



# Community Blood Center

Save a Life. **Right Here, Right Now.**

 **New York** *Blood Center*

# BAD TO THE BONE...MARROW



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Lead Technologist

# OBJECTIVES

- Discuss the need for accurate patient medical history.
- List the benefits of genotyping BMT recipients and donors prior to transplantation.

# PATIENT ADMIT INFORMATION

Patient is a Caucasian female

- Age
  - 25yrs
- Diagnosis
  - Hodgkin's lymphoma
- Transfusion history
  - No prior transfusions

# INFORMATION FROM HOSPITAL BLOOD BANK

- Getting weak back type
- DAT 1+ IgG – did not prepare eluate
- Antibody reactivity at all phases
- Patient is difficult in giving consent to be drawn

# JUNE 2015 – INITIAL IRL TESTING RESULTS

	Anti-A	Anti-B	Anti-D	Rh Cont.	A <sub>1</sub> Cell	B Cell	Interpretation
RT	0	0	0	0	2+ <sup>mf</sup>	0	?
15 min RT	0	0	0	0	3+ <sup>mf</sup>	0	?

	Poly	IgG	C3	Saline
RT	1+w	0✓	m <sup>w</sup>	0
5"	1+w		1+ <sup>w</sup>	0

# PANEL TESTING

	D	C	E	c	e	M	N	S	s	Le <sub>a</sub>	Le <sub>b</sub>	P <sub>1</sub>	K	Fy <sub>a</sub>	Fy <sub>b</sub>	Jk <sub>a</sub>	Jk <sub>b</sub>	5' rt	LISS <sub>37</sub>	iAT
1	0	0	+	+	+	+	0	+	0	0	+	+	0	0	+	+	+	0	0	0√
2	+	0	+	+	0	+	0	+	+	0	+	+	0	0	+	+	0	3+	3+	1+
3	+	0	+	+	0	+	+	0	+	0	+	+	0	+	0	+	+	3+	3+	1+
4	0	+	0	+	+	+	+	0	+	0	+	+	0	0	+	+	+	0	0	0√
5	0	0	+	+	+	0	+	0	+	0	+	+	+	0	+	0	+	2+	2+	1+
6	0	0	0	+	+	+	+	+	+	+	0	0	0	+	+	+	+	0	0	0√
7	0	+	0	+	+	+	0	0	+	0	+	0	0	+	+	+	0	0	0	0√
8	0	0	0	+	+	0	+	0	0	0	+	+	0	0	0	+	0	0	0	0√
9	0	0	0	+	+	0	+	+	+	0	+	0	+	+	+	+	+	2+	2+	1+
10	0	0	0	+	+	+	0	+	0	0	+	+	0	+	+	0	+	0	0	0√
11	0	0	+	+	+	+	+	0	+	0	+	+	0	+	0	0	+	0	0	m
12	0	0	0	+	+	0	+	0	+	0	+	0	0	+	0	0	+	0	0	0√
13	0	0	0	+	+	0	+	+	+	+	0	+	0	0	+	0	+	0	0	0√
ac																		0	0	0√

# PANEL RESULTS

	D	C	E	<del>c</del>	<del>e</del>	<del>M</del>	<del>N</del>	<del>S</del>	<del>s</del>	<del>Le</del> a	<del>Le</del> b	<del>P<sub>1</sub></del>	K	<del>F<sub>y</sub></del> a	<del>F<sub>y</sub></del> b	<del>J<sub>k</sub></del> a	<del>J<sub>k</sub></del> b	5' rt	LISS <sub>37</sub>	iAT
1	0	0	+	+	+	+	0	+	0	0	+	+	0	0	+	+	+	0	0	0√
2	+	0	+	+	0	+	0	+	+	0	+	+	0	0	+	+	0	3+	3+	1+
3	+	0	+	+	0	+	+	0	+	0	+	+	0	+	0	+	+	3+	3+	1+
4	0	+	0	+	+	+	+	0	+	0	+	+	0	0	+	+	+	0	0	0√
5	0	0	+	+	+	0	+	0	+	0	+	+	+	0	+	0	+	2+	2+	1+
6	0	0	0	+	+	+	+	+	+	+	0	0	0	+	+	+	+	0	0	0√
7	0	+	0	+	+	+	0	0	+	0	+	0	0	+	+	+	0	0	0	0√
8	0	0	0	+	+	0	+	0	0	0	+	+	0	0	0	+	0	0	0	0√
9	0	0	0	+	+	0	+	+	+	0	+	0	+	+	+	+	+	2+	2+	1+
10	0	0	0	+	+	+	0	+	0	0	+	+	0	+	+	0	+	0	0	0√
11	0	0	+	+	+	+	+	0	+	0	+	+	0	+	0	0	+	0	0	m
12	0	0	0	+	+	0	+	0	+	0	+	0	0	+	0	0	+	0	0	0√
13	0	0	0	+	+	0	+	+	+	+	0	+	0	0	+	0	+	0	0	0√
ac																		0	0	0√



