



ABO Typing Discrepancy Essentials

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HAABB – FALL Speaker Event

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Outline

- ABO Discrepancy Rules – Dr. Nicole Draper
- 4 Cases – 4 Possibilities – 4 Explanations
 - Antibody Gain
 - Antigen Gain
 - Antibody Loss
 - Antigen Loss

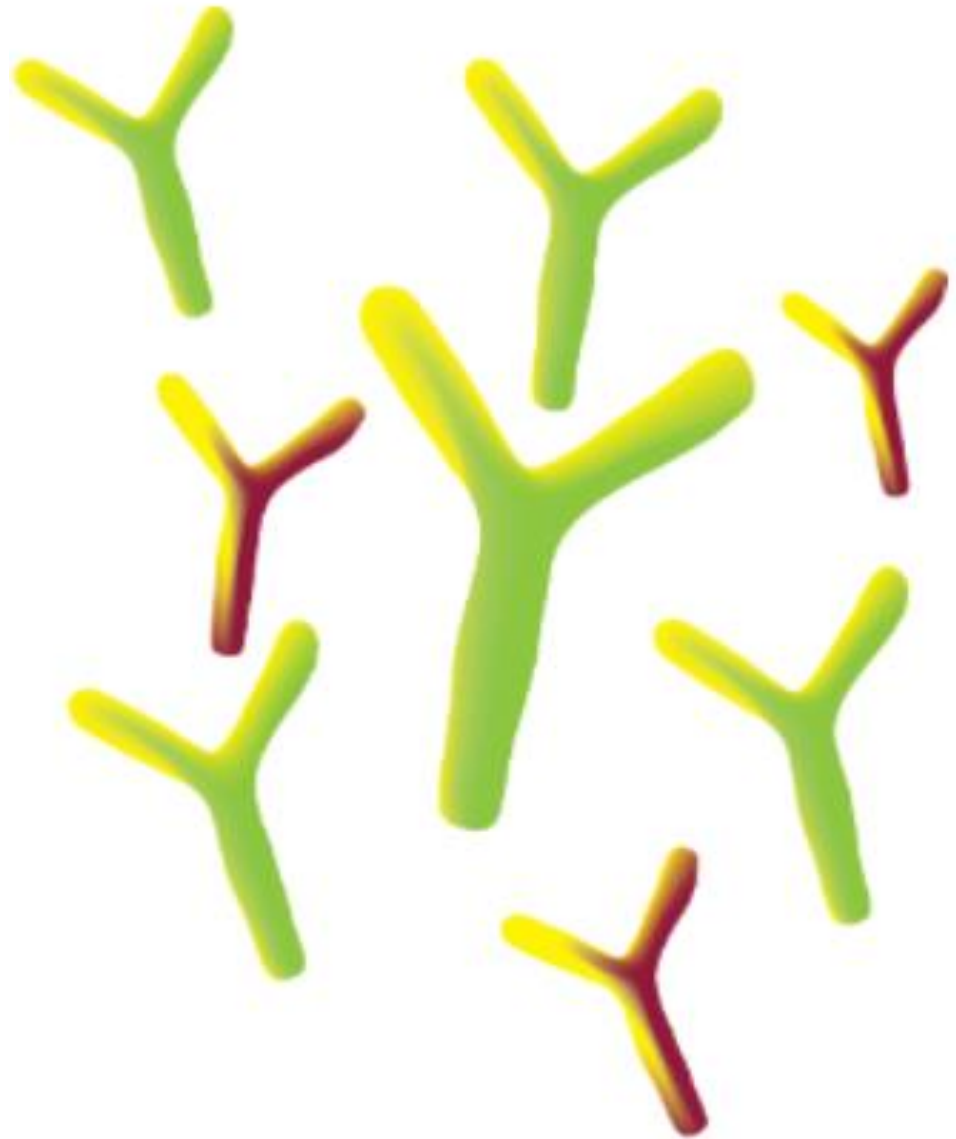
RULE #1

Weak reactions
are usually the
discrepant
reactions



RULE #2

Antibody
problems are
much more
common than
antigen problems



RULE #3

Check into the
patient's clinical
history



CASE #1

Gel Testing

Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
4+	0	4+	3+	4+

Forward Type

A+

Reverse Type

0

Tube Testing

Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
4+	0	4+	3+	4+

Forward Type

A+

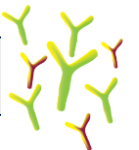
Reverse Type

0



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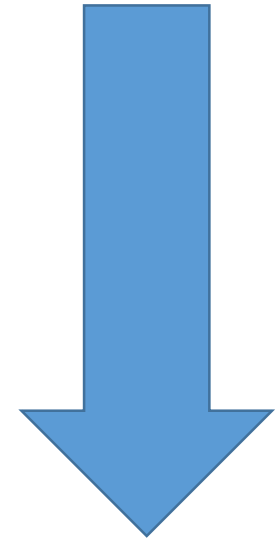
CASE #1: Further Testing

Cell/Unit #	Tube IS
A1 Positive	3+
A1 Positive	3+
A1 Negative	3+
A1 Negative	3+
A2 Cells	3+
A2 Cells	3+
Antigen Typing: A1 Positive	

Antibody Screen/Panel				
Donor	IS	AHG	REST	CC
R1R1	2+	1+	1+ ^w	N/A
R2R2	3+	1+	1+ ^w	N/A
rr	3+	2+	1+	N/A

Incubate RBCs at 37C and washing w/warm saline, testing serum grouping w/adsorbed serum.

Note: DAT invalid b/c positive saline control, patient's RBC demonstrated spontaneous aggregation



Cold Auto-Ab



71 y/o man who was
admitted for a right
frontal lobe
contusion and
subdural hematoma
after falling off a bar
stool

☐
☐
☐
☐
☐
☐
☐

Cold Auto-Ab/ Cold Autoimmune Hemolytic Anemia

- IgM autoantibody leads to RBC agglutination at cold temperatures
- Idiopathic or secondary to a variety of diseases
- Clinical severity depends:
 - thermal amplitude
 - antibody's ability to fix complement and
 - antibody titer
- ***Prewarming may mitigate reactivity***

