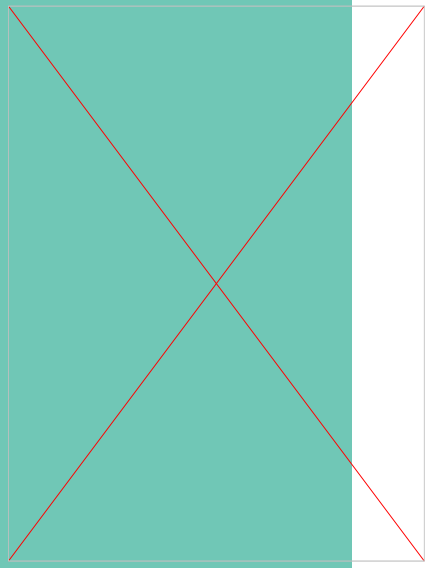
SAWA UNIVERSITY

PRACTICAL BLOOD TRANSFUSION
1ST SEMESTER

Blood products preparation



Sawa University — جامعـــــة ســـــــاوة

College of health and medical techniques — الاهلية

كليـــــة التقنيـــات الصحيـة والطبيـة

Department of Medical Laboratories..... — قسم تقنيات المختبرات الطبية

Stage: forth

تدريسي المادة : د. هبة محمد عبدالواحد

Lecture No 6 Practical

Learning Objectives

- Understand the concept of whole blood and its components.
- Learn the steps of blood component preparation.
- Recognize the importance of proper handling and storage.

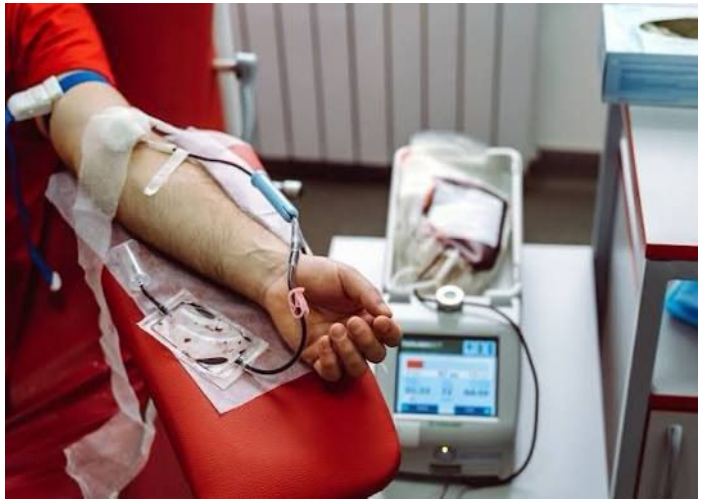
Blood products preparation methods

Blood components can be prepared and reduced from two main sources:

1. Whole Blood Donation

- Collected as 450 mL of whole blood.
- Then separated by centrifugation

into RBCs, plasma, and platelets.



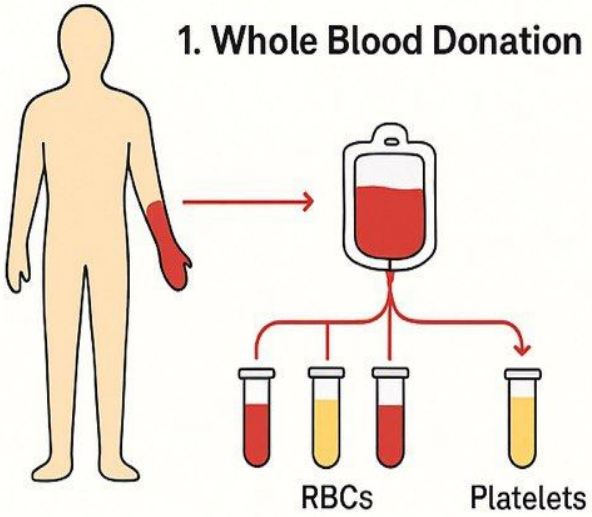
2. Apheresis Donation:

- Uses an automated cell separator to collect specific components directly (e.g., platelets, plasma, or RBCs).
- The remaining components are returned to the donor.
- Produces higher yield and purity of the desired product, reducing donor exposure.

