Shine
SCIENTIFIC AND CLINICAL DEVELOPMENT

NHS
Blood and Transplant

Journey of a Blood Bag- Blood Centre. Processing and Testing

Ruth Evans,
OD Manager - Scientific and Clinical
NHSBT Filton

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Why do we separate whole blood into different components?

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Whole Blood Pack Type

- Identified at donor session
- Determines components that can be produced:

1. Whole Blood Filtration (Top and Top)
   - (red blood cells, plasma or cryoprecipitate)
2. Bottom and Top
   - (red blood cells, and platelets; rarely-plasma and cryoprecipitate)

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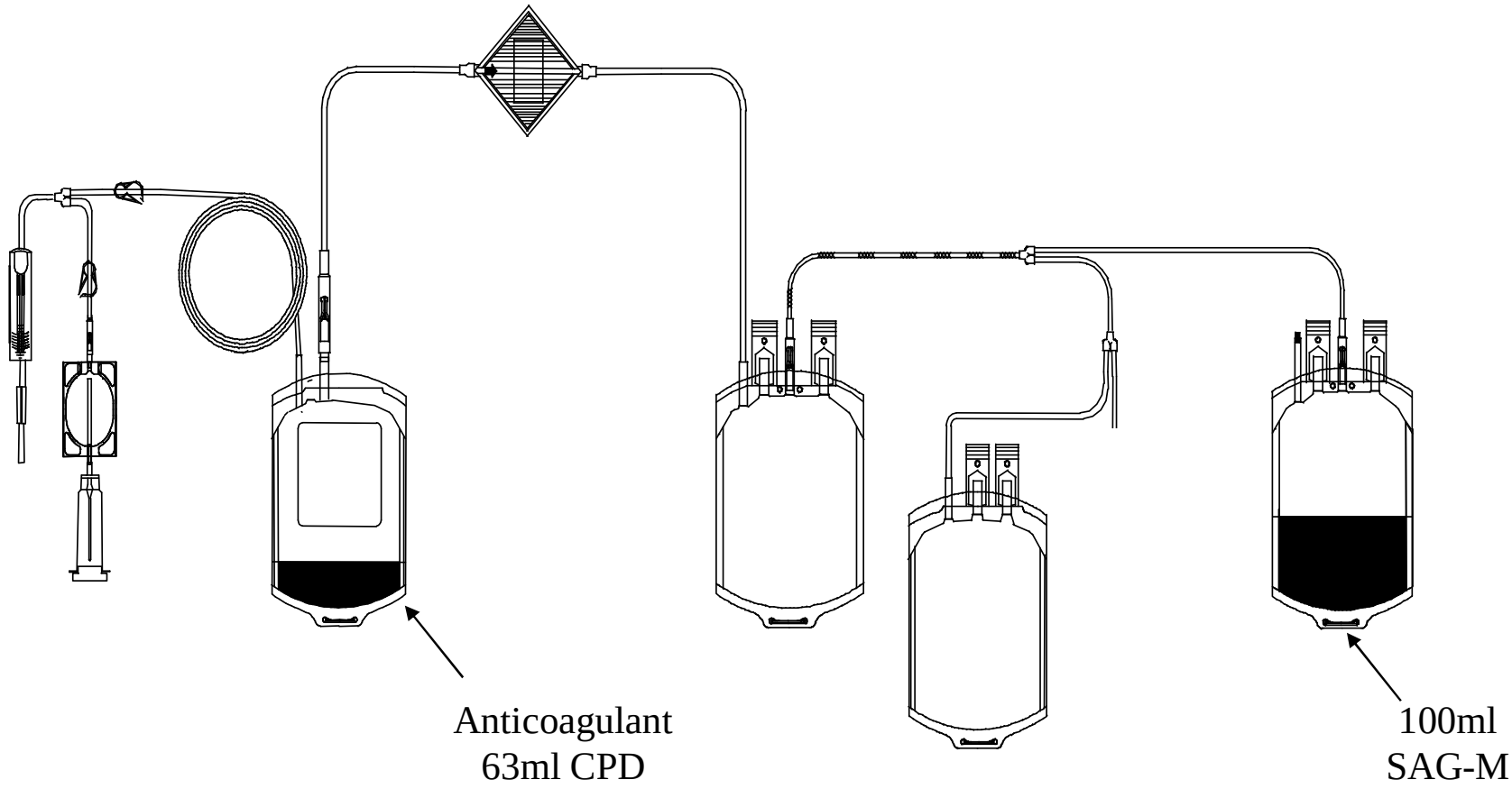
Whole Blood Filter (WBF) Pack



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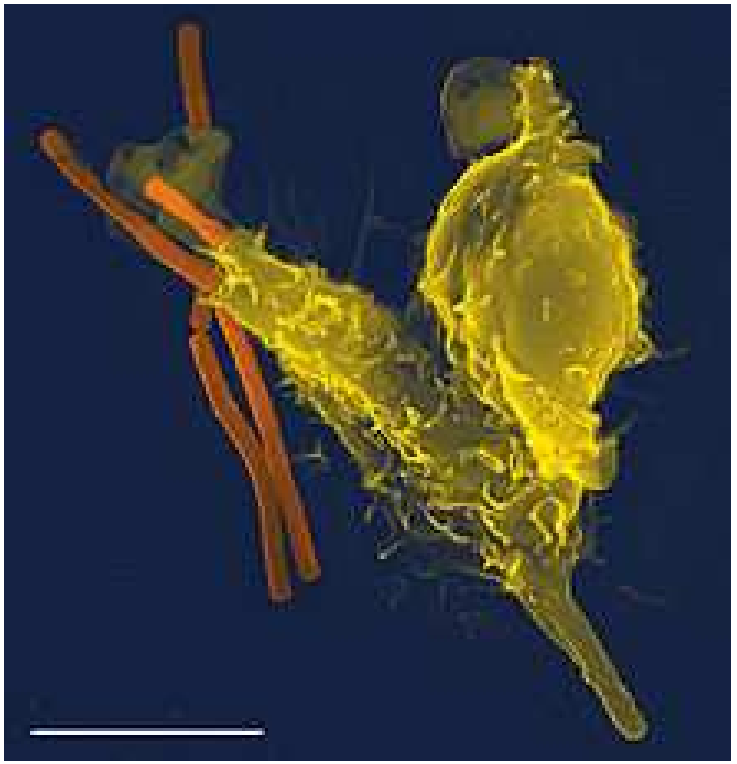
Overnight storage

- Regardless of bleed type most WB is stored overnight before processing
  - Phagocytes in product engulf bacteria



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Leucodepletion of Whole Blood Donations

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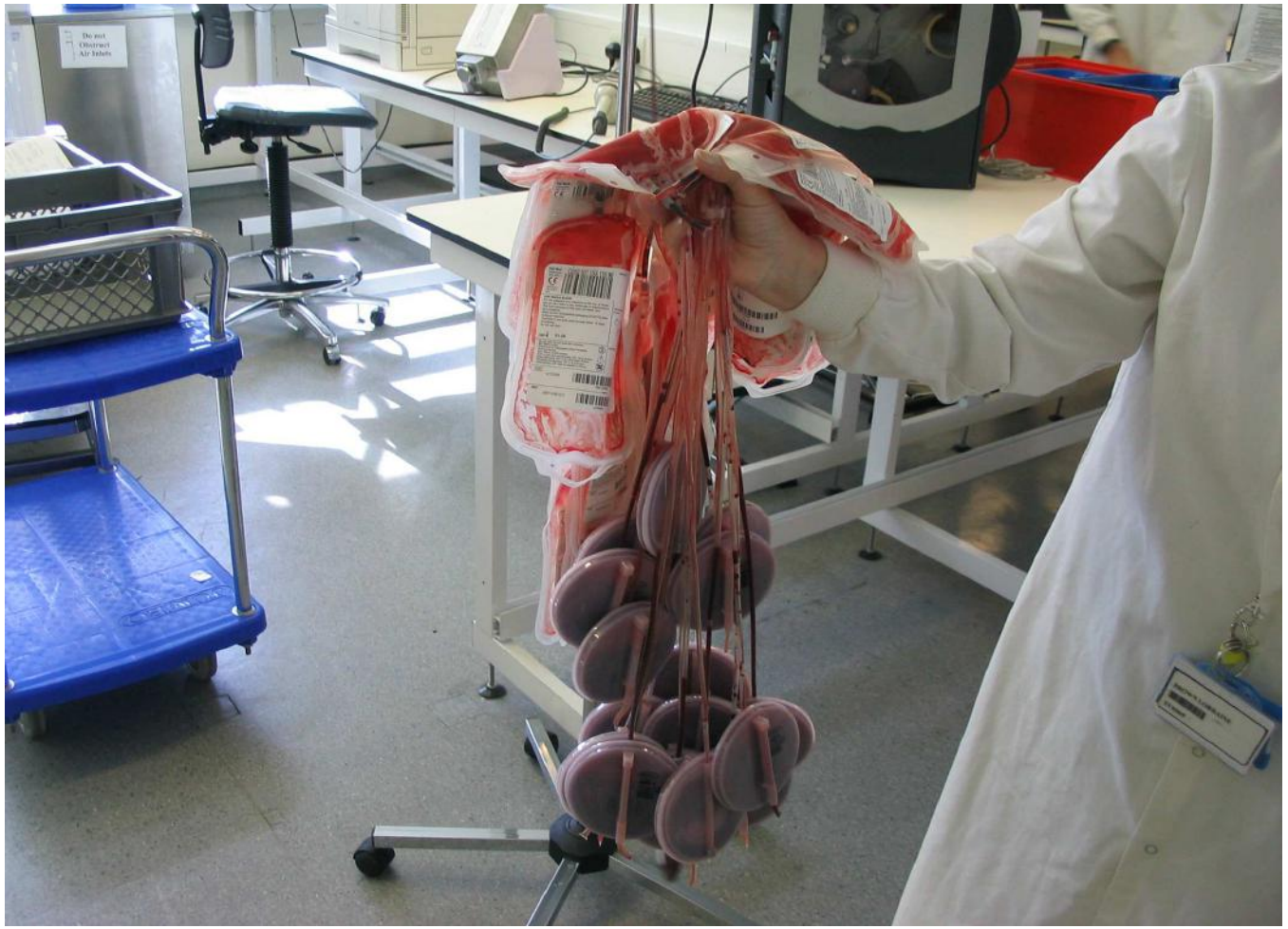