Antibody Gain

1. ABO subgroups -20% A2

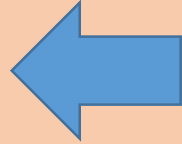
2. Cold reacting autoAb

3. Medications – DARA,
Anti-CD47

1. IVIG

2. MM or Waldenstroms
Hypergammaglobulinemia

3. Transplantation



CASE #2

Gel Testing

Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
3+	1+	3+	0+	4+

Forward Type

AB+

Reverse Type

A

Tube Testing

Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
3+	1+	3+	0+	4+

Forward Type

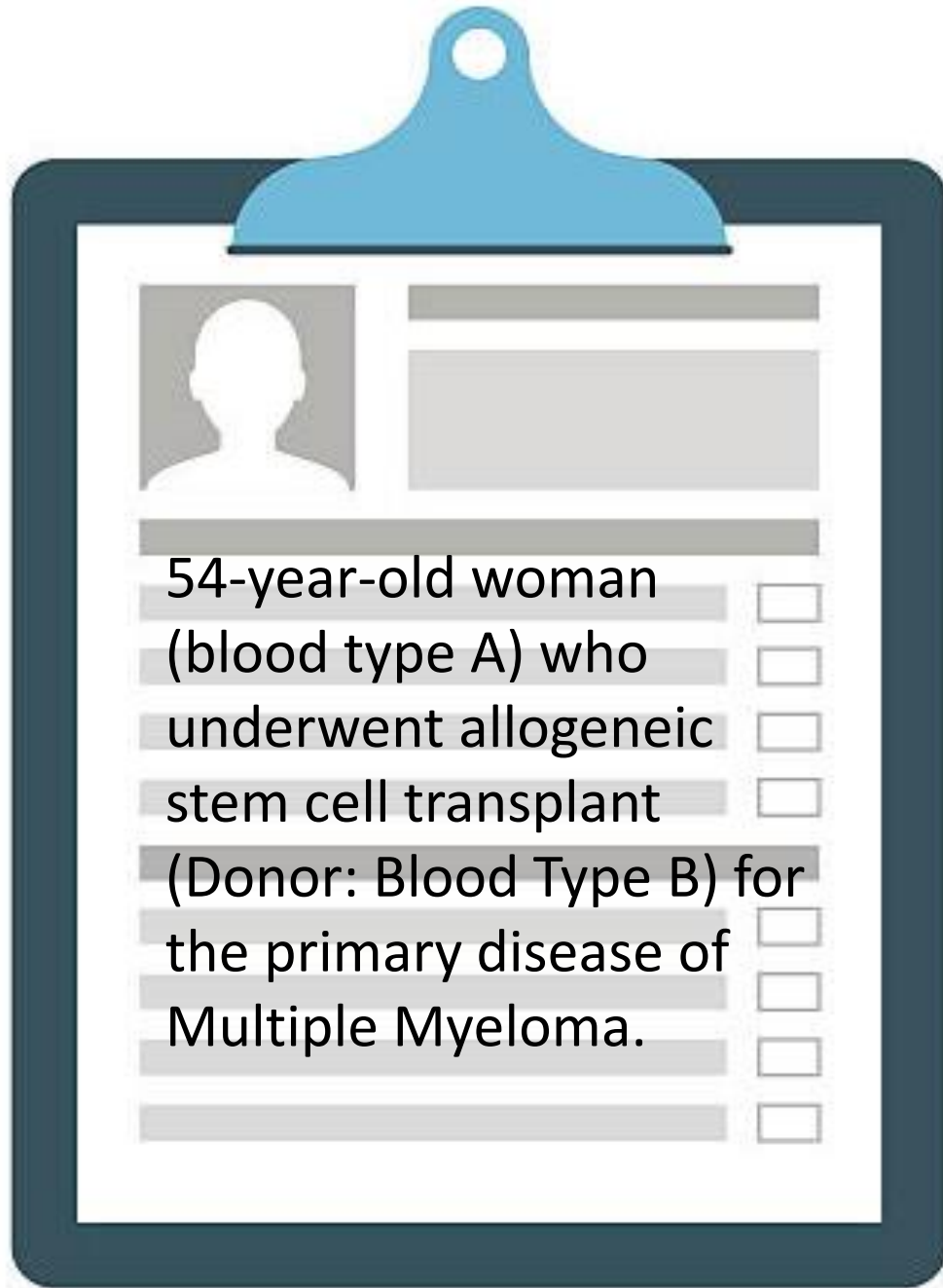
AB+

Reverse Type

O



RULE #1: Weak reactions is usually the discrepant reactions



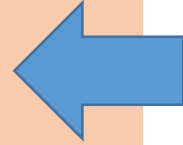
A clipboard with a blue clip at the top. The form on the clipboard includes a silhouette of a person in a grey box, followed by several horizontal grey bars for text entry. The text on the form reads: "54-year-old woman (blood type A) who underwent allogeneic stem cell transplant (Donor: Blood Type B) for the primary disease of Multiple Myeloma." To the right of the text are seven empty checkboxes.

54-year-old woman
(blood type A) who
underwent allogeneic
stem cell transplant
(Donor: Blood Type B) for
the primary disease of
Multiple Myeloma.



