0	0	+	0	+	+	0	+	+	0	0	+	+	+	+	2+	(0) ✓	

- Plasma reactivity destroyed by ficin treatment but not affected by DTT treatment of cells



Plasma Testing Against Rare Cells

		Rh					Kell		Duffy		Kidd		Lewis		MNS				Plasma Results				
		D	C	E	c	e	K	k	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	M	N	S	s	S' RT	PEG IAT			
1	U-	+	0	0	+	+	0	+	0	0	+	+	0	0	+	+	0	0	0	0	0	0	(0) ^v
2	U-	+	+	0	+	+	0		+	0	+	0	0	+	+	+	0	0	0	0	0	0	(0) ^v
3	U-	+	+	0	+	+	+	+	0	0	+	0	0	+	+	+	0	0	0	0	0	0	(0) ^v
4	V+VS+ He+	+	0	0	+	+	0	+	0	0	+	+	0	+	+	0	+	+	+	+	+	2+	@
5	Fy(a-b-)	0	0	0	+	+	0	+	0	0	+	+	0	0	+	+	+	+	0	0	0	0	(0) ^v
6	Fy(a-b-)	0	0	0	+	+	0	+	0	0	+	0	0	0	+	+	0	0	+	0	0	0	(0) ^v
7	Trypsin treated	0	0	0	+	+	0	+	0	0	+	0	0	0	0	+	+	0	0	2+	@		
8	Js(b-)	+	0	0	+	+	0	+	0	0	+	+	0	0	0	+	0	+	0	0	0	0	(0) ^v
9	Cord Blood	+	0	0	+	+			0	+	+	0			0		0	+	0	0	0	0	(0) ^v

• Patient can make anti-C, -E, -K, -Js^b, -Fy^a, Jk^b, -S



Blood Group	Antigen	Results	Comments
Rh	c	+	little c+ (partial)
	C	0	
	e	+	Little e+ (partial)
	E	0	
	V	+	
Kell	VS	+	
	K	0	
	k	+	
	Kpa	0	
	Kpb	+	
	Jsa	+	
Duffy	Jsb	0	
	Fya	0	
	Fyb	(0) ^a	Not at risk for anti-Fyb
Kidd	Jka	+	
	Jkb	0	
	M	+	
MNS	N	+	
	S	0	
	s	+	
	U	+	
	Lutheran	Lua	+
Diego	Lub	+	
	Dia	0	
	Dib	+	
Colton	Coa	+	
	Cob	0	
	Doa	0	
Dombrock	Dob	+	
	Hy	+	
	Joa	+	
	Job	+	
Landsteiner-Wiener	LWa	+	
	LWb	0	
Scianna	Sc1	+	
	Sc2	0	

Human Erythrocyte Antigen (HEA) Phenotype by DNA Analysis Report

- Sample contains GATA mutation resulting in loss of Fy^b expression on RBCs
 - Individuals not expected to make anti-Fy^b
- Sample homozygous for c.733C>G associated with partial c and e
 - Patient could produce allo anti-c, anti-e and anti-f



Conclusions from CBC Testing

- Patient plasma reactive:
 - Most cells at 22C
 - Cells agglutinated after incubation in PEG at 37C and washing with saline resulting in invalid IAT.
 - Slightly stronger reactivity with S+ cells at 22C
- Plasma reactive with DTT treated cells
- Plasma nonreactive with:
 - Cells from donors of African descent
 - Cord cells
 - Ficin treated cells
- CBC unable to determine antibody specificity
- Clinical significance unknown
- No common clinically significant alloantibodies present

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Sample Sent To NYBC

- For further serologic evaluation of plasma and genomic investigation of RH and GYPB genes

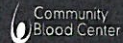


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NYBC Testing



- All testing in IgG Gel test due to sample volume
- Initially reactive 2+ with all NYBC in house panel cells
- Negative with papain treated cells
- Immucor cells:
 - S+ s- U+ nonreactive
 - S- s+ U+ nonreactive
- Uvar Dantu+: 1 weakly reactive; 1 nonreactive
- S- s- He +: 1 reactive
- Donor segments:
 - 2 S+ s- reactive 2+
 - 2 S- s+ reactive 2+

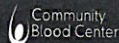
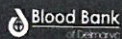


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NYBC Testing

- Lack of reactivity with Immucor cells may be related to suspension medium
- No indication of anti-Js^b since Js(b+) cell was nonreactive.
- Ran out of sample; no further serologic testing performed