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Centrifugation - fast (3800 rpm)

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- Plasma
- Red Cells

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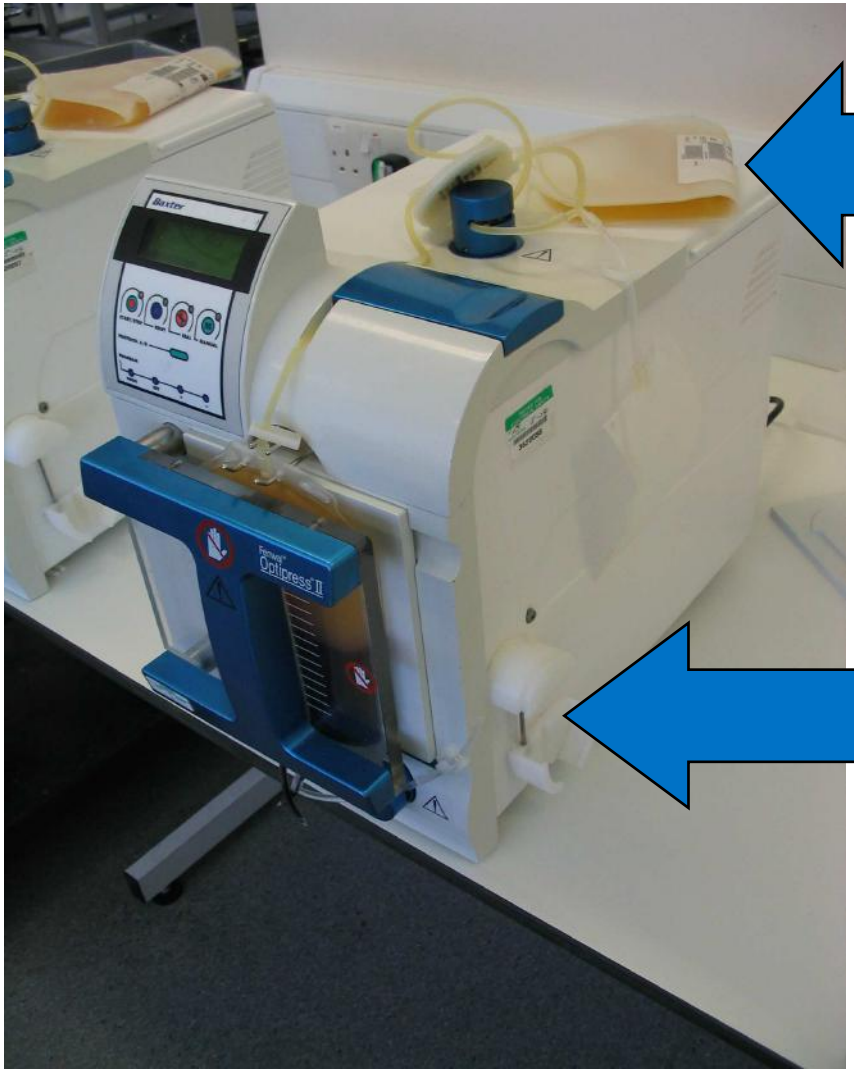
Semi-automated press



- **Plasma**
- **Red Cells**

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WBF Components

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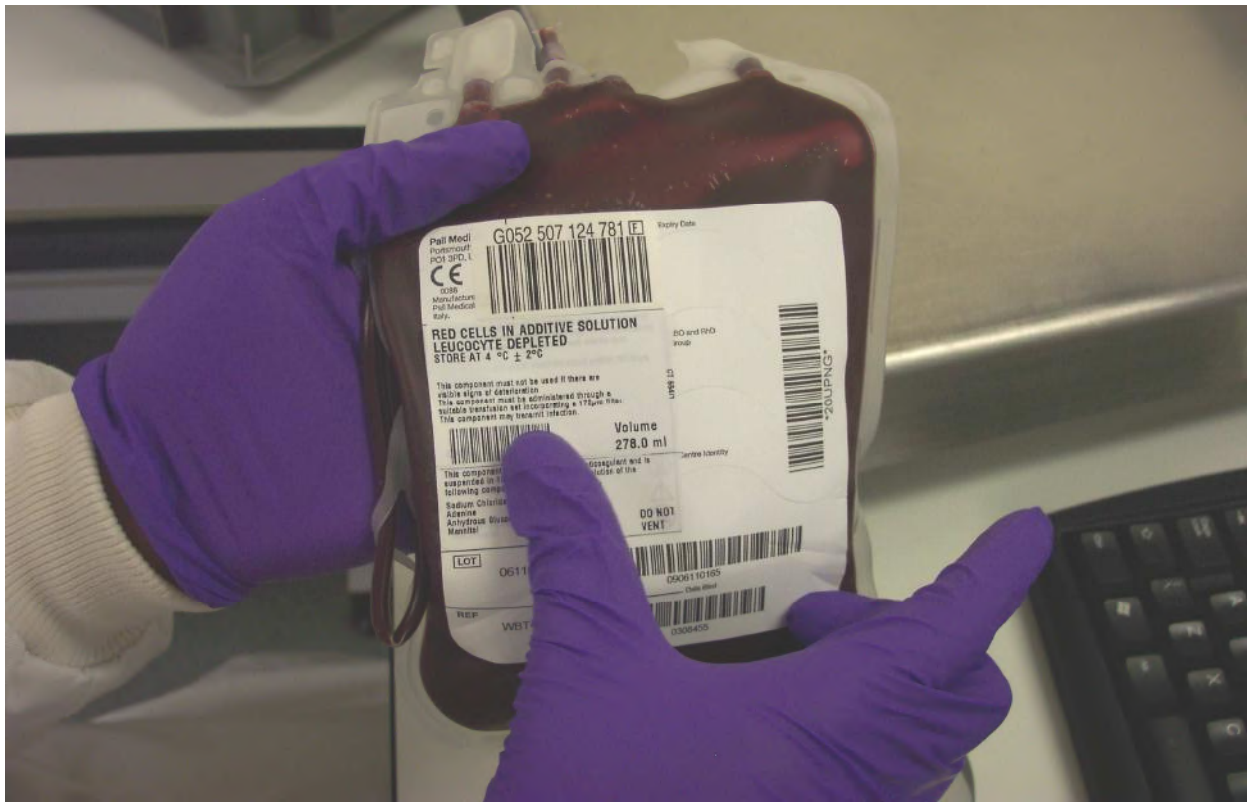

