NHS
Blood and Transplant

Blood Components – available Products

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Objectives

To Explain:

- What products we make.
- How we make them.
- What challenges we face?
- Specialist products

Donors

- NHSBT collects about 2 million donations per year.
- Only 4-6% of eligible population donate
- Eligibility:
  - 17 – 65 years old (first donation)
  - Over 50kg
- A proportion are new or returning donors
- 50% are CMV pos
- Availability vs. wastage.

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Safeguarding patients

- MHRA licensed manufacturer of blood and products – Blood Establishment
- Donor Selection for all donors
  - Lifestyle, health, not previously transfused
- Collection procedure – arm cleansing / diversion pouch
- Integrally connected pack systems
- Comprehensive testing of all products
  - Virus
    - HIV 1+2
    - Hepatitis B
    - Hepatitis C
    - Syphilis
    - HTLV
  - Bacteria
    - Platelets

Leucodepletion

- Packs hung on leucodepletion cart
- Approx 25 minutes to fully filter
- Leucodeplete to <5 x 10^6 per unit

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Centrifuging

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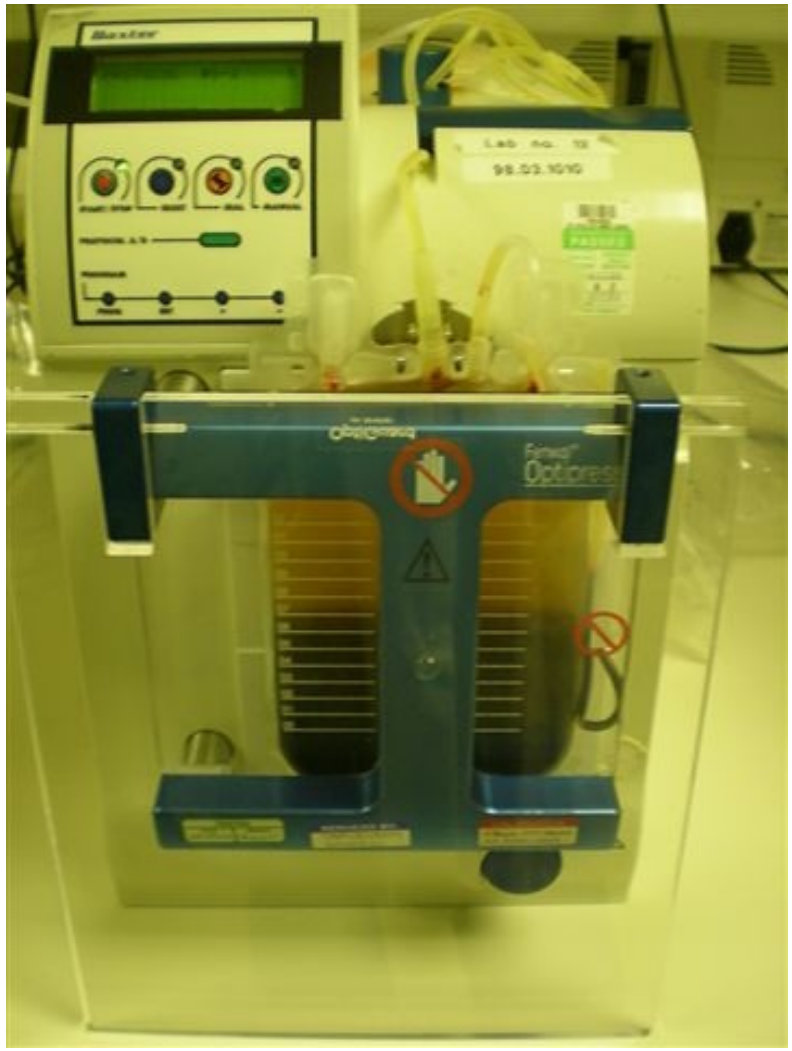
Processing



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Red Cell Product

- 35 day shelf life
- Storage 2 - 6˚C

Fresh Frozen Plasma

- 2 years shelf life
- Storage -30 or colder

Apheresis

- Up to three doses of platelets from a single donor
- Red cells returned to donor during collection process
- Leucodepletion as part of the process.
- HLA/HPA selected units are a national resource.
- Generally no supply issues

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Donor selection for neonates and paediatrics

- Donor must have donated at least once in last 2 years
- CMV neg
- K neg
- H/T neg
- PANTS neg
- Sickle neg
- HPA / HLA compatible

Generally no supply problems

Need to weigh up risk of wastage vs risk of not having products on site.