Blood Product Production and Reduction Methods

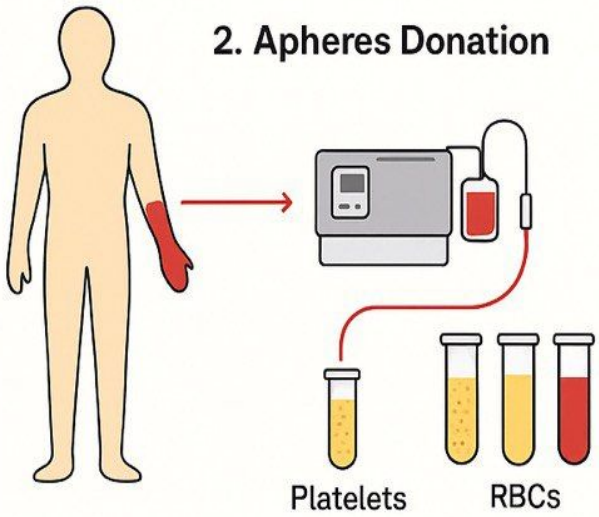
Blood components can be prepared and reduced from two main sources:

1. Whole Blood Donation



Collected as 450 mL of whole blood,
Then separated by centrifugation into RBCs, plasma, and platelets.
Allows production of multiple components from one donation.

2. Apheres Donation



Uses an automated cell separator to collect specific components directly (e.g. platelets, plasma, or RBCs). The remaining components are returned to the donor.
Produces higher yield and purity of the desired product, reducing donor exposure.

Both methods aim to optimize blood product utilization and ensure component-specific transfusion.

Importance of Blood Component Separation

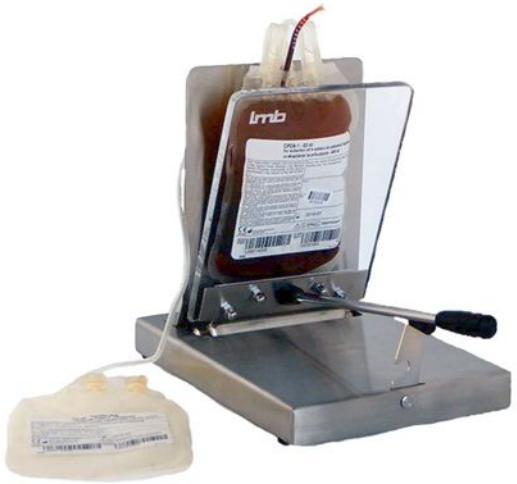
- Component separation allows optimal use of each part of blood.
- Different patients require specific components based on clinical needs.

Whole Blood Donation

Equipment and Materials Used:

- Blood bags with anticoagulant (CPDA-1 or CPD/SAGM.(
- Centrifuge.
- Plasma extractor.
- Sealer .
- transfer bags.