SAG-M additive solution added

Red Cells

4℃ +/- 2

35 days

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Freezing

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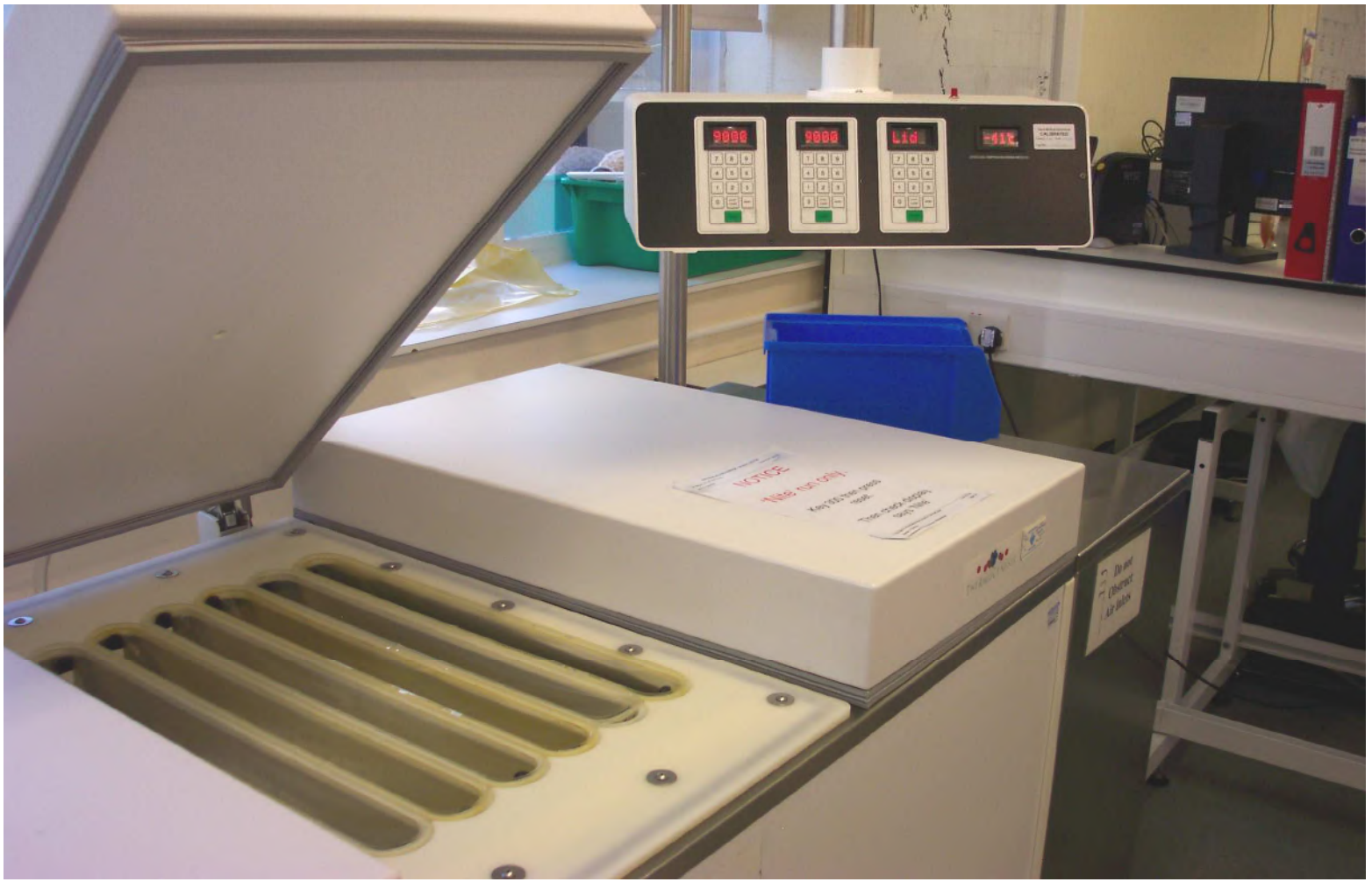

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Fresh Frozen Plasma (FFP)

< -25℃

3 years

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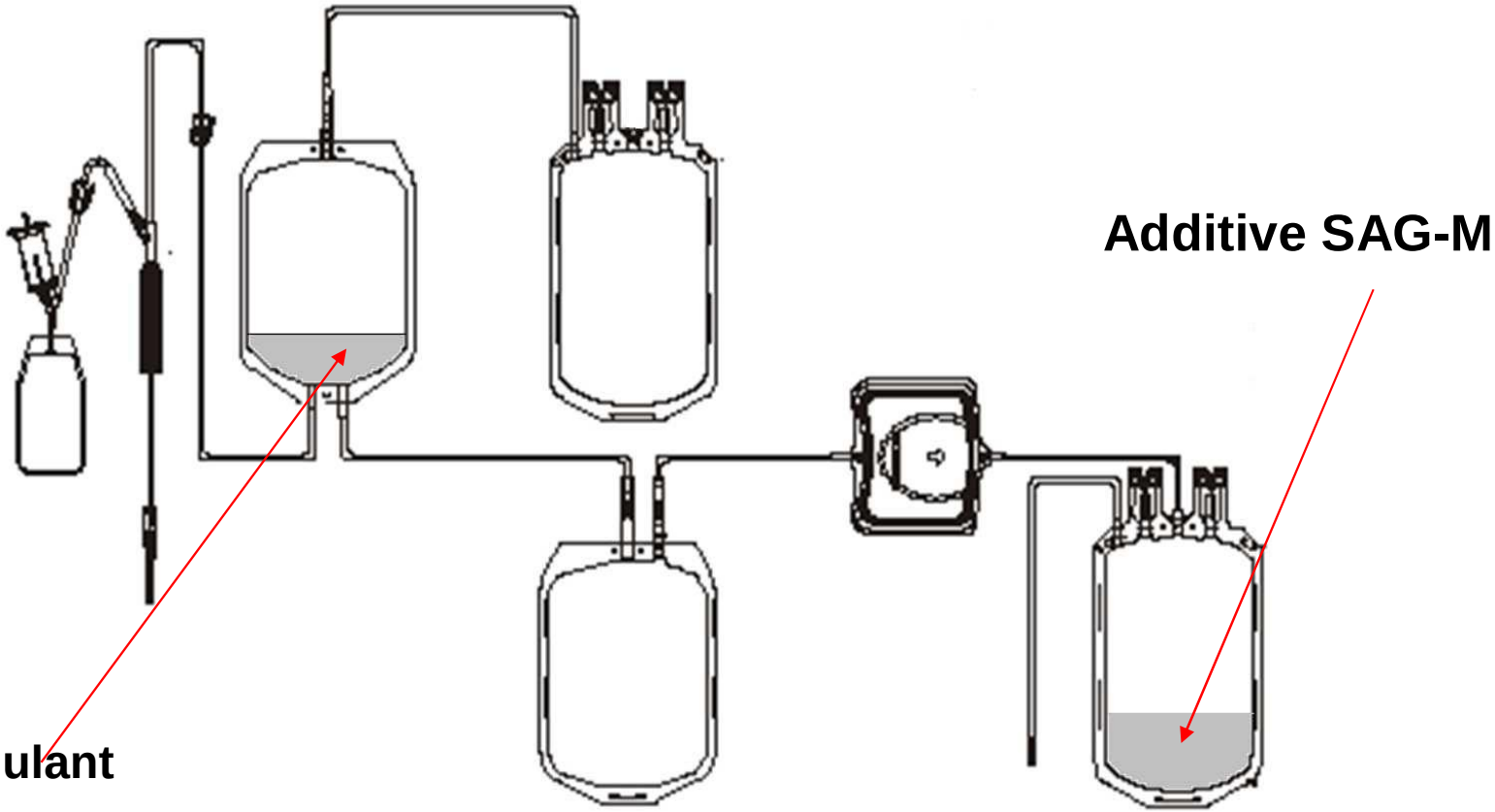
Bottom and Top (BAT) Pack



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Centrifugation - fast

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BAT Components

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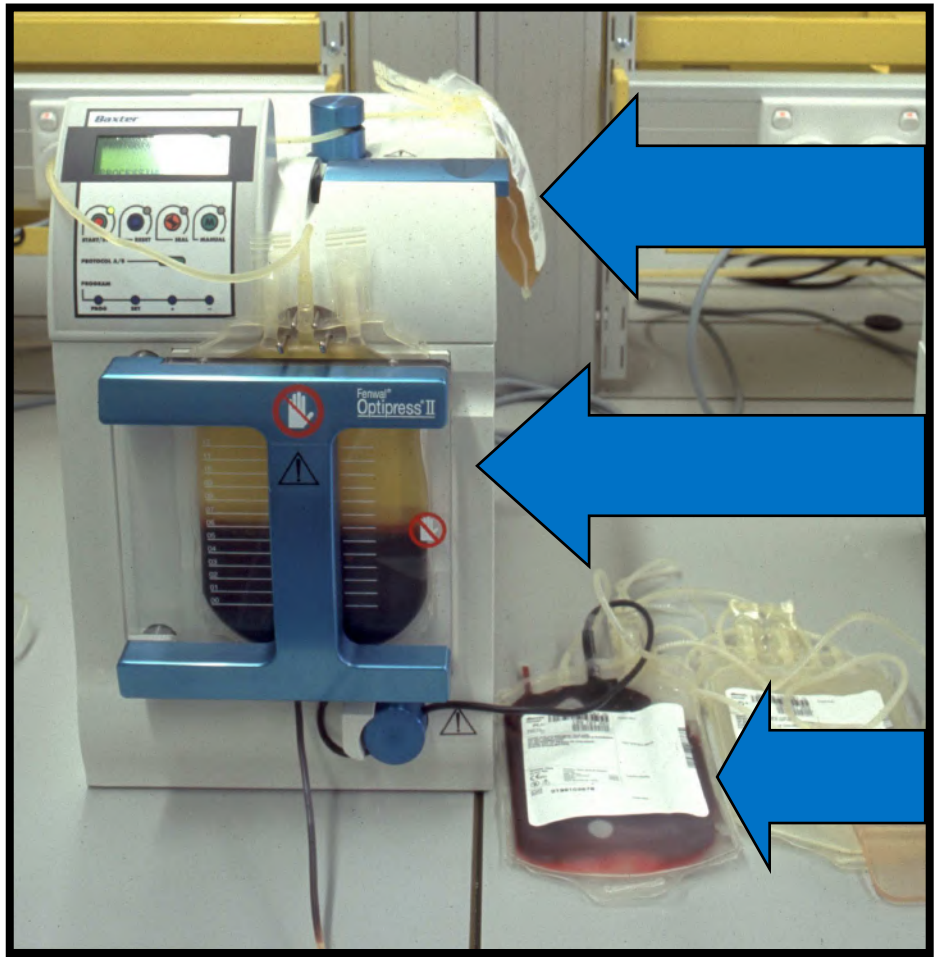

