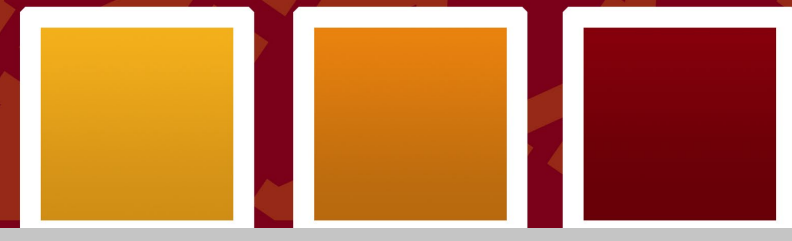


Antibody Identification

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MEDICAL LABORATORY SCIENCES



Abstract

Antibody identification is a fundamental topic taught in transfusion medicine and is widely used in clinical practice. The focus of this project was to develop a new and improved method of teaching this topic in a virtual setting. As the students work through the module, they will get numerous opportunities to practice the material being taught. Creating this E-learning module was made possible by utilizing Articulate Storyline software (4) and materials associated with the Principles and Methods of Transfusion Medicine course offered at the University of Minnesota - Twin Cities (2).

The material within the module is presented starting with the least difficult panels and working up to the most advanced. Since the module is self-paced, students can take breaks and go back to review concepts if needed. Throughout the module there are also many questions to answer that highlight important concepts. After completion, students' knowledge of the included material will be tested both in the classroom and student laboratory. Future studies could be designed to assess student success after utilizing this module to teach antibody identification in the transfusion medicine course. Furthermore, additional E-learning modules could be developed to enhance other areas of the Medical Laboratory Science curriculum.

Background

Historically, antibody panels have been used to identify most-probable antibodies. The University of Minnesota teaches a homozygous rule out for almost all the antigens on the panel. In contrast, reviewing a lecture from the University of Utah (6) revealed that they only use homozygous rule out for the following antigens: C, c, E, e, Fya, Fyb, Jka, Jkb, M, N, S, and s. The belief is that these are the antigens that may have varying reactions due to dosage. Another alternative method showed that some people use a single slash for the heterozygous rule outs and a double slash for the homozygous rule outs. In the end, these methods end up reaching the same conclusion due to the rule of three (2&3). This rule ensures a 95% confidence that the antibody you determine to be the most-likely antibody is correct. Although there are multiple ways to teach the cross-out method for antibody identification, I chose to follow what the University of Minnesota uses in their teachings (2).

Methods

For my E-learning module, I was given access to the Storyline program (4) that allows users to create their own E-learning modules. I chose to include antibody panel worksheets that have been used for the course in the past as they are still relevant to the material being taught. Most of my information has come from the book (3) associated with our course so that students can always reference it if necessary. Since it is expected to be purchased along with the course, students do not have to seek out additional resources. Although the E-learning module is a stand-alone lesson, it does require some basic understanding of antibodies and blood group systems. This module includes eight different panels to ensure students get adequate practice with the material and are comfortable with the cross-out method.

Discussion

The topic of antibody identification is an important part of the transfusion medicine curriculum, and an understanding of completing panels is essential to successfully finish the course. Not only is the technique taught in this course relevant for clinical rotations, but it is an area where your knowledge will be assessed on the BOC exam. By completing this module, students will advance their skills in transfusion medicine and become more confident in approaching a positive antibody screen for a patient situation.

This module has been designed to teach the process of reaching a most probable antibody while evaluating the students' understanding of concepts along the way. In addition to didactic coursework and experience in the student laboratory, this module should prepare students to face the challenges they may encounter in their future careers as medical laboratory scientists. The activity itself is completion based, so students can complete all eight panels in one sitting if they choose to or they can come back to it later. It is strongly recommended that they complete all eight panels with the accompanying questions to make sure they cover all the included topics. Answers to the panels are included in the module to allow students to check their results and hopefully address any mistakes they might have made. To get the most out of module, an understanding of the other blood group systems is ideal. When properly utilized, the module will help enhance self-paced student learning in a virtual environment.

Conclusion

Whether this module is used as a stand-alone lesson or as a supplemental tool for the classroom, it will enhance the way antibody identification is presented. Students will be able to work on this module anytime and anywhere, creating flexibility in their busy schedules. Going forward, there is room for this module to be expanded upon. An additional project could be designed to incorporate the remaining antibody panel worksheets associated with the transfusion medicine course (2).

References

- (1) Blood bank guy educational videos. Blood Bank Guy. (2019, October 5). Retrieved October 8, 2022, from <https://www.bbguy.org/education/videos/>
- (2) Course - MLSP 5513 Transfusion Medicine Principles & Methods: Lesson 8 Antibody Identification
- (3) Harmening, D. M. (2005). *Modern Blood Banking & Transfusion Practices* (7th ed.). F. A. Davis Company.
- (4) Harnett, S. (n.d.). Learning articulate storyline: Harness the power of storyline to create state-of-the-art e-learning projects. computer software.
- (5) Home - Association for the Advancement of Blood & Biotherapies. aabb.org. (n.d.). Retrieved October 8, 2022, from <https://www.aabb.org/>
- (6) *Introduction to antibody identification*. Educational Resources - Introduction to Antibody Identification. (n.d.). Retrieved December 3, 2022, from <https://arup.utah.edu/media/AntibodyIdentification/videoLecture.php>

REAGENT RED BLOOD CELLS
For Antibody Identification
Lot No. 3SS778 Exp. Date DDDMMYY

Pt. Name: Lilly Dale ID: 388345783 Sex: F Age: 55
Blood Group: AB Neg Tech: JG Date: MMDDYYYY
History/Dx: Bowel Obstruction; P3G4; Transfused 2 years ago; anti-D at that time
Most Probable antibody(ies): type your text here
Can't Rule Out: type your text here

PANEL #1

Rh-ir	D	C	E	c	F	V	C*	M	N	S	P	Lewis	Lutheran	Kell	Duffy	Kidd	Sex Link	Patient Results	FICIN				
1 R1R1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	1+	2+	0	2+	3+	
2 R1wR1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	1+	2+	0	2+	3+	
3 R2R2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	1+	2+	0	2+	3+	
4 R2R2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	1+	2+	0	2+	3+	
5 Fy ^a	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	0	2+	0	0	2+
6 Fy ^b	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	0	2+	0	0	2+
7 Fy ^a	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	0	2+	0	0	2+
8 Fy ^b	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	0	2+	0	0	2+
9 Fy ^a	0	0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	0	0	2+	0	0	2+
10 R1R1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	1+	2+	0	2+	3+	
11 Ror	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	1+	2+	0	2+	3+	
AC Auto Ct																	0	0	0	2+	0	0	2+

ANTIBODY SCREENING RESULTS

Rh-ir	D	C	E	c	F	V	C*	M	N	S	P	Lewis	Lutheran	Kell	Duffy	Kidd	Sex Link	Patient Results	FICIN			
I R1R1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	1+	2+	0	2+	3+
II R2R2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0	1+	2+	0	2+	3+

Figure 1: This is panel 1 included in the module. Slashes in red appear as the student works through the cells and clicks the correct antigens to cross out.

What would you need to do to ensure the rule of three is met for our most probable antibody?

- Test another P1 positive cell and get a positive result
- Test another P1 negative cell and get a positive result
- Test another P1 positive cell and get a negative result
- Test another P1 negative cell and get a negative result

Figure 2: This is an example of one of the questions that is posed after the completion of an antibody identification panel. Upon submission, the student will receive feedback on their answer.