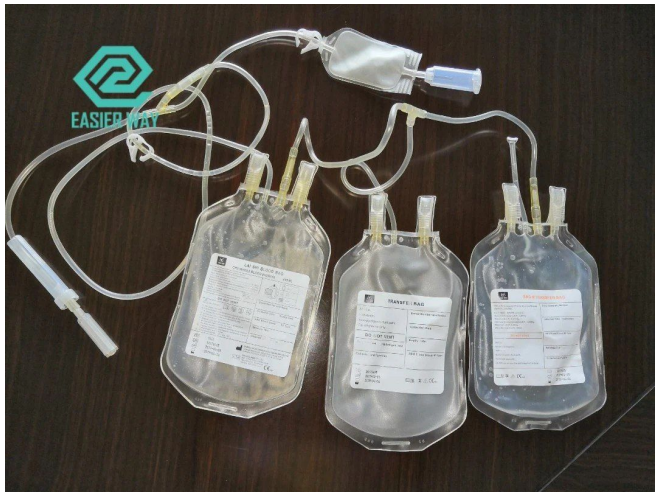
Plasma extractor



Sealer

Centrifuge

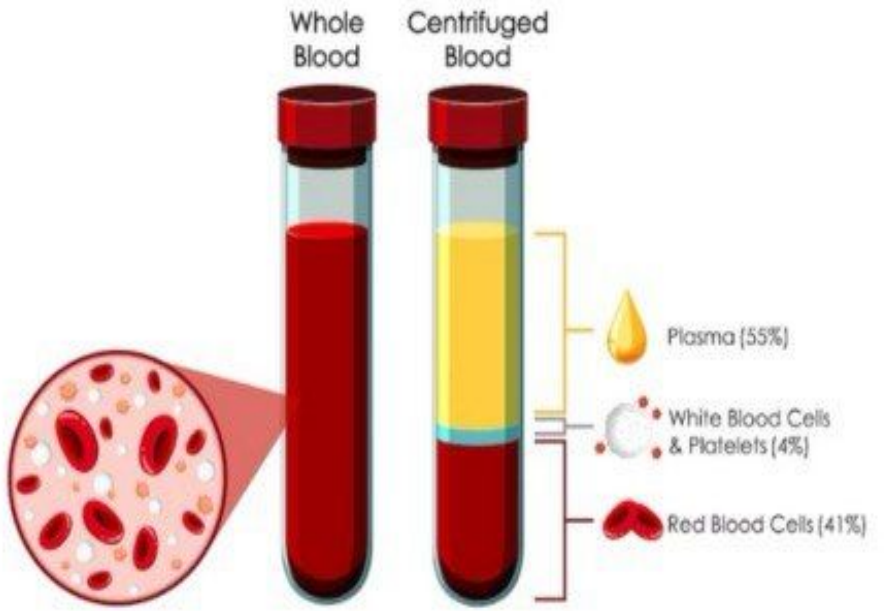
transfer bags



Principles of Centrifugation

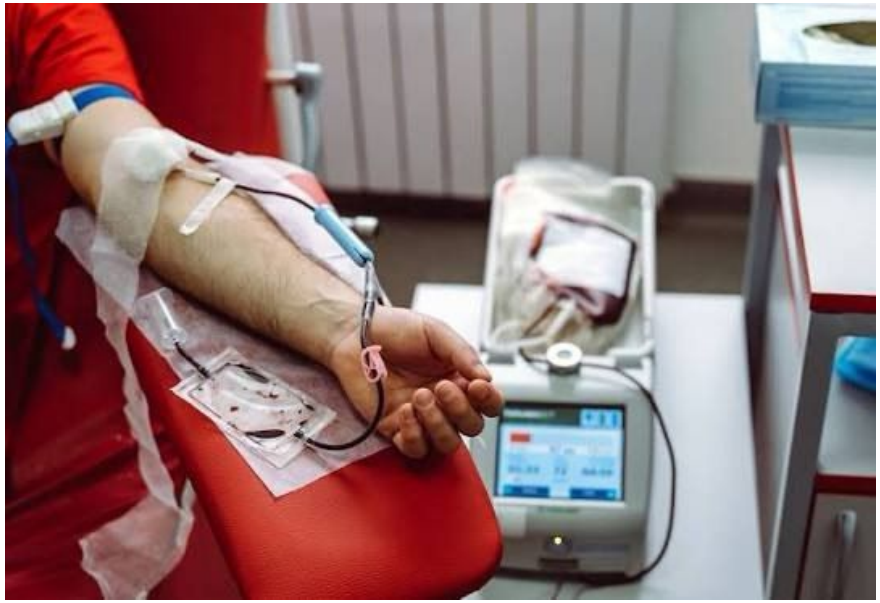
Centrifugation separates components based on density:

- RBCs: heaviest, settle at the bottom
- Buffy coat: thin middle layer (WBCs + platelets(
- Plasma: lightest, forms the top layer.