- Plasma
- Buffy Coat (for platelets)
- Red Cells

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Leucodepletion of Red Cells

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Red Cells

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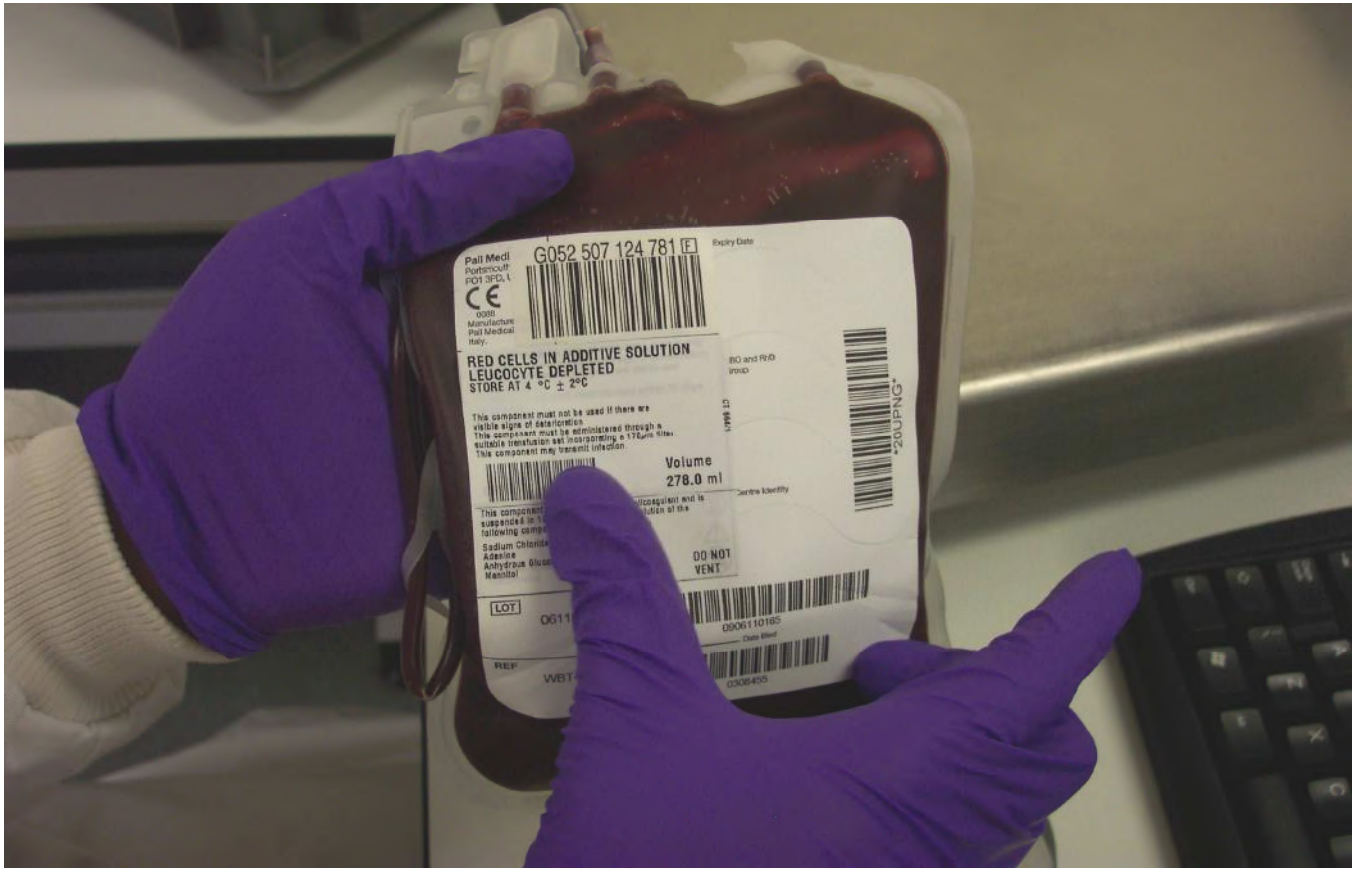

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BAT – platelet pooling

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- 4 BCs + 1 PAS
- Same ABO group
- Rh and CMV only neg if all neg
- Unique pool number generated

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Platelet Pooling - Sterile Connecting Device (SCD)

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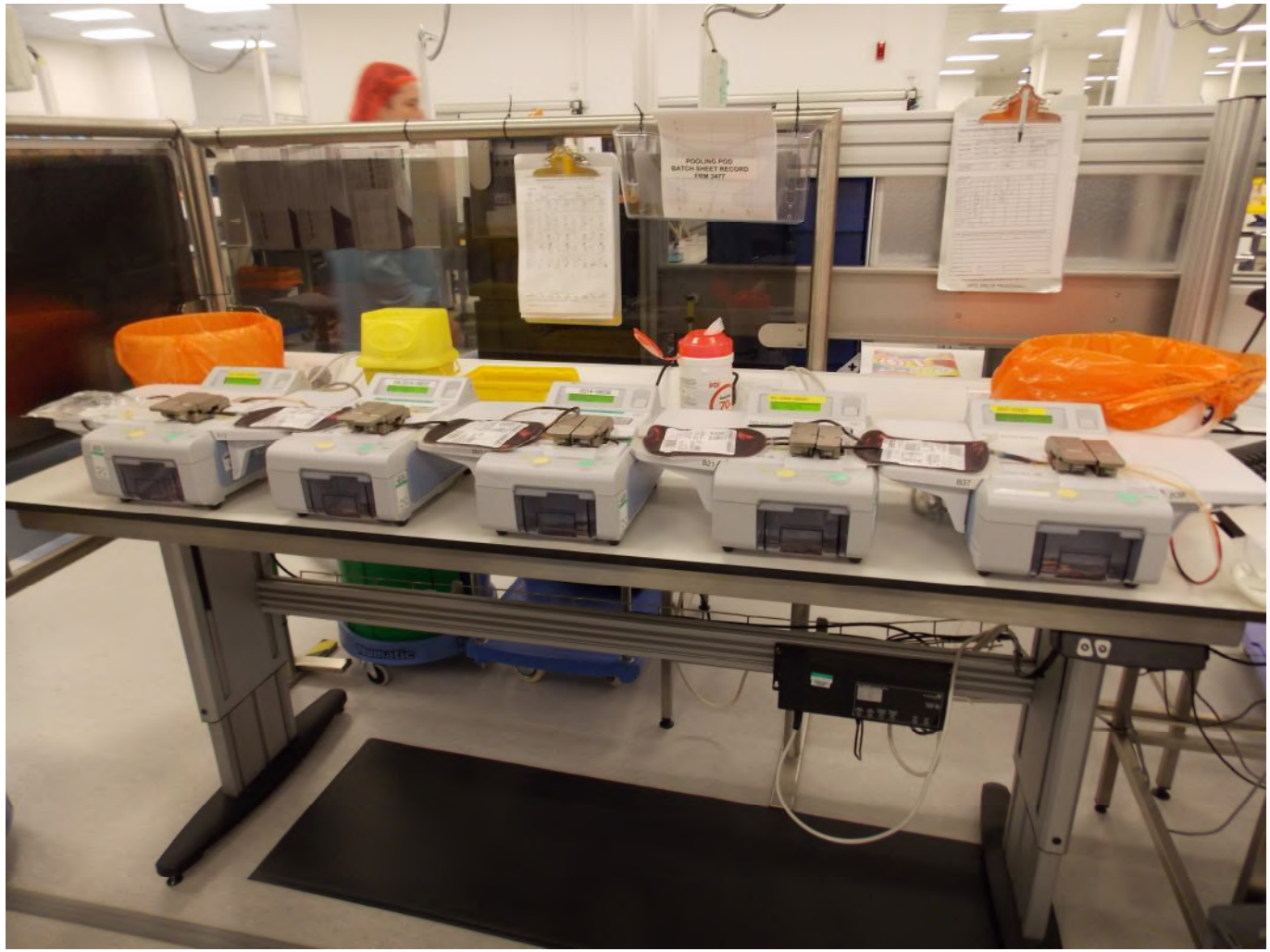
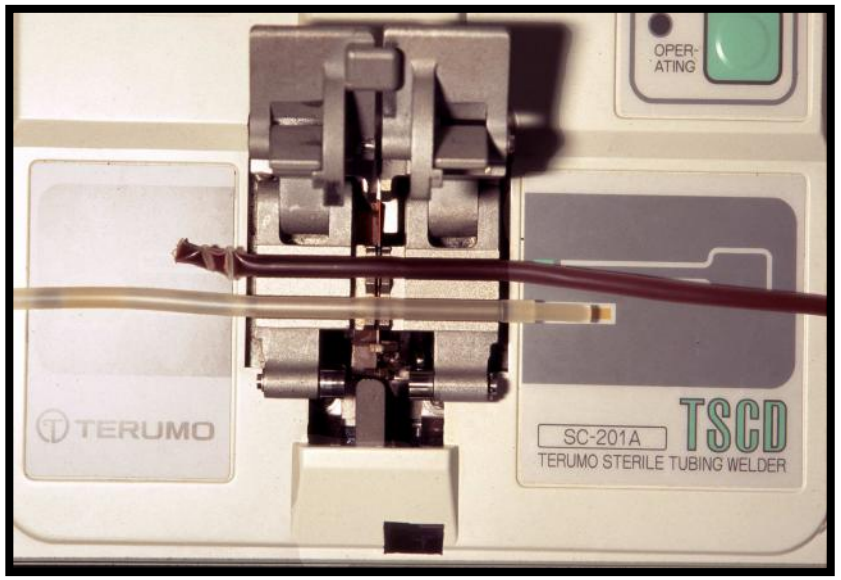
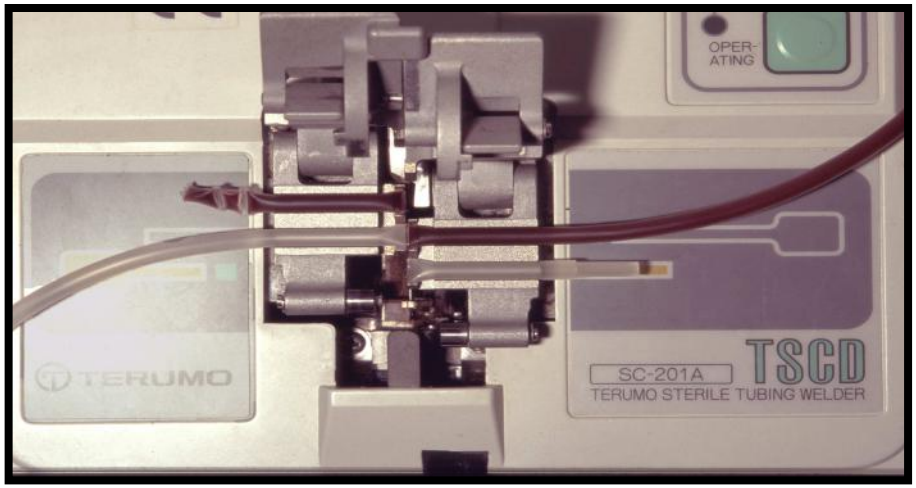


