

The Blood and Tissue Center of Central Texas
4300 North Lamar Blvd
Austin, TX 78756

Texas State University

Blood Bank Clinical Rotation Curriculum

Orientation to The Blood and Tissue Center of Central Texas

- Tour of BTC campus introducing BTC employees as encountered.
 - Restrooms
 - Basement Break room
 - Picnic tables/Smoking area
 - Donor Room
 - Apheresis Room
 - Canteen
 - QA
 - Hospital Services
 - Component Department
 - Laboratory
 - Tissue
 - Biohazard Room

- Discuss Parking Situation
 - Allowable Parking Areas are:
 - Back parking lot and any yellow stones are suitable for student parking
 - Side streets
 - Parking stones that are marked “DONOR” with hearts are reserved for donors only
 - Marathon Street restrictions – park where our stone fence is – do not park in front of houses

- Fire Safety
 - Fire Pulls and Fire Extinguisher locations
 - Evacuation Routes
 - Meeting Area
 - Alternate Meeting Area

- PPE and Safety
 - Lab Coats
 - Gloves
 - Protective Eyewear
 - First Aid Kit
 - Eye Wash Stations
 - Shower
 - Spill Kits

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Donor Services Donor Eligibility

Reading Assignment: Technical Manual, 16th Edition, Chapter 5, Allogeneic and Autologous Donor Selection

Whole Blood

- Registration
- Review information given to the donor
 - “What You Should Know About Donating Blood”
- Donor History Questionnaire
- Donor Consent
- Physical Examination- Use the front page of the Donor Record as a guide, discuss the following items, to include limits of acceptability and steps to follow if unacceptable results are obtained:
 - General Appearance
 - Weight
 - Hematocrit
 - Pulse
 - Temperature
 - Blood Pressure

Directed Donors

- Describe how they are differentiated from Allogeneic donors
 - Explain why and in what situations there may be a directed donation
 - Request Form
 - Consent Form
 - Stamp on donor record
 - Unit tags
 - Computer tracking handling

Autologous Donors

- Advantages: lower risk of disease transmission, Disadvantages: increased cost, unit discarded if not used
- Contraindications to Participate in Autologous Blood Donation (See Technical Manual)
- Medical Director/Physician responsibilities
- Donor Screening- Review Autologous Donor Questionnaire
- Collection (how it differs from Allogeneic)
- Labeling requirements
- Labeling reactive units/ donor deferral

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Whole Blood

- Donor Identification
- Vein Selection and Site Preparation
 - Inspect arms for lesions, repeated venipuncture marks, skin disorders, rash, etc.
 - Iodine Allergy
- Use of Automated Shaker/Donor Scale
- Phlebotomy and Collection of Samples
- Double Sticks
- Discontinuing Phlebotomy
 - QNS, long draw and AC units (how they are handled)
 - Donor care/post-donation instructions
 - Storing the unit
- Adverse Donor Reactions – fainting, nausea, vomiting, hematoma, convulsions, cardiac difficulties, etc.
 - General Information

ALYX

- Explain similarities and differences from whole blood donation
 - Height/Weight/Hematocrit requirements for both male and female donors
 - Deferral period
- Observe ALYX 2-RBC Procedure
 - Kit installation
 - Kit check/prime
 - Input donor/procedure information
 - Perform venipuncture
 - Monitor the collection
 - Make adjustments, as needed (cuff pressure, draw rate, return rate)
 - Final return
 - Disconnect donor
 - Post-collection processing
 - Kit removal
- Discuss the following:
 - Messages and unit tags (verify RBC product/volume, check WBC)

Therapeutic Donations

- Indications
- Review **Therapeutic Phlebotomy Physician Request and Autologous/Therapeutic Donor Record**
- Medical History Interview/Donor Consent
- Collection
- Explain how the unit is handled

Donor Services Apheresis Donations

Reading Assignment: Technical Manual 16th Edition, Chapter 7 Apheresis Component Collection
p229-238

- Donor Selection and Monitoring
 - Aspirin Ingestion
 - Allowable frequency of donation for Platelets and Red Blood Cells
 - Preferred donor blood types for platelets
 - Donor requirements are the same as Whole Blood donations
 - Additional Consent is required
 - Observe pre-collection count performed on Coulter Hematology Analyzer
 - Platelet count must be >150,000 to qualify for platelet pheresis
 - Record keeping- Donor files

- Separation Technique/System Overview
 - Amicus and Trima both separate by centrifugation
 - Use of anticoagulant
 - Platelets are extracted through a series of draws and returns, then a final re-infusion
 - All systems require pre-packaged disposable collection sets