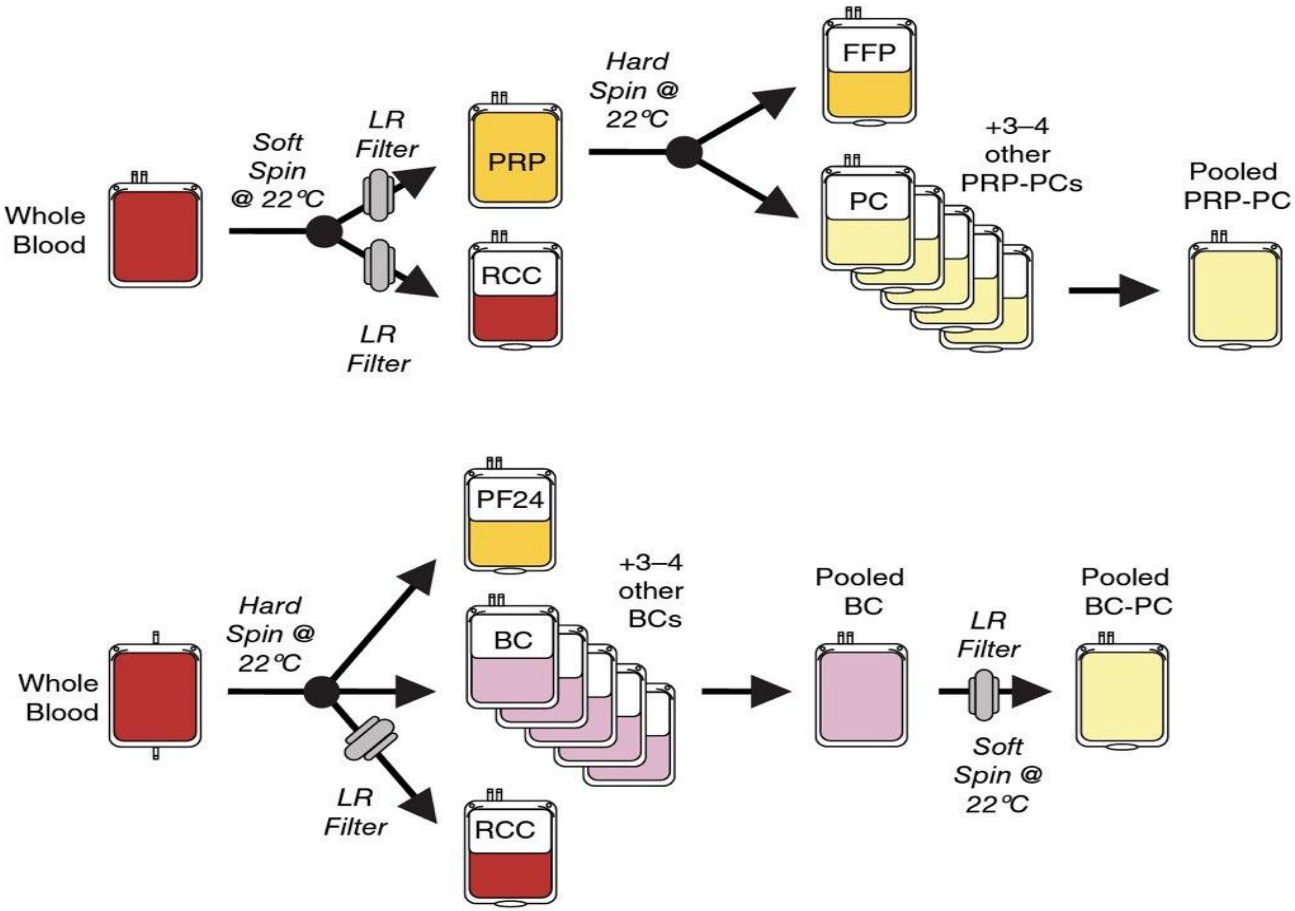
Step 1: Whole Blood Collection

- Donor selection and screening
- Blood collected into primary bag containing anticoagulant.
- Volume: ~450 mL ± 10%
- Labeling and mixing during collection.