Platelet Pooling - SCD





- Sterile Connection
- Joins tubing aseptically
- Disposable copper blade
- Creates a ‘train’

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PAS is washed through the “train” of bags to pool together the contents of the 4 Buffy coat bags into the terminal bag

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Centrifugation - slow (1300 rpm)

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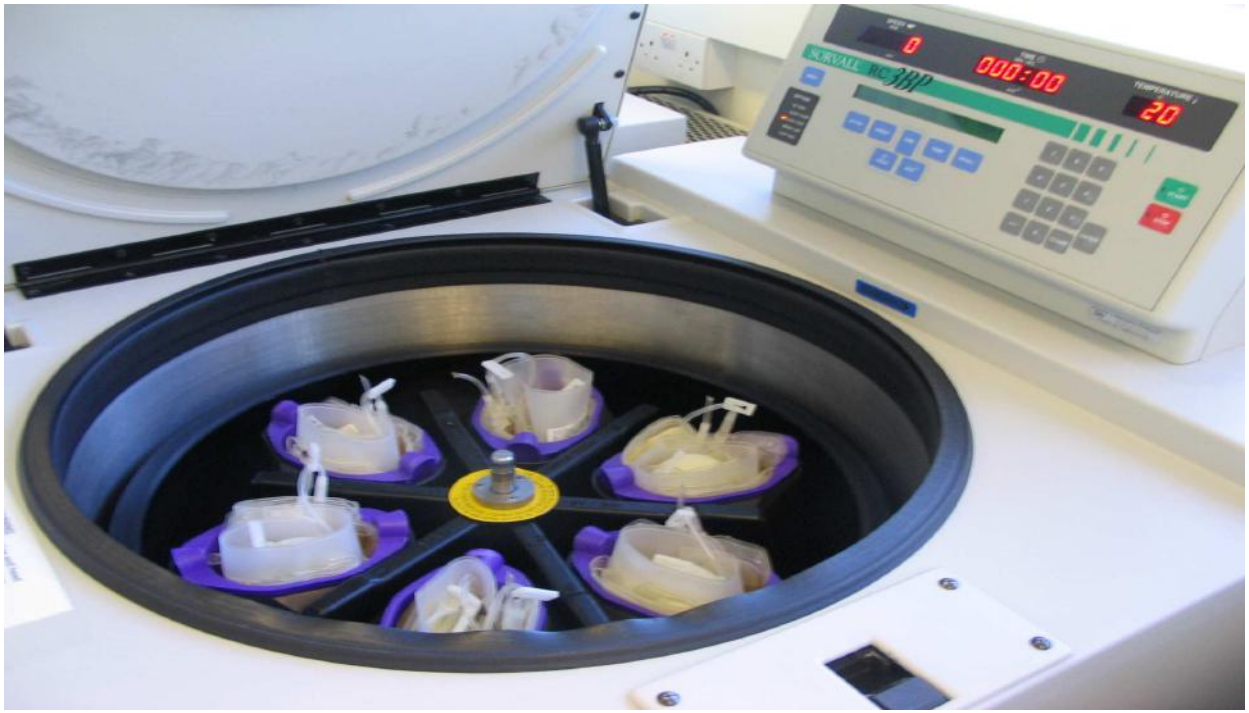

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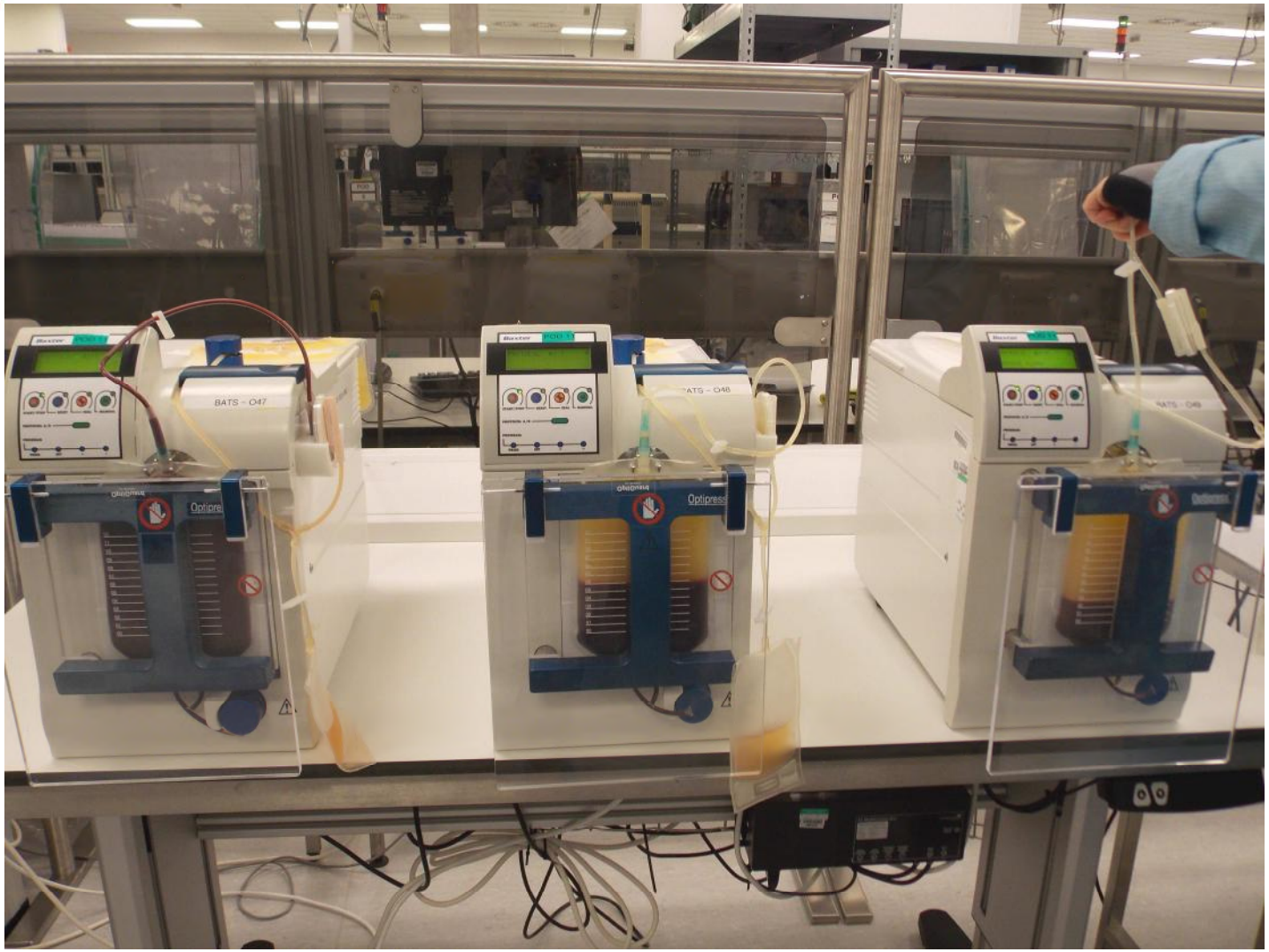