# WHAT DO WE KNOW?

## ABO/Rh

- Inconclusive; forward type and reverse type do not match
- Rh appears to be negative

## DAT

- Positive
  - Need to prepare eluate

## Plasma

- Apparent anti-D, anti-K and ?
  - More work needed still need to rule in/out anti-E and anti-Fy<sup>a</sup>



# ADDITIONAL TESTING RESULTS

	D	C	<del>E</del>	c	e	M	N	S	s	Le <sub>a</sub>	Le <sub>b</sub>	P <sub>1</sub>	K	<del>Fy<sub>a</sub></del>	Fy <sub>b</sub>	Jk <sub>a</sub>	Jk <sub>b</sub>	Liss IAT		ELUATE PEG ITA
1	0	0	+	+	+	+	+	+	+	+	0	0	0	+	0	0	+	0√		0√
2	+	+	+	0	+	0	+	0	+	0	+	+	0	+	+	+	0	/		m
3	+	+	0	0	+	+	0	+	0	0	0	+	0	+	0	+	0	/		0√
4	0	0	0	+	+	+	0	+	+	0	+	0	+	0	+	+	0	/		0√
5	0	0	0	+	+	0	+	0	+	+	0	+	0	+	0	+	0	/		0√
6	0	+	0	+	+	+	+	+	+	0	+	+	0	+	0	0	+	/		0√
7	+	+	0	0	+	+	0	0	+	0	0	0	+	+	+	+	+	/		0√
ac																		/		/

# WHAT OTHER INFORMATION DO WE NEED?

- ABO reverse type mixed field reactions?
  - Important?
    - Possible cause(s)?
- Has the patient really had no transfusions?
  - There are no records for her in our computer
- Could someone please speak to the patient or her family to verify there have not been any recent transfusions?
  - Maybe when she had the BMT
- When?
  - She received a BMT in February 2015
- Where?
  - Contact the facility

# WHAT THE OTHER GUYS KNEW

- The patient typed as B Positive and in February 2015 received an O Negative BMT.
- Since that time she was found to have anti-D, anti-K and a warm autoantibody.

# WHAT WE KNOW...NOW

## ABORh

- consistent with a BMT patient historically B Positive receiving an O Negative

## Plasma

- anti-D and anti-K, also reactivity with one D-negative, K-negative cell with no apparent specificity

## Eluate

- Weakly reactive with 7 of 20 cells; no specificity was apparent.

Any ideas on what else to do?

# SIX MONTHS LATER...SHE IS BACK

- December 2<sup>nd</sup> the patient is back
- Hgb: 5.4
- DX: WAIHA, severe anemia; encephalopathy, Hodgkin's Lymphoma in relapse; patient to receive probable exchange transfusion or plasma pheresis
- Patient history: BMT B+ to O-; anti-D, anti-K in the plasma; and weak unidentified in plasma and eluate.
- Hospital will not transfuse unless patient drops below 5g Hgb
- Patient has not been recently transfused

# HEMOGLOBIN DROPS

12-2: 2 rbcs, group O; D-, K-

12-3: 4 rbcs; group O; D-, K-

12-4: 3 rbcs; group O; D-, K-

12-5: 2 rbcs; group O; D-, K-

12-6: 4 rbcs; group O; D-, K-

12-7: 3 FFP

A call is made to the reference lab...