Step 2: Centrifugation and Separation

- Soft spin (~2000 g for 10 min) to separate plasma and buffy coat.
- Hard spin (~5000 g for 10 min) for platelet-free plasma.
- Use of plasma extractor to separate layers accurately.


Whole Blood
Soft Spin @ 22°C
LR Filter
PRP
RCC
LR Filter
Hard Spin @ 22°C
FFP
PC
+3–4 other PRP-PCs
Pooled PRP-PC
Whole Blood
Hard Spin @ 22°C
PF24
BC
+3–4 other BCs
LR Filter
RCC
Pooled BC
LR Filter
Soft Spin @ 22°C
Pooled BC-PC

Step 3: Plasma Preparation

- Plasma is transferred to a satellite bag.
- Can be frozen within 8 hours → Fresh Frozen Plasma (FFP.(
- Stored at –30°C up to 1 year.

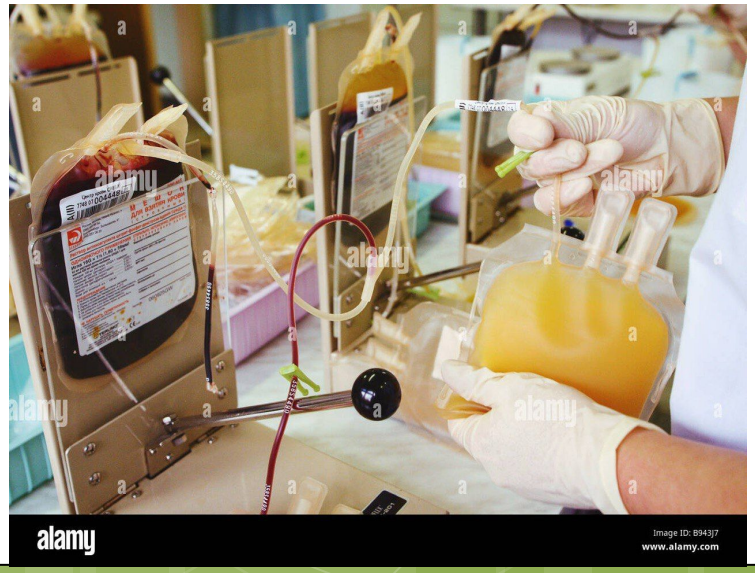
Step 4: Packed Red Cells Preparation

- After plasma removal, the remaining product is RBC concentrate.
- Add additive solution (SAGM.(
- Store at +2°C to +6°C

for up to 42 days

Step 5: Platelet Concentrate Preparation

- Derived from buffy coat or platelet-rich plasma method
- Must be kept under constant agitation at +20°C to +24° C.
- Shelf life: 5 days.


alamy
Image ID: B943J7
www.alamy.com

Step 6: cryoprecipitate

Cryoprecipitate is prepared from Fresh Frozen Plasma.

The cryoprecipitate frozen at –30°C or below, for up to 12 months.