- Collection
 - Platelet count/Hematocrit are input into the collection system-used to determine how many products can be collected and how long the donation will take
 - Observe tubing set installation
 - Donor is observed at approximately 15-minute intervals
 - Possible system errors/corrective actions
 - Disconnect donor/post-donation instructions
 - Product handling

◆ APPENDIX 5-3

Full-Length Donor History Questionnaire (Version 1.3, May 2008)

	Yes	No	
Are you	<input type="checkbox"/>	<input type="checkbox"/>	
1. Feeling healthy and well today?	<input type="checkbox"/>	<input type="checkbox"/>	
2. Currently taking an antibiotic?	<input type="checkbox"/>	<input type="checkbox"/>	
3. Currently taking any other medication for an infection?	<input type="checkbox"/>	<input type="checkbox"/>	
Please read the Medication Deferral List.			
4. Are you now taking or have you ever taken any medications on the Medication Deferral List?	<input type="checkbox"/>	<input type="checkbox"/>	
5. Have you read the educational materials?	<input type="checkbox"/>	<input type="checkbox"/>	
In the past 48 hours			
6. Have you taken aspirin or anything that has aspirin in it?	<input type="checkbox"/>	<input type="checkbox"/>	
In the past 6 weeks			
7. Female donors: Have you been pregnant or are you pregnant now? (Males: check "I am male.")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> I am male
In the past 8 weeks have you			
8. Donated blood, platelets or plasma?	<input type="checkbox"/>	<input type="checkbox"/>	
9. Had any vaccinations or other shots?	<input type="checkbox"/>	<input type="checkbox"/>	
10. Had contact with someone who had a smallpox vaccination?	<input type="checkbox"/>	<input type="checkbox"/>	
In the past 16 weeks			
11. Have you donated a double unit of red cells using an apheresis machine?	<input type="checkbox"/>	<input type="checkbox"/>	
In the past 12 months have you			
12. Had a blood transfusion?	<input type="checkbox"/>	<input type="checkbox"/>	
13. Had a transplant such as organ, tissue, or bone marrow?	<input type="checkbox"/>	<input type="checkbox"/>	
14. Had a graft such as bone or skin?	<input type="checkbox"/>	<input type="checkbox"/>	
15. Come into contact with someone else's blood?	<input type="checkbox"/>	<input type="checkbox"/>	

◆ **APPENDIX 5-3**
Full-Length Donor History Questionnaire (Version 1.3, May 2008) (Continued)

	Yes	No	
16. Had an accidental needle-stick?	<input type="checkbox"/>	<input type="checkbox"/>	
17. Had sexual contact with anyone who has HIV/AIDS or has had a positive test for the HIV/AIDS virus?	<input type="checkbox"/>	<input type="checkbox"/>	
18. Had sexual contact with a prostitute or anyone else who takes money or drugs or other payment for sex?	<input type="checkbox"/>	<input type="checkbox"/>	
19. Had sexual contact with anyone who has ever used needles to take drugs or steroids, or anything not prescribed by their doctor?	<input type="checkbox"/>	<input type="checkbox"/>	
20. Had sexual contact with anyone who has hemophilia or has used clotting factor concentrates?	<input type="checkbox"/>	<input type="checkbox"/>	
21. Female donors: Had sexual contact with a male who has ever had sexual contact with another male? (Males: check "I am male.")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> I am male
22. Had sexual contact with a person who has hepatitis?	<input type="checkbox"/>	<input type="checkbox"/>	
23. Lived with a person who has hepatitis?	<input type="checkbox"/>	<input type="checkbox"/>	
24. Had a tattoo?	<input type="checkbox"/>	<input type="checkbox"/>	
25. Had ear or body piercing?	<input type="checkbox"/>	<input type="checkbox"/>	
26. Had or been treated for syphilis or gonorrhea?	<input type="checkbox"/>	<input type="checkbox"/>	
27. Been in juvenile detention, lockup, jail, or prison for more than 72 hours?	<input type="checkbox"/>	<input type="checkbox"/>	
In the past three years have you			
28. Been outside the United States or Canada?	<input type="checkbox"/>	<input type="checkbox"/>	
From 1980 through 1996,			
29. Did you spend time that adds up to three (3) months or more in the United Kingdom? (Review list of countries in the UK)	<input type="checkbox"/>	<input type="checkbox"/>	
30. Were you a member of the U.S. military, a civilian military employee, or a dependent of a member of the U.S. military?	<input type="checkbox"/>	<input type="checkbox"/>	
From 1980 to the present, did you			
31. Spend time that adds up to five (5) years or more in Europe? (Review list of countries in Europe.)	<input type="checkbox"/>	<input type="checkbox"/>	
32. Receive a blood transfusion in the United Kingdom or France? (Review list of countries in the UK.)	<input type="checkbox"/>	<input type="checkbox"/>	