# DECEMBER 7<sup>TH</sup>... THE CALL



more awesome pictures at [THEMETAPICTURE.COM](http://THEMETAPICTURE.COM)

# HAVING LUNCH



# WE HAVE AN ISSUE



# WHAT'S UP?



# SHE'S BACK AND...

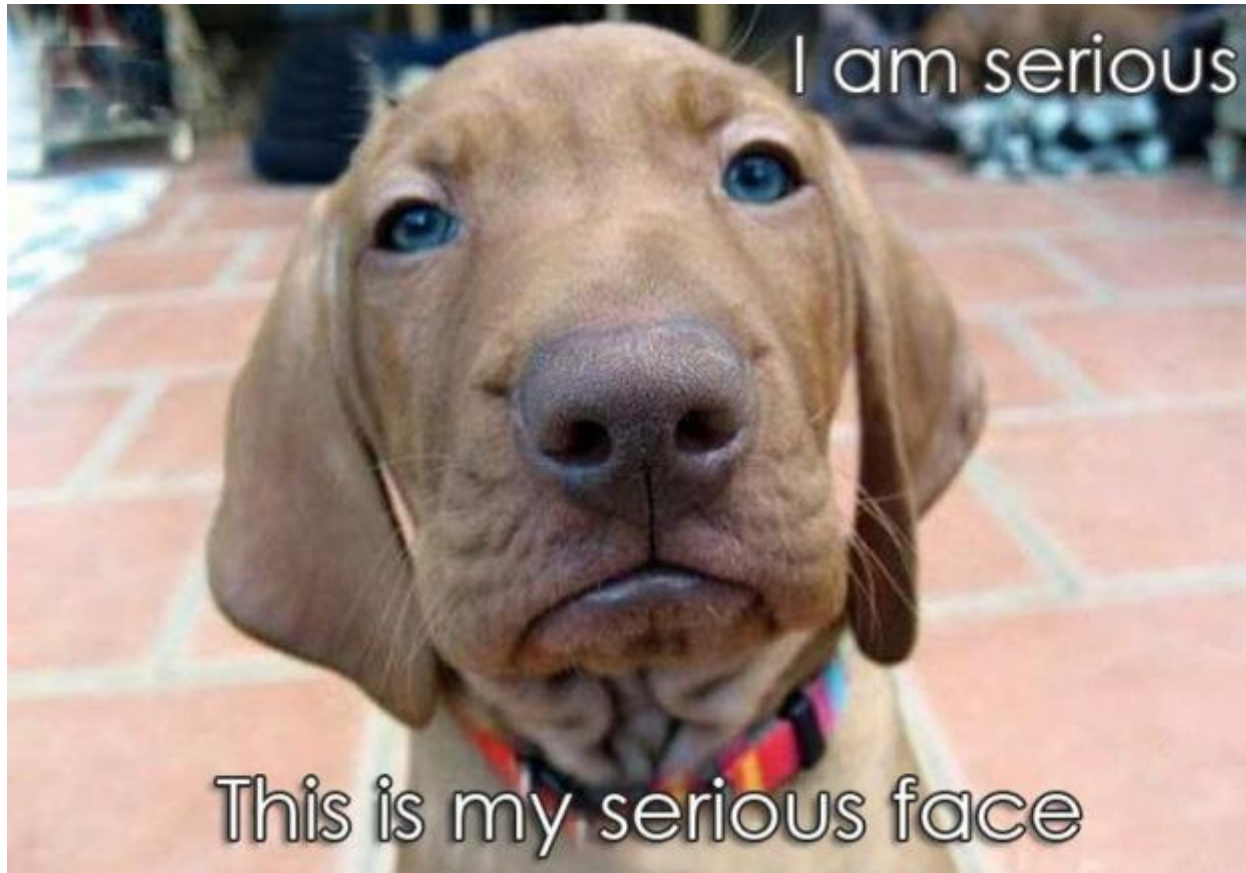


# SERIOUSLY?





# YES!



# WE WILL BE WAITING





# IRL TESTING

	Anti-A	Anti-B	Anti-D	Rh Cont.	A <sub>1</sub> Cell	B Cell	Interpretation
RT	0	0	2+	2+	4+	0	?
Warm washed x4			1+	1+			?
Warm washed x8			1+	1+			?