Antigen Gain

1. Transfusion
2. Rouleaux
3. Acquired B
4. (Stem Cell) Transplantation
5. Rare AB phenotype



CASE #3

Gel Testing

Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
0	0	0	2+	0

Forward Type

O=

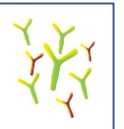
Reverse Type

B



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Tube Testing

Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
0	0	0	2+	1+

Forward Type

O=

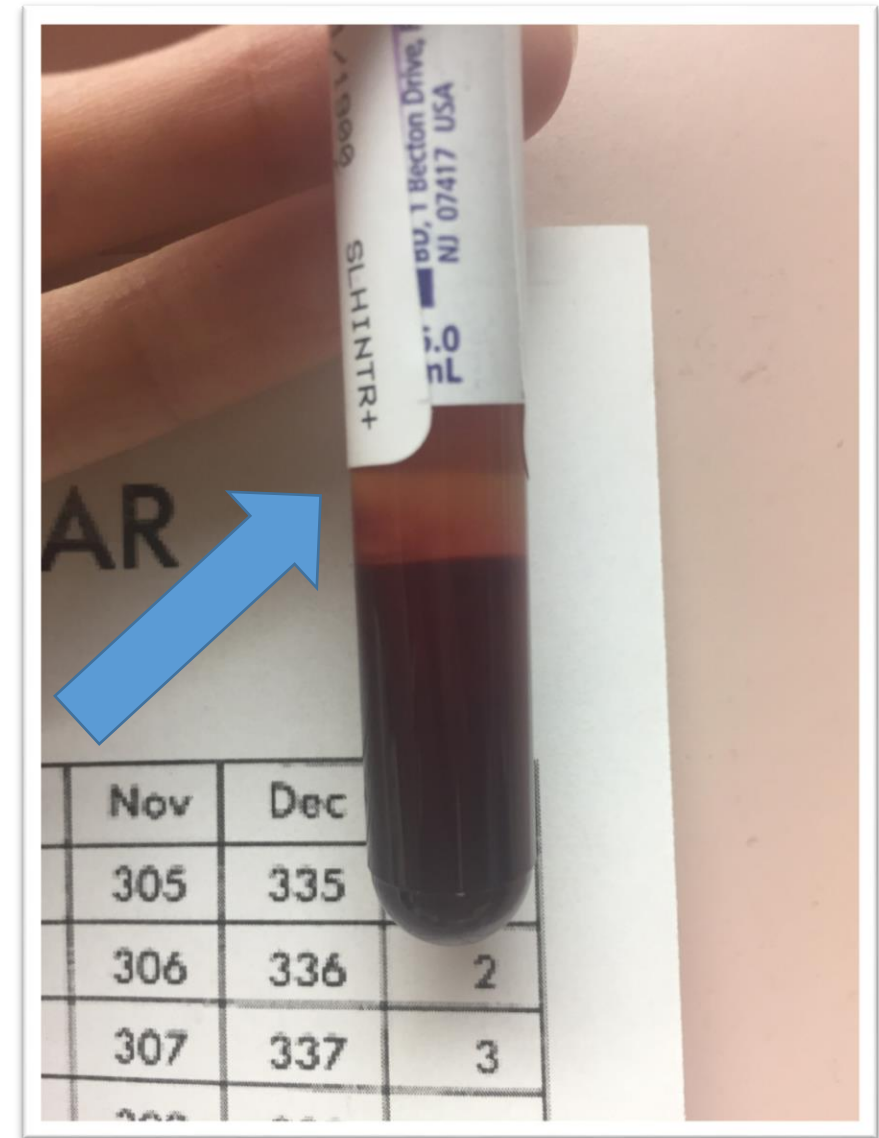
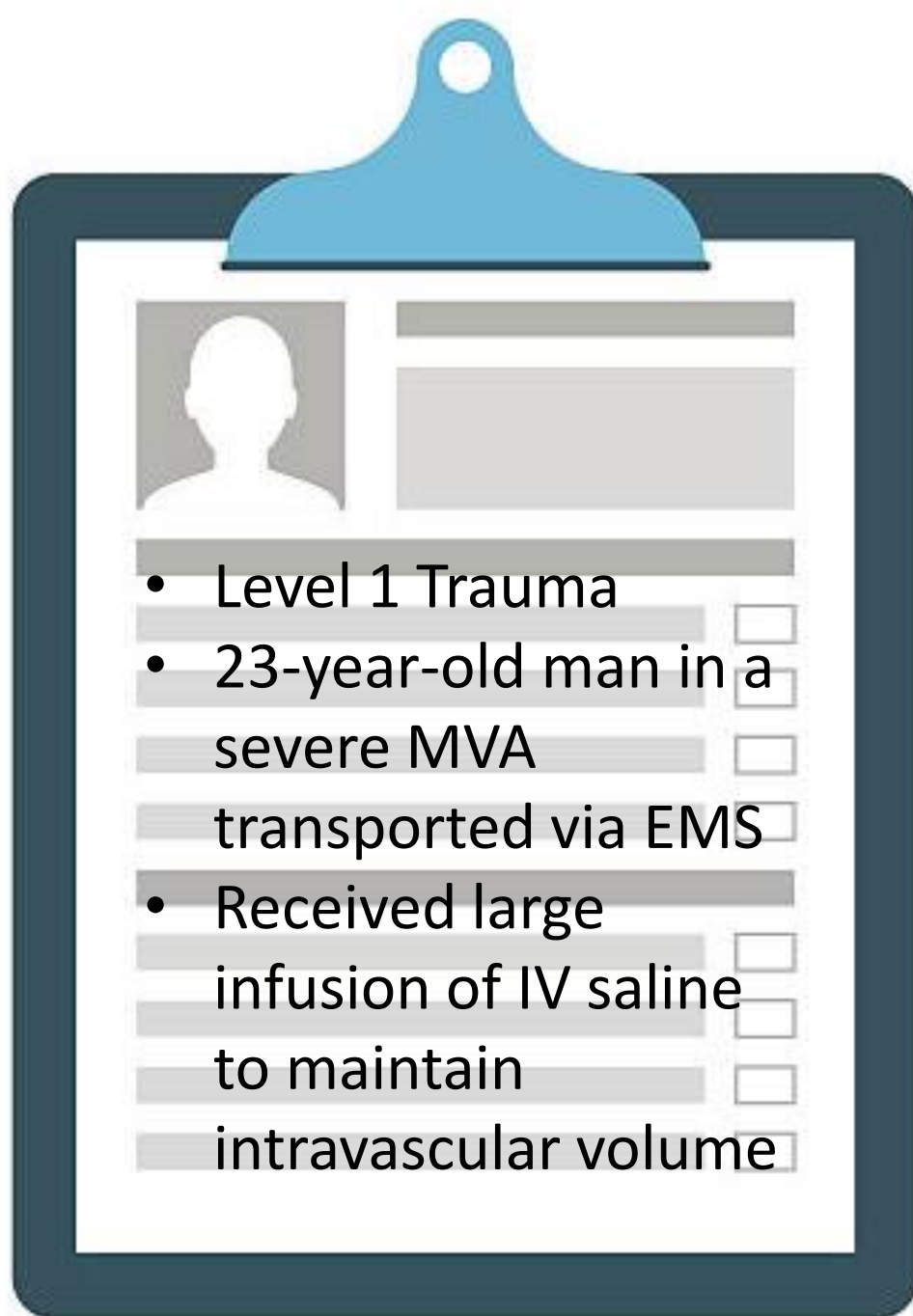
Reverse Type