(Continued)

I am male

◆ APPENDIX 5-3

Full-Length Donor History Questionnaire (Version 1.3, May 2008) (Continued)

	Yes	No	
From 1977 to the present, have you			
33. Received money, drugs, or other payment for sex?	<input type="checkbox"/>	<input type="checkbox"/>	
34. Male donors: Had sexual contact with another male, even once? (Females: check "I am female.")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> I am female
Have you EVER			
35. Had a positive test for the HIV/AIDS virus?	<input type="checkbox"/>	<input type="checkbox"/>	
36. Used needles to take drugs, steroids, or anything <u>not</u> prescribed by your doctor?	<input type="checkbox"/>	<input type="checkbox"/>	
37. Used clotting factor concentrates?	<input type="checkbox"/>	<input type="checkbox"/>	
38. Had hepatitis?	<input type="checkbox"/>	<input type="checkbox"/>	
39. Had malaria?	<input type="checkbox"/>	<input type="checkbox"/>	
40. Had Chagas disease?	<input type="checkbox"/>	<input type="checkbox"/>	
41. Had babesiosis?	<input type="checkbox"/>	<input type="checkbox"/>	
42. Received a dura mater (or brain covering) graft?	<input type="checkbox"/>	<input type="checkbox"/>	
43. Had any type of cancer, including leukemia?	<input type="checkbox"/>	<input type="checkbox"/>	
44. Had any problems with your heart or lungs?	<input type="checkbox"/>	<input type="checkbox"/>	
45. Had a bleeding condition or a blood disease?	<input type="checkbox"/>	<input type="checkbox"/>	
46. Had sexual contact with anyone who was born in or lived in Africa?	<input type="checkbox"/>	<input type="checkbox"/>	
47. Been in Africa?	<input type="checkbox"/>	<input type="checkbox"/>	
48. Have any of your relatives had Creutzfeldt-Jakob disease?	<input type="checkbox"/>	<input type="checkbox"/>	

◆ **APPENDIX 5-4**

Medication Deferral List for the Donor History Questionnaire (Version 1.3, May 2008; revised Sept 2010)

Please tell us if you are now taking or if you have EVER taken any of these medications:

- Proscar (finasteride) – usually given for prostate gland enlargement
 - Avodart, Jalyn (dutasteride) – usually given for prostate enlargement
 - Propecia (finasteride) – usually given for baldness
 - Accutane, Amnesteem, Claravis, Sotret (isotretinoin) – usually given for severe acne
 - Soriatane (acitretin) – usually given for severe psoriasis
 - Tegison (etretinate) – usually given for severe psoriasis
 - Growth Hormone from Human Pituitary Glands – used usually for children with delayed or impaired growth
 - Insulin from Cows (Bovine, or Beef, Insulin) – used to treat diabetes
 - Hepatitis B Immune Globulin – given following an exposure to hepatitis B.
- NOTE:** This is different from the hepatitis B vaccine which is a series of 3 injections given over a 6 month period to prevent future infection from exposures to hepatitis B.
- Plavix (clopidogrel) and Ticlid (ticlopidine) – inhibits platelet function; used to reduce the chance for heart attack and stroke.
 - Feldene – given for mild to moderate arthritis pain
 - Experimental Medication or Unlicensed (Experimental) Vaccine – usually associated with a research protocol

IF YOU WOULD LIKE TO KNOW WHY THESE MEDICINES AFFECT YOU AS A BLOOD DONOR, PLEASE KEEP READING:

- ◆ If you have taken or are taking **Proscar, Avodart, Jalyn, Propecia, Accutane, Soriatane, or Tegison**, these medications can cause birth defects. Your donated blood could contain high enough levels to damage the unborn baby if transfused to a pregnant woman. Once the medication has been cleared from your blood, you may donate again. Following the last dose, the deferral period is one month for Proscar, Propecia and Accutane, six months for Avodart and Jalyn, and three years for Soriatane. Tegison is a permanent deferral.
- ◆ **Growth hormone from human pituitary glands** was prescribed for children with delayed or impaired growth. The hormone was obtained from human pituitary glands, which are found in the brain. Some people who took this hormone developed a rare nervous system condition called Creutzfeldt-Jakob Disease (CJD, for short). The deferral is permanent.
- ◆ **Insulin from cows (bovine, or beef, insulin)** is an injected material used to treat diabetes. If this insulin was imported into the US from countries in which "Mad Cow Disease" has been found, it could contain material from infected cattle. There is concern that "Mad Cow Disease" is transmitted by transfusion. The deferral is indefinite.
- ◆ **Hepatitis B Immune Globulin (HBIG)** is an injected material used to prevent infection following an exposure to hepatitis B. HBIG does not prevent hepatitis B infection in every case, therefore persons who have received HBIG must wait 12 months to donate blood to be sure they were not infected since hepatitis B can be transmitted through transfusion to a patient.
- ◆ **Feldene** is a non-steroidal anti-inflammatory drug that can affect platelet function. A donor taking Feldene will not be able to donate platelets for 2 days; however, its use will not affect whole blood donations.
- ◆ **Plavix and Ticlid** are medications that can decrease the chance of a heart attack or stroke in individuals at risk for these conditions. Since these medications can affect platelets, anyone taking Plavix or Ticlid will not be able to donate platelets for 14 days after the last dose. Use of either medication will not prohibit whole blood donations.
- ◆ **Experimental Medication or Unlicensed (Experimental) Vaccine** is usually associated with a research protocol and the effect on blood donation is unknown. Deferral is one year unless otherwise indicated by Medical Director.

◆ APPENDIX 5-5**Blood Donor Educational Materials: Making Your Blood Donation Safe (Version 1.3, May 2008)**

Thank you for coming in today! This information sheet explains how **YOU** can help us make the donation process safe for yourself and patients who might receive your blood. **PLEASE READ THIS INFORMATION BEFORE YOU DONATE!** If you have any questions now or anytime during the screening process, please ask blood center staff.

ACCURACY AND HONESTY ARE ESSENTIAL!

Your **complete honesty** in answering all questions is very important for the safety of patients who receive your blood. **All information you provide is confidential.**

DONATION PROCESS:

To determine if you are eligible to donate we will:

- Ask questions about health, travel, and medicines
- Ask questions to see if you might be at risk for hepatitis, HIV, or AIDS
- Take your blood pressure, temperature and pulse
- Take a small blood sample to make sure you are not anemic

If you are able to donate we will:

- Cleanse your arm with an antiseptic (If you are allergic to iodine, please tell us!)
- Use a new, sterile, disposable needle to collect your blood

DONOR ELIGIBILITY – SPECIFIC INFORMATION

Why we ask questions about sexual contact:

Sexual contact may cause contagious diseases like HIV to get into the bloodstream and be spread through transfusions to someone else.

Definition of "sexual contact":

The words "have sexual contact with" and "sex" are used in some of the questions we will ask you, and apply to any of the activities below, whether or not a condom or other protection was used:

1. Vaginal sex (contact between penis and vagina)
2. Oral sex (mouth or tongue on someone's vagina, penis, or anus)
3. Anal sex (contact between penis and anus)

HIV/AIDS RISK BEHAVIORS AND SYMPTOMS

AIDS is caused by HIV. HIV is spread mainly through sexual contact with an infected person OR by sharing needles or syringes used for injecting drugs.

DO NOT DONATE IF YOU:

- Have AIDS or have ever had a positive HIV test
- Have ever used needles to take drugs, steroids, or anything not prescribed by your doctor
- Are a male who has had sexual contact with another male, even once, since 1977
- Have ever taken money, drugs or other payment for sex since 1977
- Have had sexual contact in the past 12 months with anyone described above
- Have had syphilis or gonorrhea in the past 12 months
- In the last 12 months have been in juvenile detention, lockup, jail or prison for more than 72 hours

(Continued)

◆ APPENDIX 5-5

Blood Donor Educational Materials: Making Your Blood Donation Safe (Version 1.3, May 2008) (Continued)

-
- Have any of the following conditions that can be signs or symptoms of HIV/AIDS:
- Unexplained weight loss or night sweats
 - Blue or purple spots in your mouth or skin
 - Swollen lymph nodes for more than one month
 - White spots or unusual sores in your mouth
 - Cough that won't go away or shortness of breath
 - Diarrhea that won't go away
 - Fever of more than 100.5 F for more than 10 days

Remember that you **CAN** give HIV to someone else through blood transfusions even if you feel well and have a negative HIV test. This is because tests cannot detect infections for a period of time after a person is exposed to HIV. **If you think you may be at risk for HIV/AIDS or want an HIV/AIDS test, please ask for information about other testing facilities. PLEASE DO NOT DONATE TO GET AN HIV TEST!**

Travel to or birth in other countries

Blood donor tests may not be available for some contagious diseases that are found only in certain countries. If you were born in, have lived in, or visited certain countries, you may not be eligible to donate.