	Poly	IgG	C3	Saline
IS	3+	3+	2+	1+
WW x12	4+	4+	3+	m
WW x14	4+	4+	2+	0√

# INITIAL PANEL RESULTS

	D	C	E	c	e	M	N	S	s	Le <sub>a</sub>	Le <sub>b</sub>	P <sub>1</sub>	K	Fy <sub>a</sub>	Fy <sub>b</sub>	Jk <sub>a</sub>	Jk <sub>b</sub>	5' rt	LISS 37C **	iAT
1	0	+	0	+	+	+	0	+	0	0	+	+	0	+	+	+	0	0	0	2+
2	0	0	+	+	+	+	+	+	0	0	+	+	0	+	+	+	0	0	0	2+
3	0	0	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	0	0	3+
4	0	0	0	+	+	0	+	+	+	+	0	0	0	+	0	0	+	0	0	2+
5	0	+	0	+	+	+	+	0	+	0	+	+	0	+	0	+	0	0	0	2+
6	0	0	+	+	+	+	+	0	+	0	+	+	0	+	0	0	+	0	0	3+
7	0	0	0	+	+	+	0	+	0	0	+	+	0	+	0	+	0	0	0	3+
8	0	0	0	+	+	+	0	0	+	+	0	+	0	0	+	+	0	0	0	3+
9	0	0	0	+	+	+	0	0	+	0	+	0	0	0	+	0	+	0	0	3+
ac*																		0	0	3+
11	0	+	0	0	+	+	+	0	+	+	0	+	0	0	+	+	+	0	0	1+
12	0	+	0	0	+					0	0	+	0	0	0	+	+	0	0	1+
13	0	0	+	+	0	+	0	+	0	+	0	+	0	0	+	+	0	0	0	2+

# INITIAL PANEL INTERPRETATION

	D	C	E	c	e	M	N	S	s	Le <sub>a</sub>	Le <sub>b</sub>	P <sub>1</sub>	K	Fy <sub>a</sub>	Fy <sub>b</sub>	Jk <sub>a</sub>	Jk <sub>b</sub>	5'rt	LISS 37C **	iAT
1	0	+	0	+	+	+	0	+	0	0	+	+	0	+	+	+	0	0	0	2+
2	0	0	+	+	+	+	+	+	0	0	+	+	0	+	+	+	0	0	0	2+
3	0	0	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	0	0	3+
4	0	0	0	+	+	0	+	+	+	+	0	0	0	+	0	0	+	0	0	2+
5	0	+	0	+	+	+	+	0	+	0	+	+	0	+	0	+	0	0	0	2+
6	0	0	+	+	+	+	+	0	+	0	+	+	0	+	0	0	+	0	0	3+
7	0	0	0	+	+	+	0	+	0	0	+	+	0	+	0	+	0	0	0	3+
8	0	0	0	+	+	+	0	0	+	+	0	+	0	0	+	+	0	0	0	3+
9	0	0	0	+	+	+	0	0	+	0	+	0	0	0	+	0	+	0	0	3+
ac*																		0	0	3+
11	0	+	0	0	+	+	+	0	+	+	0	+	0	0	+	+	+	0	0	1+
12	0	+	0	0	+					0	0	+	0	0	0	+	+	0	0	1+
13	0	0	+	+	0	+	0	+	0	+	0	+	0	0	+	+	0	0	0	2+

# ONCE AGAIN

## ABO

- Consistent with patient history

## Rh

- ??

