





What happens to your blood after you donate it???

Objectives:

- 1. Discuss the components that can be prepared from whole blood.
- 2. Evaluate various laboratory methods used to prepare components for transfusion use.
- 3. Recognize collection and storage issues for various blood components.





 Separated through centrifugation

• Centrifugal forces push formed elements to the bottom of the bag

7















13



14

What's in the bags?

Anticoagulants, preservatives, nutrients

- ACD-A (Acid-citrate-dextrose A)
- CPD (Citrate, phosphate, dextrose)
- CP2D (Citrate, phosphate, dextrose, dextrose)
- CPDA-1 (Citrate, phosphate, dextrose, adenine)
- Additive solution AS-1 Adsol
- Additive solution AS-3 Nutricel
- Additive solution AS-5 Optisol Additive solution AS-7 – SOLX

15

Anticoagulants and Preservatives		
Sodium citrate	Binds calcium and prevents coagulation	
Citric acid	Creates acidic environment to slow down glycolysis that occurs through cell metabolism	
Dextrose	Provides source of sugar for cell metabolism	
Phosphate	Buffer to maintain pH	
Adenine	Maintains ATP levels during cell metabolism	

16



Blood cells need food too!

• After plasma is expressed off the RBCs Nutritional additives are added to the bags

<u>Solution</u>	<u>Name</u>	<u>Shelf life</u>
AS-1	Adsol	42 days
AS-3	Nutricel	42 days
AS-5	Optisol	42 days



Those WBC have got to go!

Leukoreduction

- Utilize gravity to drain blood through special filter
- Filter "catches" white blood cells
- All the RBCs continue downward into a new bag
- Packed RBC unit (pRBC)





20



21

19



22





And now, back to our plasma...

- Platelet-rich plasma
- Another centrifuge spin, \geq 3500 rpm for 10 minutes
- Another expression step to separate plasma from platelets



<u>Time for a deep freeze</u>

- Plasma then frozen at -18°C
- Can be stored frozen for up 1 year
 Once thawed, must be transfused within 24 hours
- FFP: Fresh Frozen Plasma, within 8 hrs
- FP24: Frozen Plasma, within 24 hrs

25

Now, where'd those platelets go?

- Sampled for bacterial testing
- Weighed and counted;
- Must contain certain amount of plts
- Finally placed on agitatorStored at room temperature
- Shelf life of 5 days





26











After all that hard work...

• pRBC: 42 days

• FFP: 1 year

• FFP, thawed: 24 hrs

Platelets: 5 days

31





32

pRBC modification DE-GLYCEROLIZED IRRADIATED FROZEN WASHED Washed Gamma ≤-65°C Thawed in with saline ray 37°C water bath with 40% Removes Prevents glycerol Ta-GVHD plasma , proteins Rare types, Glycerol For immuno-suppressed neonates, removed Prevents military by washing patients allergic rxns

33



















Major biochemicals of RBCs

- Constituents must be kept in balance to maintain cellular integrity
 - >pH (hydrogen ion concentration)
 - >Adenosine triphosphate (ATP)
 - ≻Glucose
 - >2,3 diphosphoglycerate (2,3 DPG)

43

45



44

Effects of storage on other products The blood demand What is needed everyday • Platelets are fragile and susceptible to membrane changes, cell death, and bacterial contamination in the US? • 36,000 units of RBC • WBCs are fragile and break down readily • 10,000 units of plasma • Release cytokines and enzymes Accelerate RBC and platelet death • 7,000 units of platelets • Can cause TR Every 2 seconds, someone in US needs transfusion • Factors V and VIII are heat labile >Cancer, anemia, organ transplant, surgery, accidents/trauma • Bacteria cannot be stopped s://www.redcrossblood.org/donate-blood/how-to-donate/how-blood-donations-help/blood-needs-blood-supply.htm 46







And that is the story of your blood donation!

http://redcrossncgc.blogspot.com/2 014/01/tbt-story-of-blood.html

49



50