WHAT HAPPENS AFTER YOUR DONATION

To protect patients, your blood is tested for hepatitis B and C, HIV, certain other infectious diseases, and syphilis. If your blood tests positive it will not be given to a patient. You will be notified about test results that may disqualify you from donating in the future. **Please do not donate to get tested for HIV, hepatitis, or any other infections!**

Thank you for donating blood today!

(Donor Center Name)

(Telephone Number)

Donor Services Blood Bank Clinical Rotation

Name/Date: _____

1. What is the acceptable Hematocrit for a whole blood donor?
 - a. 40%
 - b. 28%
 - c. 42%
 - d. 38%
 - e. It depends on the height and weight of the donor.

2. Name two reasons (based on the donor history questionnaire) that would exclude a person from being eligible to donate?

3. Name two drugs that, if taken by the potential donor, are considered acceptable and will allow them to donate?

4. Name two drugs that, if taken by the potential donor, are considered unacceptable and will not allow them to donate?

5. Which if the following medical conditions of a patient would render them a good candidate for an autologous donation?
 - a. Uncontrolled seizure disorder
 - b. Recent myocardial infarction
 - c. Joint replacement
 - d. Cyanotic heart disease

6. Can directed donations ever be used for a donor that it was not donated for?

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7. List one advantage and one disadvantage of autologous donations.

8. List two adverse donor reactions.

9. Can donors who have taken aspirin or aspirin-containing drugs donate platelets? Why?

10. What is the required minimum platelet count of a potential platelet pheresis donor?

11. What blood types are preferred in platelet donors? Why?

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Components

Reading Assignment: Technical Manual 16th Edition, Chapter 9: p 291-295

- Product Transfer (from Apheresis, Donor Room, Round Rock and Mobile Drives)
- Whole Blood
 - Anticoagulant(s)
 - Storage temperature requirements
 - Expiration date
 - Discuss uses
- Red Blood Cells
 - Observe leukoreduction - time restraints
 - Observe centrifugation/packing/adding additive
 - Discuss different types of additives (AS-1, AS-3, AS-5)
 - Final hematocrit must be less than or equal to 80%
 - Storage temperature requirements
 - Expiration date
 - Discuss washing red blood cells- expiration date
 - Discuss adding glycerol/freezing- expiration date
 - Discuss deglycerolizing frozen red cells- expiration date
- Plasma
 - Observe freezing process
 - Discuss different types of plasma products (FFP, RPL, Pedi FFP, PCR)
 - Discuss time constraints regarding freezing FFP vs. RPL
 - Discuss uses of RPL vs. transfusable plasma products
 - Storage temperature requirements
 - Observe shipping RPL products
 - Expiration dates
- Apheresis
 - Discuss collection systems (ALYX, TRIMA)
 - Storage temperature requirements
 - Expiration date
 - Platelet volume reduction- Expiration dates

Components Blood Bank Clinical Rotation

Name/Date: _____

1. What are the storage temperature requirement and expiration date of the following products:

Product	Storage Temp. Requirement	Expiration Date
AS-1 Red Blood Cells		
Platelet Pheresis		
Fresh Frozen Plasma/Thawed FFP		
Whole Blood CPDA-1		
Washed Red Blood Cells		
Volume Reduced Platelet Pheresis		
Granulocytes		
Cryoprecipitate Frozen/Thawed		
Frozen Red Blood Cells (high glycerol method)		

2. What product is used to treat factor VIII deficiency?
3. Explain the process of converting a unit of whole blood into a unit of plasma and a unit of AS-1 Red Blood Cells.
4. Why are units for neonates drawn only on O Negative, CMV Negative donors in CPDA-1 bags?
5. Do the expiration dates of FFP and RPL (Recovered Plasma) products differ?
6. What is Recovered Plasma (RPL) used for?

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Technical Services Distribution

Reading Assignment: Technical Manual, 16th Edition, Chapter 9: Inspection, Shipping, Disposition, and Issue, p 295-298.