## Plasma

- possible anti-c, warm auto, and Rouleaux

# ELUATE RESULTS

	D	C	E	c	e	M	N	S	s	Le <sub>a</sub>	Le <sub>b</sub>	P <sub>1</sub>	K	Fy <sub>a</sub>	Fy <sub>b</sub>	Jk <sub>a</sub>	Jk <sub>b</sub>	Acid Eluate PEG IAT
1	0	+	0	+	+	+	0	+	0	0	+	+	0	+	+	+	0	@
2	0	0	+	+	+	+	+	+	0	0	+	+	0	+	+	+	0	@
3	0	0	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	@
4	0	0	0	+	+	0	+	+	+	+	0	0	0	+	0	0	+	@
5	0	+	0	+	+	+	+	0	+	0	+	+	0	+	0	+	0	@
6	0	0	+	+	+	+	+	0	+	0	+	+	0	+	0	0	+	@
7	0	0	0	+	+	+	0	+	0	0	+	+	0	+	0	+	0	@
8	0	0	0	+	+	+	0	0	+	+	0	+	0	0	+	+	0	@
9	0	0	0	+	+	+	0	0	+	0	+	0	0	0	+	0	+	@
ac*																		/
11	0	+	0	0	+	+	+	0	+	+	0	+	0	0	+	+	+	@
12	0	+	0	0	+					0	0	+	0	0	0	+	+	@
13	0	0	+	+	0	+	0	+	0	+	0	+	0	0	+	+	0	@

# NOW WHAT?

- Plasma panel is all positive; however, it is stronger with c+ cells
- The acid eluate is agglutinated after washing – what does this mean?
- Any suggestions?

# ALLO ADSORPTIONS

$R_1R_1$  cell; K-; Fy(a+b-); Jk(a-b+); S-, s+

- D+, C+, e+; Jk(b+) and E-, c-; K-; Fy(a-b-); Jk(a-); S-, s-

$R_2R_2$  cell; K-; Fy(a+b-); Jk(a-b+); S-; s+

- D+, E+, c+, Jk(b+) and C-, e-; K-; Fy(a-b-); Jk(a-); S-, s-

rr cell; K-, Fy(a+b+); Jk(a+b-); S+; s+

- c+, e+; Jk(a+) and D-, C-, E-; K-; Fy(a-b-); Jk(b-); S-, s-

All cells used for adsorbing were ficin treated.

All adsorptions were performed at 37C and each was sequentially adsorbed X 4

# ADSORBED PLASMA TESTING

	D	C	E	c	e	M	N	S	s	Le <sub>a</sub>	Le <sub>b</sub>	P <sub>1</sub>	K	Fy <sub>a</sub>	Fy <sub>b</sub>	Jk <sub>a</sub>	Jk <sub>b</sub>	R1R1	R2R2	rR
1	0	+	0	+	+	+	0	+	0	0	+	+	0	+	+	+	0	1+	0√	0√
2	0	0	+	+	+	+	+	+	0	0	+	+	0	+	+	+	0	2+	0√	0√
3	0	0	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	2+	0√	0√
4	0	0	0	+	+	0	+	+	+	+	0	0	0	+	0	0	+	2+	0√	0√
5	0	+	0	+	+	+	+	0	+	0	+	+	0	+	0	+	0	1+	0√	0√
6	0	0	+	+	+	+	+	0	+	0	+	+	0	+	0	0	+	2+	0√	0√
7	0	0	0	+	+	+	0	+	0	0	+	+	0	+	0	+	0	2+	0√	0√
8	0	0	0	+	+	+	0	0	+	+	0	+	0	0	+	+	0	2+	0√	0√
9	0	0	0	+	+	+	0	0	+	0	+	0	0	0	+	0	+	2+	0√	0√
10	+	0	+	+	0	+	+	0	+	0	+	+	0	0	+	0	+	2+	/	0√
11	+	+	0	0	+	0	+	0	+	0	0	+	0	0	+	0	+	0√	/	0√
12	+	+	0	0	+	+	0	+	+	+	0	+	0	+	0	0	+	0√	/	0√