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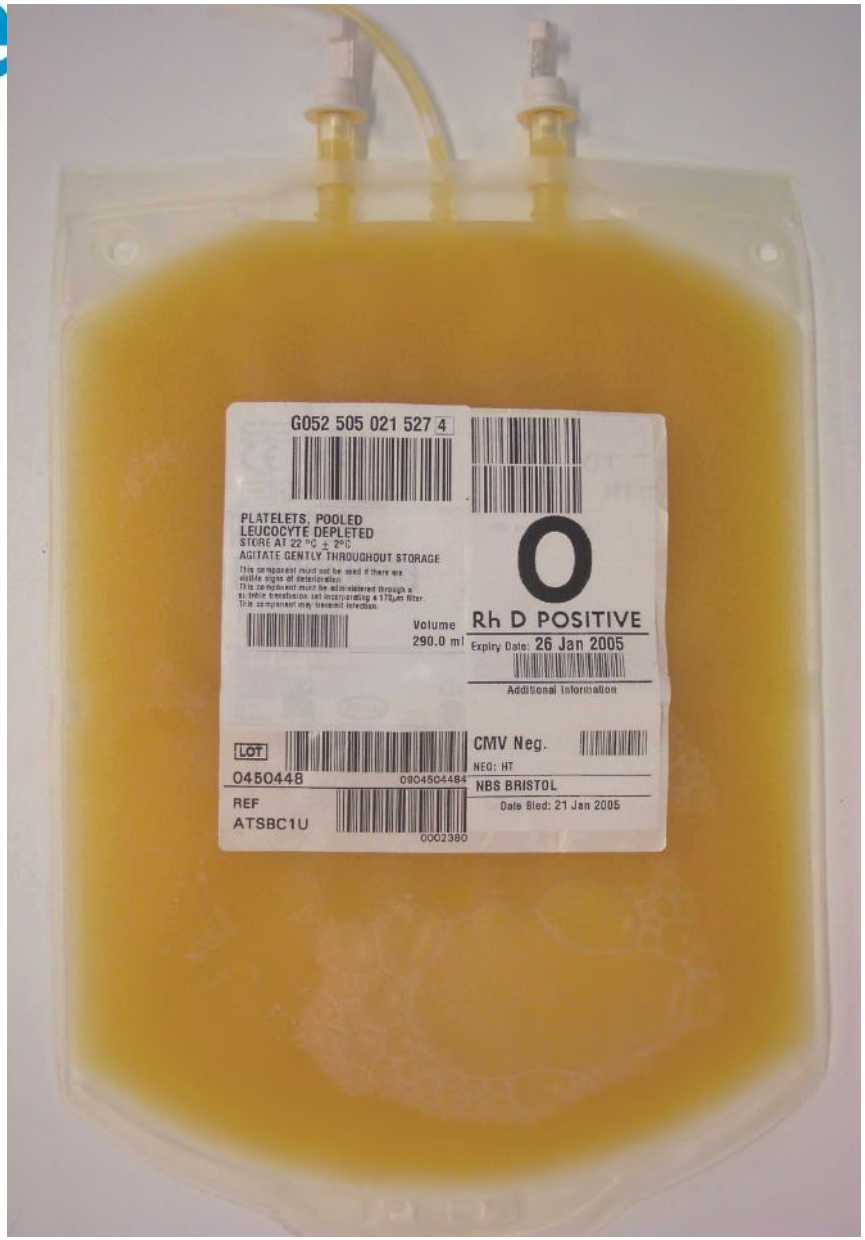

Pooled Platelet

22°C +/-2 gently agitating

7 days (if bacterial monitoring)

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Special components: Cryoprecipitate

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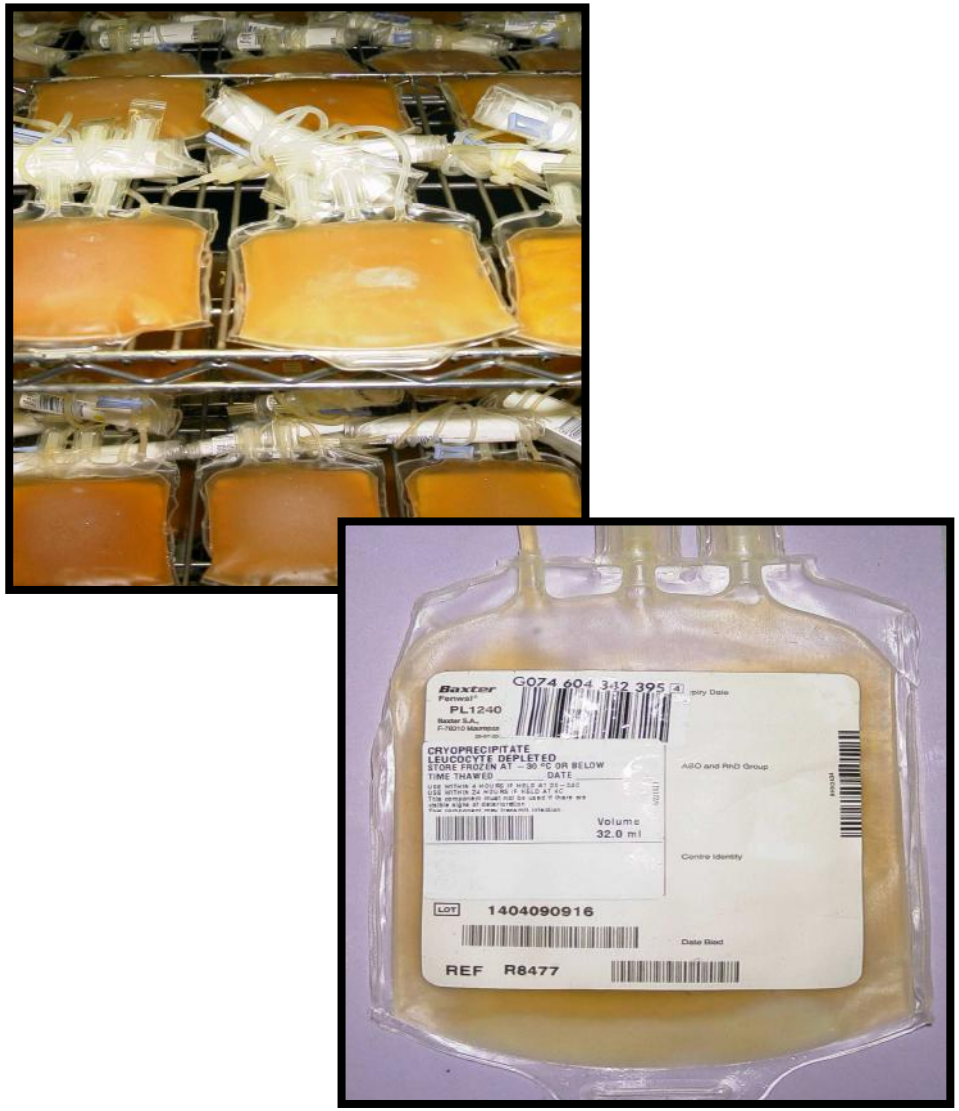
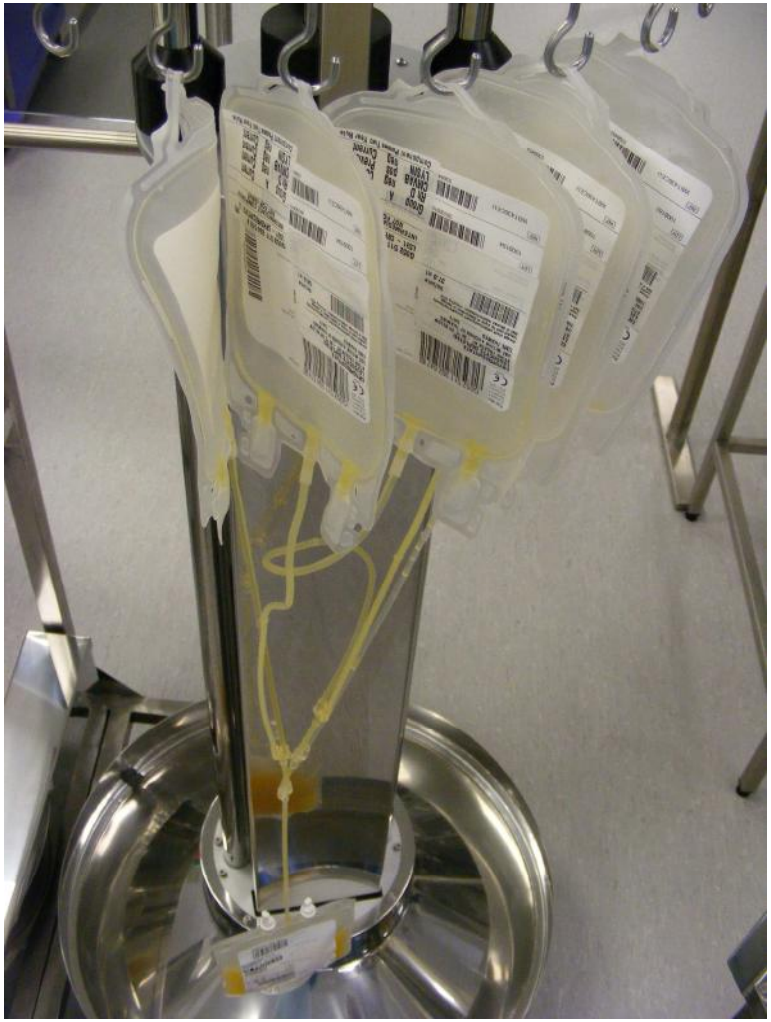
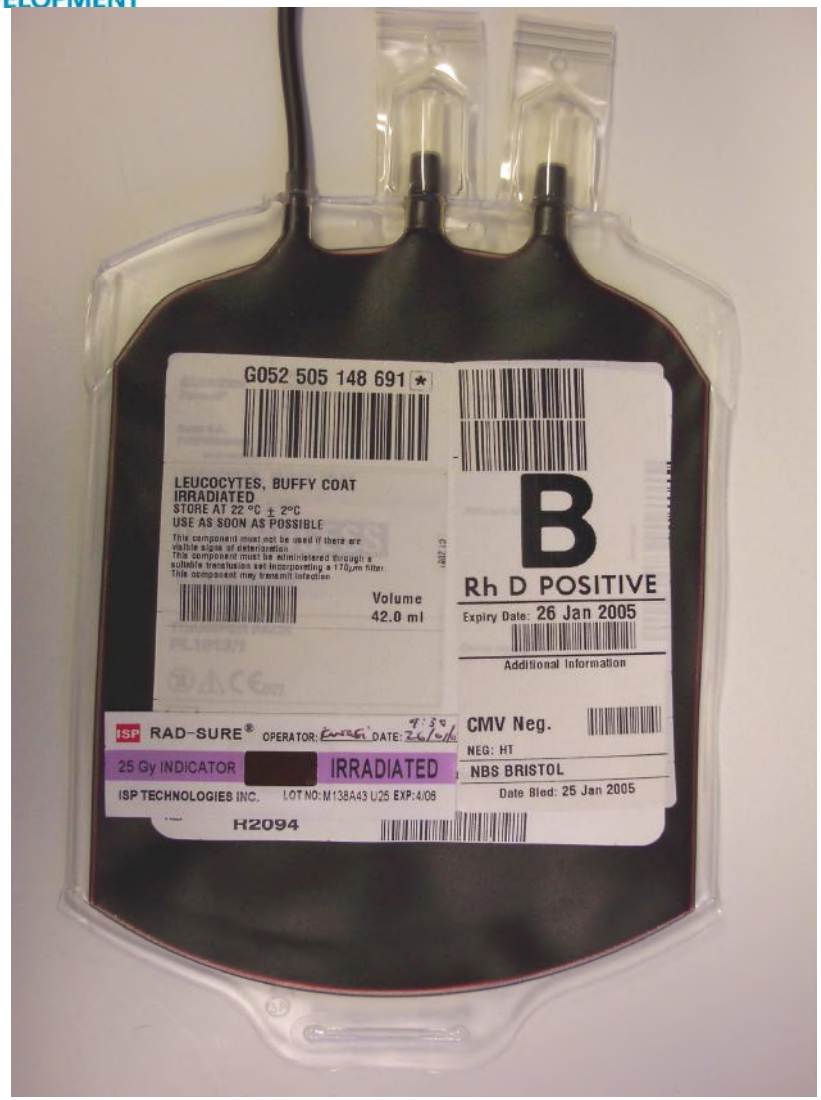