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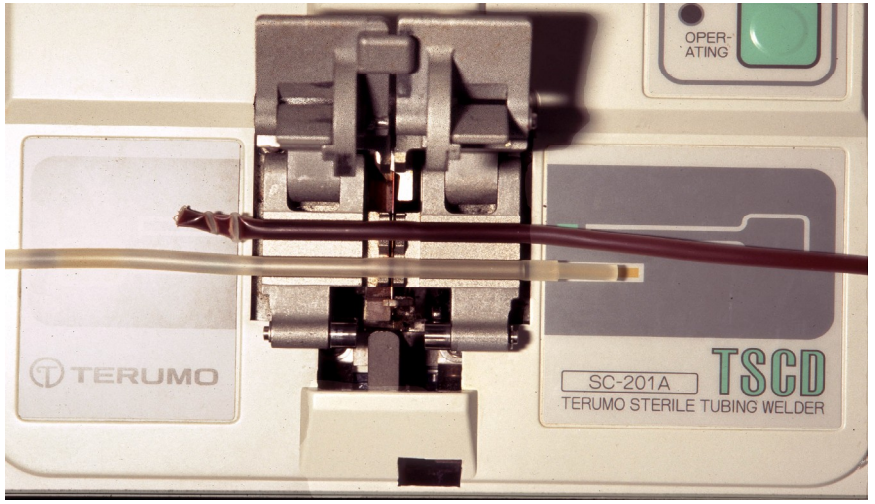
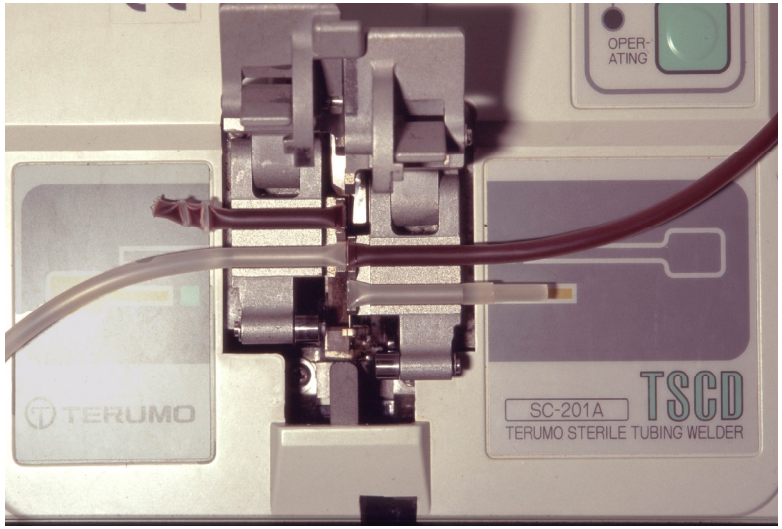
Sterile Connection

- Joins tubing aseptically
- Disposable copper blade





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Paediatric Red cells

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Paediatric Platelets

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Exchange Units

- Group O R1R1 and O rr are selected
- Whole blood is leucodepleted and stored at 4˚C for testing
- Suitable units are centrifuged and a proportion of plasma is removed (plasma reduced)
- QM testing to confirm HCT is 50-55%
- Irradiated if required and issued <5 days

Rarely used at some sites but required quickly when needed.

- Cambridge issued 8 last year, but 5 this year already.

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IUT RBC

- Exchange units are centrifuged to pack the red cells
- All plasma is removed and a proportion added back to give a final HCT of 70-85%
- Sample taken for QM testing
- Packs issued after irradiation (GvHD)

Not a stock item.

Prepared at one of the 5 manufacturing sites.

24 hr notice required.

IUT Platelet

- Bled at the Apheresis clinic at Cambridge, but prepared at Colindale.
- HPA-1a, 5b neg
- Sample taken and tested by QM to confirm platelet count and white cell count
- Platelet count 2000 – 4000 x 10^9 per litre
- White cell count <2.5 x 10^6 per unit
- Irradiated and issued

7 days notice if possible. 24 hr shelf life.