- Inspection of Blood Products
 - Red Blood Cells are inspected for:
 - Hemolysis (in segments or product)
 - Murky, brown, red, green, grossly lipemic plasma
 - In-tact, unmarked correct labeling
 - Plasma products (platelets, plasma and cryoprecipitate) are inspected for:
 - Murky, brown, red, green or grossly lipemic plasma
 - Cracks in the bag
 - Signs of thawing
 - In-tact, unmarked correct labeling
 - Any product with a questionable appearance will be quarantined.
- Observe Dispatch Activities and Logbook Documentation
- Observe process of filling daily stock orders
- Distribution of Red Cell Products
 - Acceptable transport temperature
 - Observe packing and shipping
- Distribution of FFP, SDP
 - Acceptable transport temperature
 - Observe packing and shipping
- Distribution of Platelets
 - Acceptable transport temperature
 - Observe packing and shipping
- Observe/discuss Irradiation of blood products
 - Purpose of irradiation
 - Expiration date change
 - Use of RAD-SURE labels
 - Re-labeling product (product label and expiration date label)
- Observe/discuss Special Product Orders
 - Antigen negative/special unit orders

Distribution Blood Bank Clinical Rotation

Name/Date: _____

1. Which of the following are blood products inspected for prior to distribution:
 1. Murky plasma
 2. Hemolysis
 3. Signs of thawing in plasma
 4. Fingerprints on the product
 5. Un-readable labels

2. How many times per day are hospitals inventory re-stocked by The Blood and Tissue Center of Central Texas?

3. What are the acceptable transport temperatures for the following products:

Red Blood Cells _____
Fresh Frozen Plasma _____
Platelets _____

4. Why are blood products irradiated?

5. What is the purpose of using RAD-SURE labels when irradiating blood products?

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Laboratory General

Reading Assignment: Technical Manual, 16th Edition, Transfusion Transmitted Diseases, p241-260.
See attached reading assignments

- Discuss Infectious Disease Testing and required donor testing
 - Testing performed by Creative Testing Solutions in Dallas Texas.
 - Observe results transfer

Reading Assignment: Technical Manual, 16th Edition, p216-220.

- Observe labeling different types of products
 - Discuss licensed/unlicensed products (cannot ship unlicensed products out of state)

Reading Assignment: Technical Manual, 16th Edition, Bacterial Contamination, p256-257.

- Observe bacterial detection in platelets
 - System used is Pall eBDS
 - Observe Sampling
 - Platelets are sampled 24 hours post-collection.
 - Sterile docking allows closed system sampling – doesn't affect expiration of product
 - Observe Reading
 - Pouches are read after 18 hours of incubation at 35°C
 - The eBDS instrument analyzes the oxygen content in the pouches
 - System detects aerobic and facultative organisms because they give off oxygen
 - Positives are confirmed by culture
- Apheresis platelet processing
 - Platelets are processed by the laboratory
 - Product platelet count is determined by hematology analyzer
 - Up to 3 platelet products can be made from one donation – depends on platelet count

Reading Assignment: Technical Manual, 16th Edition, Blood Component Quality Control, p220-225.

- Equipment Quality Control
 - Observe examples of equipment QC (refrigerators, heat blocks, centrifuges)
- Product Quality Control
 - 1% of collections for each bag type/bag manufacturer every month
 - Verify that units are leukoreduced and the packed cell volume is appropriate
 - Products that fail QC are investigated for mishandling and bag manufacturer error
 - WBC count is performed on a flow cytometer, packed cell volume is calculated using the hematocrit of the unit which is determined on a hematology analyzer.

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Laboratory ABO/Rh

Reading Assignment: Technical Manual, 16th Edition, Chapter 12 The ABO System

Reading Assignment: Technical Manual, 16th Edition, Chapter 13 The Rh System

- Observe/Discuss ABO/Rh typing
 - Discuss differences between forward/reverse types
 - Discuss D/Rh type and weak D testing
 - Discuss and observe tube-labeling techniques
 - Discuss and observe loading centrifuge
 - Discuss reaction grading (refer to reaction grading chart)
 - Discuss results/interpretations
 - Discuss ABO discrepancies (refer to ABO Discrepancy Resolution Chart)

- Student will perform 5-10 ABO/Rh types on known samples.
- The student will initially be observed until it is determined that he/she can properly perform the testing independently.

Agglutination Reaction Grading Chart

Observed reactions	Description of observed reactions
4+	One solid clump without any small clumps visible
3+	One large clump with a few small clumps around
2+	Many smaller clumps with a clear background
1+	Many smaller clumps without a clear background
WP	Very small clumps but still visible without a microscope/very strong under the microscope
R	Agglutination is only visible under the microscope
0	No agglutination observed
*MF	Seen with any of the above reactions. Appears more flakey with a very cloudy background. (Two cell population)

*Document the graded reaction along with MF as a superscript - For example 1+^{MF}

ABO/Rh Discrepancies Blood Bank Clinical Rotation

Name/Date: _____

1. What would be the cause of discrepancy if a patient forward types as an AB and reverse types as a B, and has a positive antibody screen? How would you resolve this discrepancy?