O



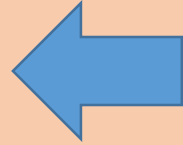
RULE #3: Check the clinical history





Antibody Loss

1. Immunosuppressed
2. Transplantation
3. Age spectrums
4. Dilutional effect



CASE #4

Gel Testing

Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
0	0	4+	0	4+

Forward Type

O+

Reverse Type

A

Tube Testing

Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
0	0	4+	0	4+

Forward Type

O+

Reverse Type

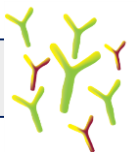
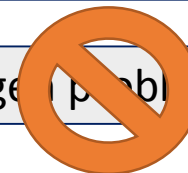
A



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RULE #2: Antibody problems are much more common than antigen problems





- 48 year-old woman
- Recently admitted for abdominal pain ☐
- CT showed ulcer and mass in the stomach, invading into adrenal gland ☐
- Bx: primary gastric signet ring cell carcinoma ☐
- Completed two cycles of chemotherapy ☐

Present blood sample taken 3 weeks after the 2nd cycle of chemotherapy

➤ *Possibility of A blood group substance inhibited the reaction with anti-A antiserum*

CASE #4 – Further Testing

Washed - Tube Testing

Anti-A	Anti-B	Anti-D	A ₁ Cells	B Cells
4+	0	4+	0	4+
Forward Type	A+		Reverse Type	A



- Certain malignancies effect blood groups
 - Pancreatic, Ovarian, Colonic, Bile duct carcinomas
- Neutralization of typing antiserum secreted by the tumor
→ loss of expression (Ag Loss)
- Apparent vs True Loss

Antigen Loss

1. Leukemia/Lymphoma
 2. Transplantation
 3. Excessive soluble blood group antigens
✓ Pancreatic, stomach and ovarian cancer
 4. Recent transfusion of O-units
- Sickle Cell patients: RBC Xchange
- Massive transfusion