# ADSORBED PLASMA TESTING

	D	C	E	c	e	M	N	S	s	Le <sub>a</sub>	Le <sub>b</sub>	P <sub>1</sub>	K	Fy <sub>a</sub>	Fy <sub>b</sub>	Jk <sub>a</sub>	Jk <sub>b</sub>	R1R1	R2R2	rr
1	0	+	0	+	+	+	0	+	0	0	+	+	0	+	+	+	0	1+	0√	0√
2	0	0	+	+	+	+	+	+	0	0	+	+	0	+	+	+	0	2+	0√	0√
3	0	0	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	2+	0√	0√
4	0	0	0	+	+	0	+	+	+	+	0	0	0	+	0	0	+	2+	0√	0√
5	0	+	0	+	+	+	+	0	+	0	+	+	0	+	0	+	0	1+	0√	0√
6	0	0	+	+	+	+	+	0	+	0	+	+	0	+	0	0	+	2+	0√	0√
7	0	0	0	+	+	+	0	+	0	0	+	+	0	+	0	+	0	2+	0√	0√
8	0	0	0	+	+	+	0	0	+	+	0	+	0	0	+	+	0	2+	0√	0√
9	0	0	0	+	+	+	0	0	+	0	+	0	0	0	+	0	+	2+	0√	0√
10	+	0	+	+	0	+	+	0	+	0	+	+	0	0	+	0	+	2+	/	0√
11	+	+	0	0	+	0	+	0	+	0	0	+	0	0	+	0	+	0√	/	0√
12	+	+	0	0	+	+	0	+	+	+	0	+	0	+	0	0	+	0√	/	0√

# ADSORBED PLASMA TESTING

	D	C	E	c	e	M	N	S	s	Le <sub>a</sub>	Le <sub>b</sub>	P <sub>1</sub>	K	Fy <sub>a</sub>	Fy <sub>b</sub>	Jk <sub>a</sub>	Jk <sub>b</sub>	R1R1	R2R2	rr
1	0	+	0	+	+	+	0	+	0	0	+	+	0	+	+	+	0	1+	0√	0√
2	0	0	+	+	+	+	+	+	0	0	+	+	0	+	+	+	0	2+	0√	0√
3	0	0	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	2+	0√	0√
4	0	0	0	+	+	0	+	+	+	+	0	0	0	+	0	0	+	2+	0√	0√
5	0	+	0	+	+	+	+	0	+	0	+	+	0	+	0	+	0	1+	0√	0√
6	0	0	+	+	+	+	+	0	+	0	+	+	0	+	0	0	+	2+	0√	0√
7	0	0	0	+	+	+	0	+	0	0	+	+	0	+	0	+	0	2+	0√	0√
8	0	0	0	+	+	+	0	0	+	+	0	+	0	0	+	+	0	2+	0√	0√
9	0	0	0	+	+	+	0	0	+	0	+	0	0	0	+	0	+	2+	0√	0√
10	+	0	+	+	0	+	+	0	+	0	+	+	0	0	+	0	+	2+	/	0√
11	+	+	0	0	+	0	+	0	+	0	0	+	0	0	+	0	+	0√	/	0√
12	+	+	0	0	+	+	0	+	+	+	0	+	0	+	0	0	+	0√	/	0√

# WHAT DOES IT ALL MEAN?

## ABO/Rh

- ABO was consistent with previous results
- Rh?

## Eluate

- Probable WAIHA

## Plasma

- Probable WAIHA (also: rouleaux observed with all cells at LISS 37C)

## Alloabsorbed plasma

- **Anti-c is present**, the previous anti-D is no longer being detected

We did not perform any testing to re-identify the anti-K

# WHAT ABOUT DNA?

IRL uncomfortable performing serologic and blood DNA

- Why?
  - Patient reported to only be 98% engrafted
- Options?
  - Buccal swab of patient to obtain original genotype
    - Submitting client did not want to do this
  - Unable to obtain BMT source genotype/phenotype

# WELL...WHAT HAPPENED?

12-8: at 08:15 Hgb: 4.5g;

- Transfused 2 rare rbc: O-, c-, K-. This did not work. The patient's hemoglobin continued to drop.
- Transfused 1 rbc: O-, K-, and 4 FFP

12-9: at 04:10 Hgb: 5.0g;

bilirubin: 8 (normal range 0.3-1.2)

direct bilirubin: 0.9 (normal range < 0.4)

Hospital to perform plasma pheresis and RBC exchange:

- RBC exchange used 8 rbc: O-, K-

In total the patient received:

- 23 O neg, K- rbc
- 2 O neg, K-, c- rbc
- 5 group O, FFP
- 2 group A, FFP – yes, group A

# AND...

The submitting hospital blood bank received a Christmas card from the patient to Thank them for giving her...





# The End



# Community Blood Center

Save a Life. **Right Here, Right Now.**

 **New York** *Blood Center*