2. If a patient forward types as an O and reverse types as an AB, which of the following would be your first step in resolving the discrepancy?
 - a. Incubate reverse type tubes at 37° for 10 min.
 - b. Spin reverse type tubes for 60 seconds
 - c. Incubate reverse type tubes at -18° for 10 min.
 - d. Incubate reverse type tubes at room temp for 10 min.

3. A patient has a forward type of an A and a reverse type of an O. The antibody screen is negative. What is the probable cause? How would you resolve this discrepancy?

4. A patient has a forward type as an A and a reverse type as an O. An anti-M is identified in the patient's serum. This patient requires a transfusion. What type of blood should be given?

ABO Discrepancy Resolution Chart

Forward Reaction	Reverse Reaction	Antibody Screen at RT	Possible Reason	Resolution	Blood type to transfuse with	
AB	A	Negative	Acquired B antigen	ID Antibody	A	
	A	Positive	Specific Antibody at RT	Find B cell that is negative for the corresponding antibody. Repeat reverse type.	AB-that is antigen negative for the corresponding antibody	
	B	Negative	Probable Anti-A1	Antigen type with Anti-A1. Run 3 A1 cells and 3 A2 cells to coombs to prove Anti-A1	A2B crossmatch compatible	
	B	Positive	Probable antibody at RT	ID antibody. Find A1 cells antigen negative for corresponding antibody. Repeat reverse type.	AB-antigen negative for corresponding antibody	
O	O	Positive	Possible RT specific antibody, non-specific antibody or Rouleaux	ID antibody. Specific AB- find A1 and B cells antigen negative for corresponding Antibody. Non-Specific- prewarm serum and cells. For rouleaux perform a saline replacement.	O-antigen negative for specific antibody or crossmatch compatible if non-specific	
	AB (Anti-A,B negative)	Negative	Immunosuppressed (newborn, elderly, diseases i.e. leukemia or HIV)	Incubate reverse cells at RT 10 min, if still negative incubate at 4°C with an autocontrol for 10 min.	O	
	B (Anti-A,B negative)	Negative	Immunosuppressed (newborn, elderly, diseases i.e. leukemia or HIV)	Incubate reverse cells at RT 10 min, if still negative incubate at 4°C with an autocontrol for 10 min.	O	
	A (Anti-A,B negative)	Negative	Immunosuppressed (newborn, elderly, diseases i.e. leukemia or HIV)	Incubate reverse cells at RT 10 min, if still negative incubate at 4°C with an autocontrol for 10 min.	O	

ABO Discrepancy Resolution Chart

Forward Reaction	Reverse Reaction	Antibody Screen at RT	Reason	Resolution	Blood type to transfuse with
O	A (Anti-A,B positive)	Positive	Subgroup of A with RT reacting antibody.	Perform antibody ID	O-antigen negative for corresponding antibody.
		Negative	Subgroup of A with Anti-A1.	Type for Anti-A1, and run 3 A1 cells and 3 A2 cells to combs to prove Anti-A1.	A2 or negative for Anti-A1
		Negative	Immunosuppressed (newborn, elderly, diseases i.e. leukemia or HIV)	Incubate reverse cells at RT 10 min, if still negative incubate at 4°C with an autocontrol for 10 min.	A
A	O	Positive	RT antibody to a specific or nonspecific antibody.	ID antibody- Find A1 cells antigen negative for corresponding specific antigen or prewarm reverse cells and serum.	A-antigen negative for corresponding specific antibody or crossmatch compatible if non-specific antibody
		Negative	Immunosuppressed (newborn, elderly, diseases i.e. leukemia or HIV)	Incubate reverse cells at RT 10 min, if still negative incubate at 4°C with an autocontrol for 10 min.	B
		Positive	RT antibody to a specific or nonspecific antibody.	ID antibody- Find B cells antigen negative for corresponding specific antigen or prewarm reverse cells and serum.	B
B	AB (Anti-A,B positive)	Positive	Subgroup of AB (AoB) specific antibody.	ID antibody- Find B cells antigen negative for corresponding specific antigen.	B-antigen neg. for corresponding AB

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Laboratory Antibody Screen/Antibody ID

Reading Assignment Technical Manual, 16th Edition, Chapters 15, 16, and 17 Antigen and Antibody Testing