contains mainly

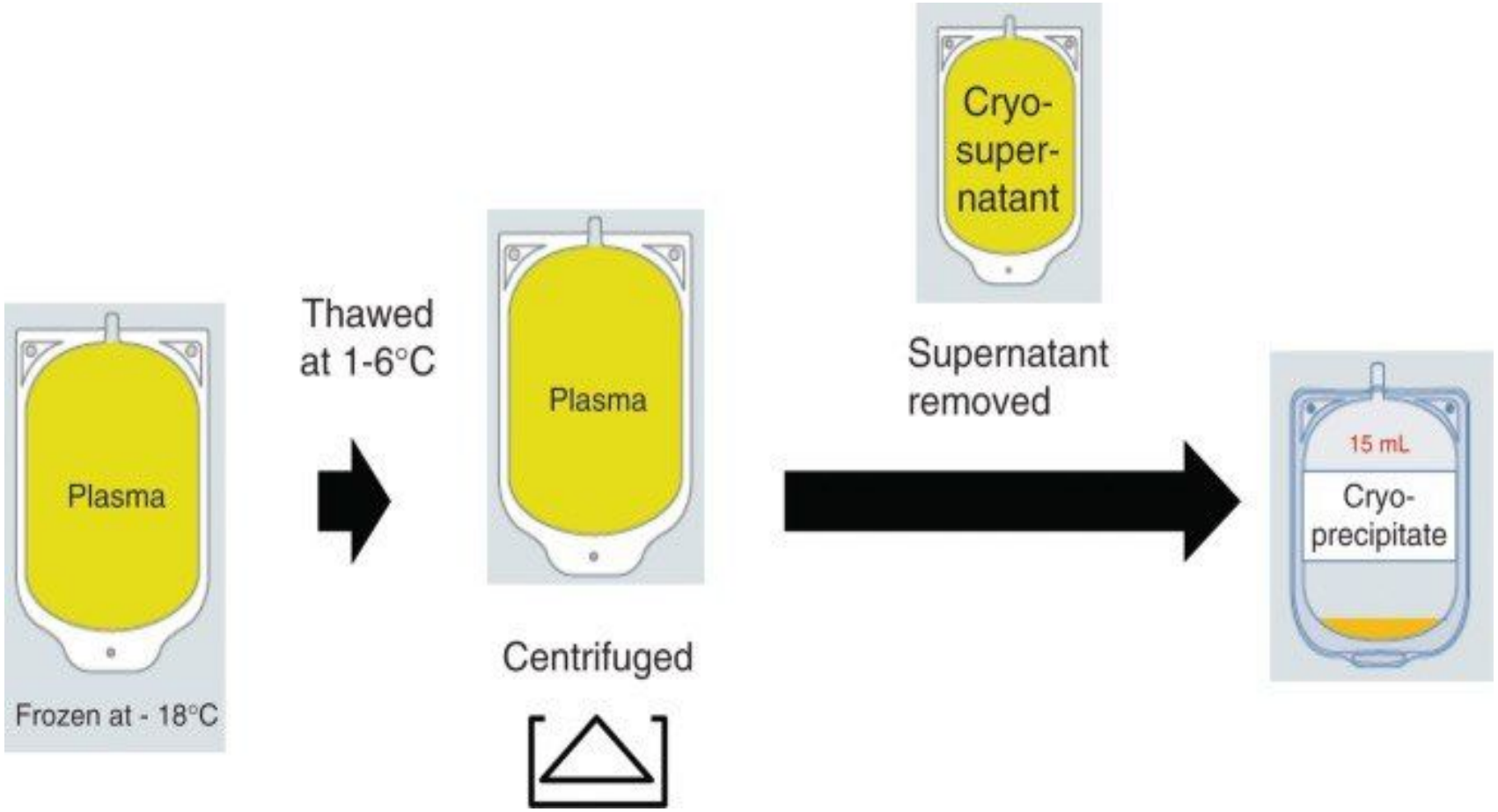
fibrinogen (1)

factor VIII (8)

factor XIII (13)

von Willebrand factor

fibronectin.


Plasma
Frozen at - 18°C
Thawed
at 1-6°C
Plasma
Centrifuged
Cryo-
super-
natant
Supernatant
removed
15 mL
Cryo-
precipitate

References

1. AABB Technical Manual, 21st Edition.
2. WHO Guidelines on Blood Transfusion Services.

Q/ What are the blood products preparation methods?

Q/ what are the contents of cryoprecipitate?

Q/ cryoprecipitate contain:

1. Factor 7.
2. Factor 2.
3. Factor 1.
4. Factor 5.