Granulocytes



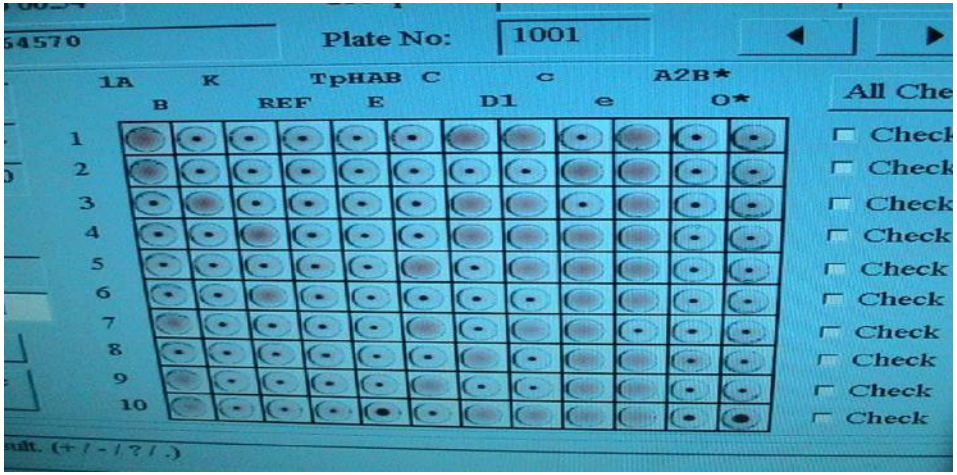
Stored 22℃ without agitation for 24 hours only

Must contain >$5x10^9$ cells per unit

Must be CMV neg (if patient CMV neg)

Donation Testing – Grouping

- Mandatory testing:
  - ABO / RhD grouping
  - antibody screening



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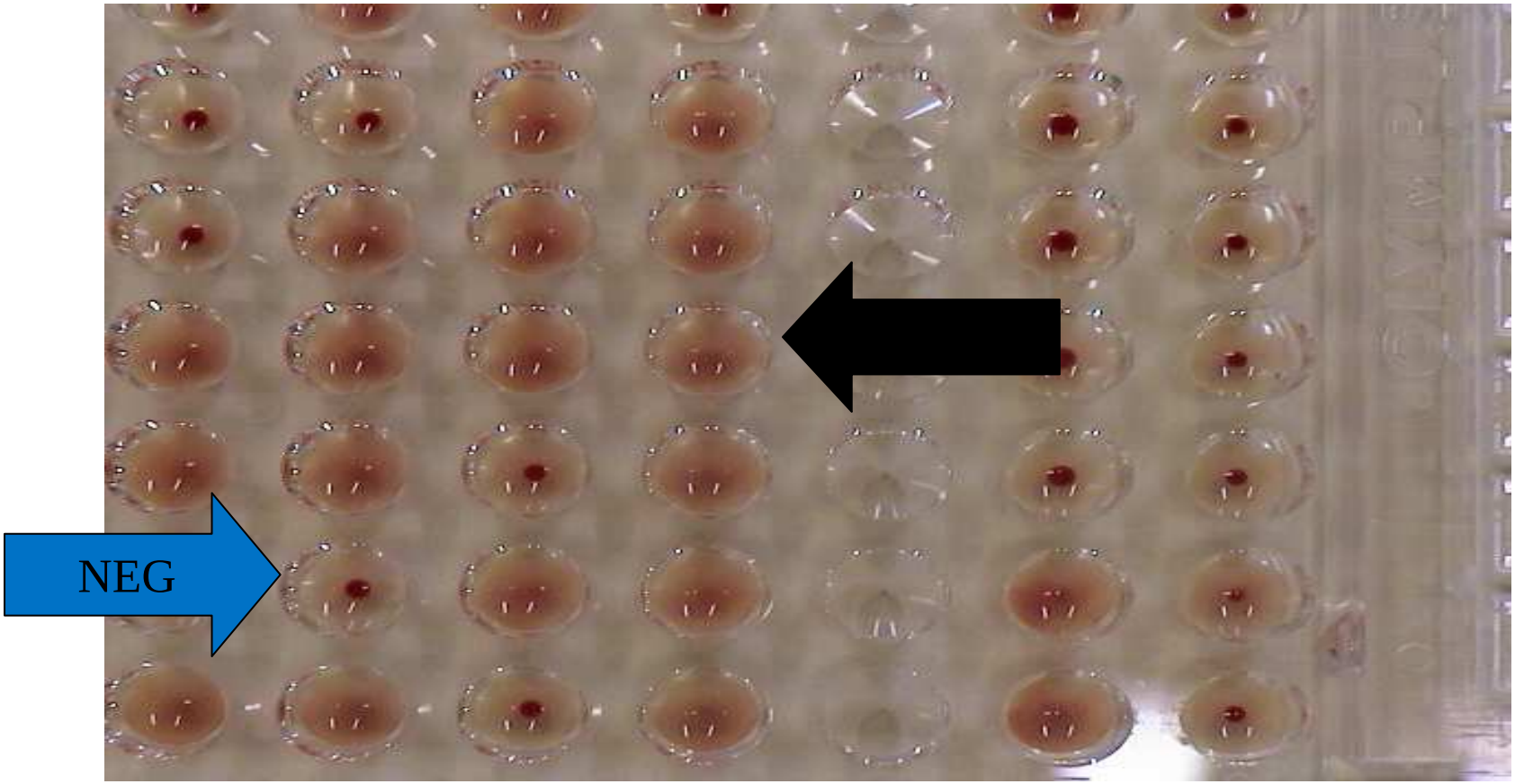
Haemagglutination



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Mandatory/ discretionary testing

- Why do we test for what we do test for?

- Why don’t we test for everything?