Antibody Screen/Antibody ID (Tube Method)

- Observe/Discuss Antibody Screen
 - Discuss basic antibody/antigen properties (i.e. antigens on cells, antibodies are in serum)
 - Discuss and observe tube-labeling techniques
 - Discuss auto-control – some blood banks do not perform
 - Observe adding reagent cells/serum (2 drops plasma, 1 drop cells)
 - Discuss and observe loading centrifuge and spin times
 - Discuss reaction grading (refer to reaction grading chart)
 - Discuss phases of testing and enhancements
 - Observe use of cell washer/give instructions for use/ discuss theory of washing
 - Discuss results/interpretations/use of reagent manufacturer Panoscreen sheet
 - Observe use of Check Cells/discuss theory of use
 - Discuss further ID techniques

- Student will perform 5-10 antibody screens on known samples continuing with antibody identification as applicable.
- The student will initially be observed until it is determined that he/she can properly perform the testing independently.

Antibody Screen/Antibody ID (Gel Method)

- Observe and discuss the performance of antibody detection by gel method
 - Refer to Manufacturers Instructions for the principle, procedure and interpretation of test results

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Laboratory Pre-transfusion Testing and Compatibility Testing

Reading Assignment Technical Manual, 16th Edition, Chapter 15, Pre-transfusion Testing

- Transfusion Request Requirements
 - Patient Identification
 - Sample Labeling
 - Sample requirements (Age of sample, appearance, sample retention)

- Serologic Testing Requirements
 - Historical Check
 - Perform ABO/Rh and Antibody Screen at a minimum
 - Autologous Control – some blood banks do not perform
 - Crossmatch

- Crossmatch
 - Choosing appropriate donor units
 - Verify ABO/Rh of Donor unit
 - Discuss Computer Crossmatches – not performed at BTC
 - Immediate Spin Crossmatch
 - Observe proper tube labeling
 - Performed when no antibody is present and there is no history of antibodies
 - 1 drop of donor cells to 2 drops patient plasma/serum
 - Discuss reaction grading (refer to reaction grading chart)
 - Discuss results/interpretation
 - Extended (AHG) Crossmatch
 - Performed when patient has history of antibodies or newly identified antibodies
 - Discuss phases of testing
 - AHG is observed under microscope if macroscopically negative
 - Check Cells - discuss theory of use
 - Discuss results/interpretations

- The student will perform 5-10 crossmatches on known samples (with both positive and negative antibody screens).

Antibody ID and Compatibility Testing

Blood Bank Clinical Rotation

Name/Date: _____

1. When an antibody screen shows reactivity at immediate spin, the following should be performed:
 - a. Throw the tubes away and start over without recording IS reactions
 - b. Allow panel cells to incubate at room temp for 10-15 minutes with an auto-control.
 - c. Disregard the reactions since room temp antibodies are not clinically significant
 - d. Go straight to AHG phase of testing

2. When the auto control is positive at Coombs phase, what additional testing is required?

3. What is required to prove an antibody?

4. To rule out an antibody, the serum must have tested negative at all phases of testing against cells that have the corresponding antigen expressed in a heterozygous state.

T___ F___

5. PEG can be used to enhance which antibodies:
 - a. Anti-Fya and Anti-Fyb
 - b. Anti-P1
 - c. Anti-Jka and Anti-Jkb
 - d. Rh antibodies
 - e. A and C
 - f. A, C, and D

6. Describe the Dosage Effect.

7. When is it necessary to perform an extended crossmatch?

8. Name a precaution that should be taken when an Rh-negative patient needs a transfusion with red cells or platelet products and only Rh-positive products are available.

9. Which of the following should be done if it is not possible to rule out an antibody due to the lack of available reagent cells:
 - a. Antigen type the patient for the corresponding antigen and give antigen negative blood if they are negative for the antigen
 - b. Issue units with an emergency release form
 - c. Advise the transfusion facility NOT to transfuse the patient
 - d. Give crossmatch compatible units

10. When using PEG, reactions are observed and recorded at 37°C.

T____ F____

11. What is the purpose of an elution?

12. If a patient antigen types as Lea- Leb+, are they able to form a Lewis antibody?

13. When is it appropriate to only perform an Immediate Spin crossmatch?

14. If immediate washing of the test tubes is delayed following 37°C incubation, allowing them to sit at room temp will:
 - a. Cause Rouleaux formation
 - b. Enhance any clinically significant antibodies
 - c. Enhance cold reacting antibodies
 - d. Will not interfere with testing

15. Why should antigen typing not be performed on a patient that has recently been transfused?