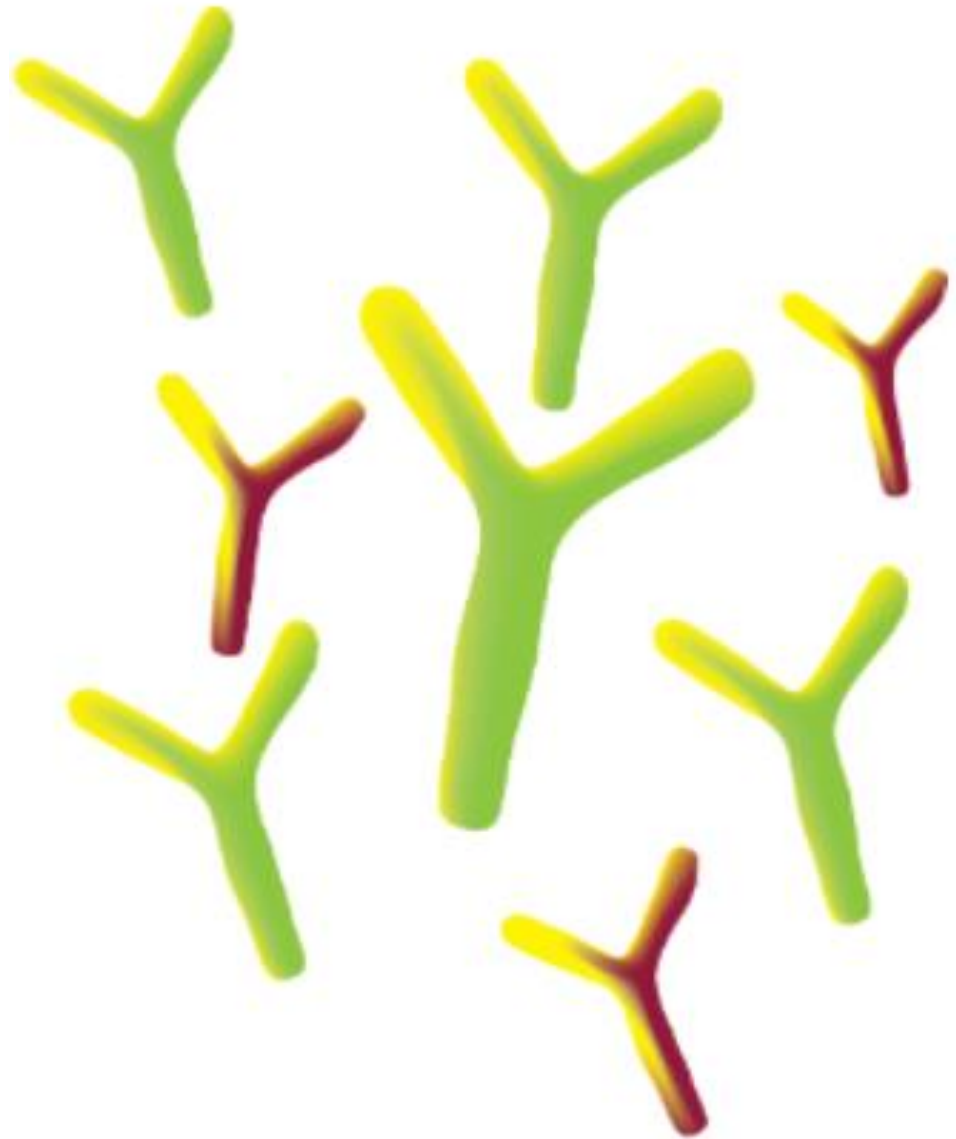
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Thank you!



Resources

1. Subramaniyan, Rajeswari, and Balan Louis Gaspar. “A Closer Look into Blood Group Discrepancy Arising due to an Underlying Malignancy.” *Revista Brasileira de Hematologia e Hemoterapia* 38.4 (2016): 361–363. *PMC*. Web. 4 Sept. 2018.
2. Makroo, R. N., Kakkar, B. , Agrawal, S. , Chowdhry, M. , Prakash, B. and Karna, P. (2018), Retrospective analysis of forward and reverse ABO typing discrepancies among patients and blood donors in a tertiary care hospital. *Transfusion Med.* . doi:[10.1111/tme.12506](https://doi.org/10.1111/tme.12506)
3. **054: ABO Discrepancies Essentials with Dr. Nicole Draper:**
<https://www.bbguy.org/2018/08/01/054/>