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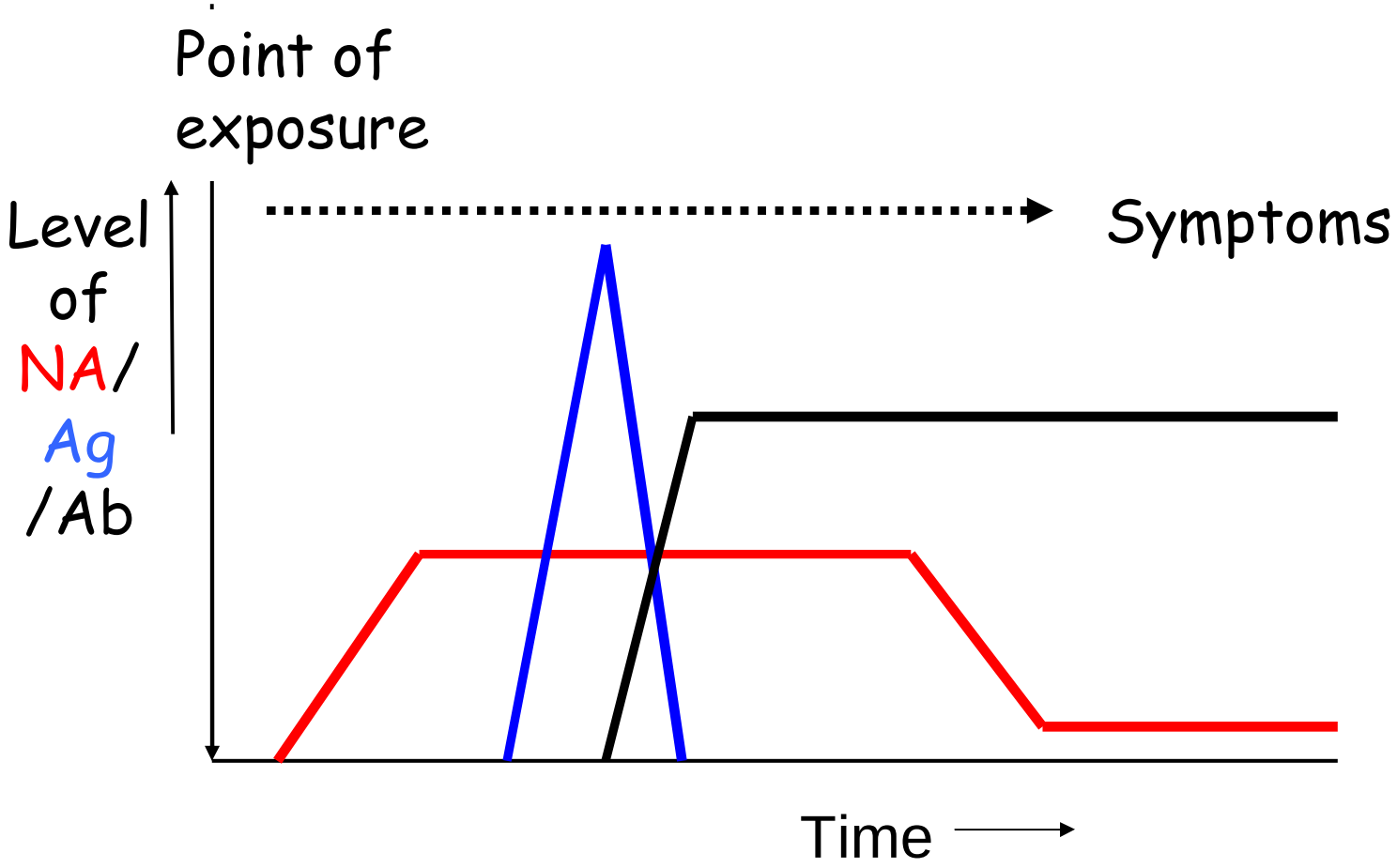
Agent/host/test interaction



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Mandatory screening	
Hepatitis B virus	HBsAg, (+HBV DNA)
Hepatitis C virus	Anti-HCV, HCV RNA
HIV	Anti-HIV I & II (+HIV Ag, HIV RNA)
HTLV	Anti-HTLV I & II
Syphilis	Anti-treponemes (inc other endemic infections)
?HEV	?NAT
Discretionary tests	
Hepatitis B virus	Anti-HBc, anti-HBs*
Malaria	Anti-malaria
T. cruzi	Anti-*T. cruzi*
West Nile virus	Stopped 2006 (deferral in season). Restarted 2012

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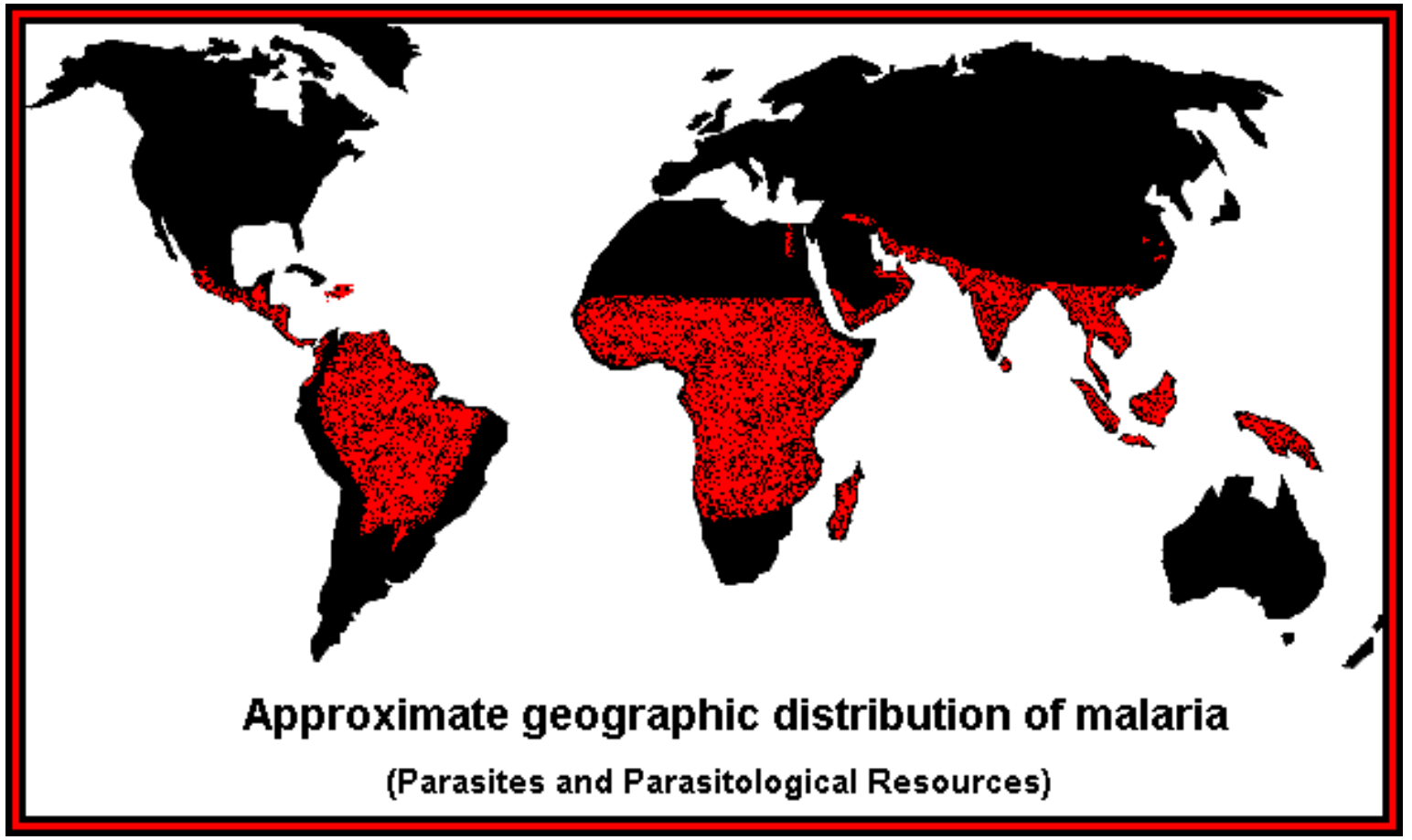
Malaria Distribution



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Vector of Chagas' Disease

Adult *Rhodnius prolixus*, a kissing bug.
WHO/TDR/Stammers

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Donor Infection Rates

HCV	1:12150
HBV	1:20500
HTLV	1:30750
Syphilis	1:32200
HIV	1:65000

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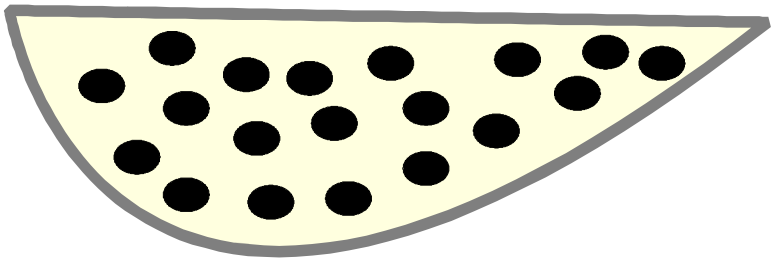
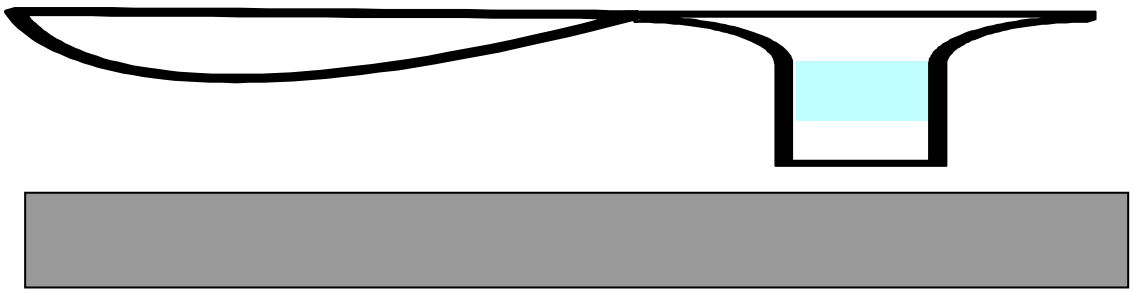
PRISM:- Principles of reaction HIV HBV HCV EIA



Latex microparticles



Washed through to filter

- Assay specific acridinium-labelled antibody (or antigen) conjugate added to reaction well

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Nucleic Acid Amplification Technology (NAT)

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Residual risks for NHSBT (blood) donations

Risk due to	HBV	HCV	HIV
Window period donation *No. (per million) entering the blood supply*	0.46	0.026	0.17
1 per X million donations	2.2	39	5.9

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Contaminated Platelets

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- **Bacterial Screening – 7 Day Platelets**