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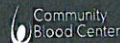
Rh Genotype Results from NYBC

RH alleles

- *RHD* homozygote
 - No changes associated with common or partial D or weak D
- *RHCE*ce(733G)* homozygote
 - Associated with partial c, partial e, and a V+ VS+, hr^{B-} phenotype

Predicted Rh Phenotype:

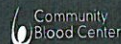
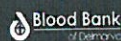
- D+, C-, E-, c+(partial), e+(partial), V+ VS+, hr^{B-}, hr^{S+}



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Rh Genotype Results from NYBC

- Patient has apparent conventional RHD alleles
- Patient is at risk for allo anti-C and allo anti-E
- Additionally anti-e-like and/or -c, -ce(-f), or hr^B-like reactivity has been observed in patient's with this phenotype most often in the presence of other RH antibodies
 - Vast majority are not associated with clinically significant hemolysis
- For prophylactic Rh antigen matching, patient should receive C-E-units
 - May reduce the risk of production of anti-e or -hr^B specificities.



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Investigation of *GYP A* by NYBC

- Genotype: *GYP A**03/*04(38A)
 - Predicted phenotype: M+N+
- *GYP A* sequencing by Sanger and Illumina short read sequencing identified changes in *GYP A* exon 2 associated with M and N
 - Additional c.38C>A (p.Glu) and c.93C>T (silent) changes
- *GYP A**N with c.38A and c.93T reported by ErythroGene with overall frequency of 10.9%
- Impact of *GYP A* allele is not known. Not expected to be associated with production of anti-GPB

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Investigation of *GYP B* by NYBC

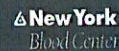
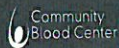
- *GYP B* multiplex: positive for null allele *GYP B**05N.01
- Genotype: *GYP B**04/*05N.01
 - Predicted phenotype: S-s+, U+
- Sample has conventional *GYP B**s in trans to deleted *GYP B* indicating single dose s antigen expression
- No changes found on *GYP B**s by Illumina short read sequencing to explain apparent anti-U-like/-GPB in plasma

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NYBC Conclusion



- No clear conclusion due to lack of sample
- Genotype indicated only single allele for s antigen expression
- No genomic explanation for anti-U-like antibody in plasma testing from CBC

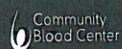


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Patient Follow Up

- Patient delivered baby with no complications
- Patient and baby discharged from hospital
- No baby results obtained from hospital
- Requested additional patient sample be collected during maternal/baby follow up visits
 - No sample on baby or additional patient sample sent to our lab to date



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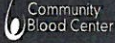



Vox Sanguinis (2002) 83, 51–54
© 2002 Blackwell Science

ORIGINAL PAPER

Anti-U-like: a common antibody in Black individuals

D. Janvier¹, Y. Lam² Et J. Maury³

¹ST-Louis,
²Lariboisière, and
³Tenon, EFS Ile-de-France sites, Paris, France


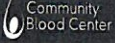

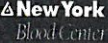

    

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Anti-U^Z

- 1978 Booth published a paper in which further studies were completed and further classification of anti-U^Z.^{3,4}
- Characteristics:^{1,4,5}
 - Cold reactive antibody
 - High-incidence antigen
 - Variable expression
 - Absent from S-s-U- RBCs
 - More strongly expressed by S+ RBCs
 - Greater quantity of glycoprotein B on S+ cells
 - Protease sensitive

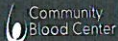
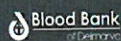
    

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Associations/Significance

- No relationship with a pathological condition
- Most patients were of African origin
- Other studies have linked several cases of auto anti-U with AIDS patients
 - No HIV/AIDS involved in this study
- Most likely of little clinical significance
 - Cold, LISS-reactive



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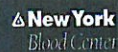
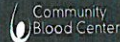
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Anti-U^Z found in mother's serum and child's eluate

S.M. READ, M.M. TAYLOR, M.E. REID, AND M.A. POPOVSKY

IMMUNOHEMATOLOGY, VOLUME 9, NUMBER 2, 1993



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Case Report Conclusions

- Clinical significance in pregnancy
 - Crossed placenta and caused positive DAT on cord RBCs
 - No HDFN observed
 - May be a transient alloantibody
 - Same reactivity observed during 2nd and 3rd pregnancy
 - Not detected 3 months prior to delivery of 4th child
- MMA indicated transfusion of S+ or U+ would not result in overt hemolysis

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