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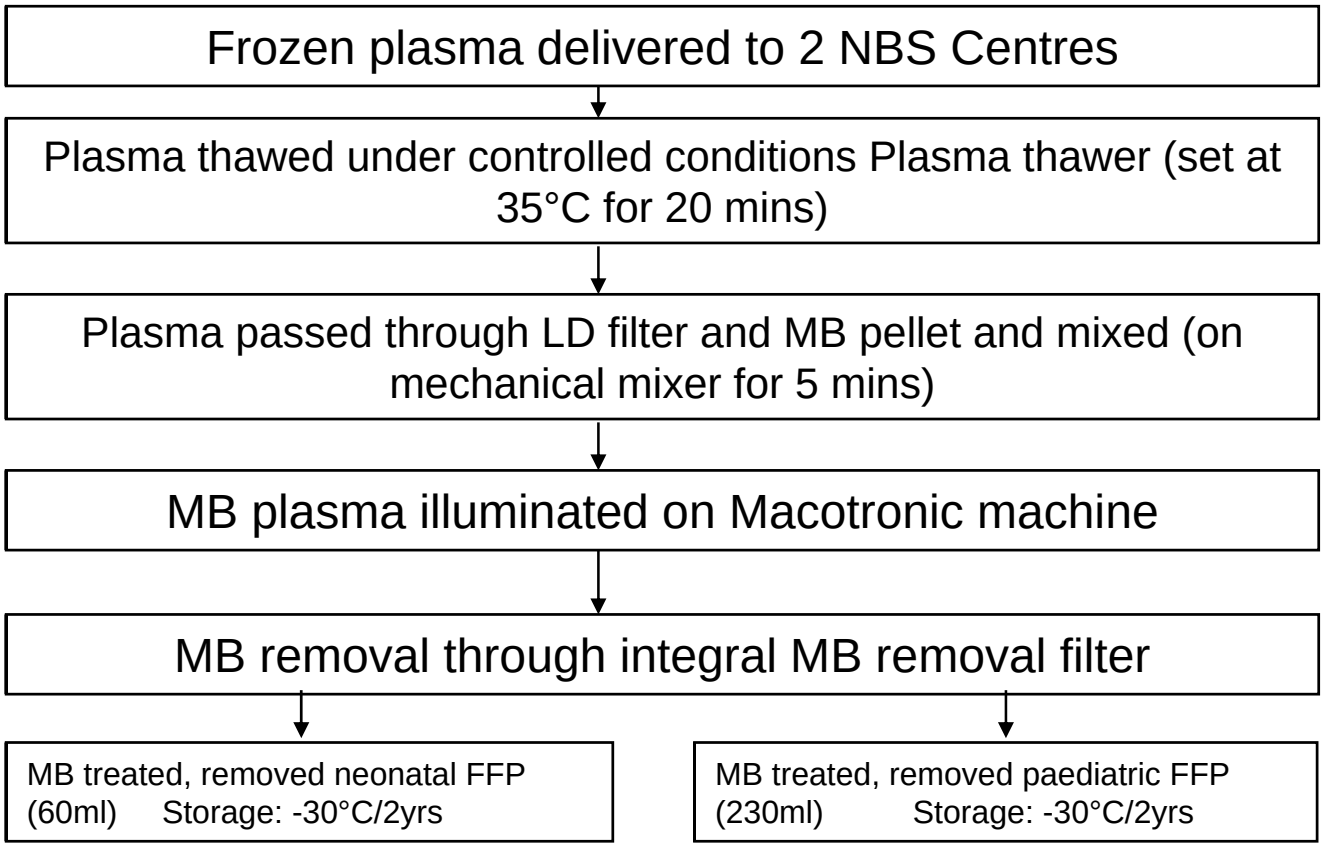
Methylene Blue FFP



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Plasma Throughput

- 1.5 tonnes of frozen US male plasma/year
- 756 units/site/8 weeks
- 3 Macotronic machines/site
- 2-3 staff/MB lab
- 40 units/day/site

MB Cryoprecipitate Processing

- Single and pooled (x5) MB cryo product

Automated Haemonetics Washed Red Cells

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- Red Cells with plasma removed and replaced with SAGM
- For patients allergic to the transfused plasma or IgA deficient.
- Sample for total protein (less than 0.5g/pack)
- Stock product

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Saline Washed Red Cells

Same principle of use as Haemonetics Washed Cells

- 0.9% saline added to red cells (sterile connection)
- Centrifugation
- Supernatant removed
- Process repeated (2nd wash pack)
- 65ml of saline added and left in the pack
- Sample for total protein (less than 0.5g/pack)
- 24 hour expiry from start of process

Back up process:

- used in emergency

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Platelets in PAS

- Sterile docking of a transfer pack to platelet
- Centrifugation
- Cautious removal of all plasma
- Addition of PAS (platelet additive solution- previously known as PSM)
- Rest period of 30 minutes, followed by gentle agitation for platelets to disaggregate
- 24 hours expiry from start of process

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Frozen Red Cells

- Red cells frozen to <-80 °C within 5 days of collection
- Centrifuged to remove excess plasma
- Controlled addition of glycerol.
- Closed system using bacterial filters and SCD (sterile connecting device)
- Stored at Liverpool site - in Hospital Services department

- Units are vacuum packed and placed in a cardboard liner.
- Very fragile when frozen.
- Once frozen - allocated a position in a freezer for future retrieval
- 10 years (at least) frozen storage
- Maintain a bank of rare phenotypes (U-, Bombay etc.)

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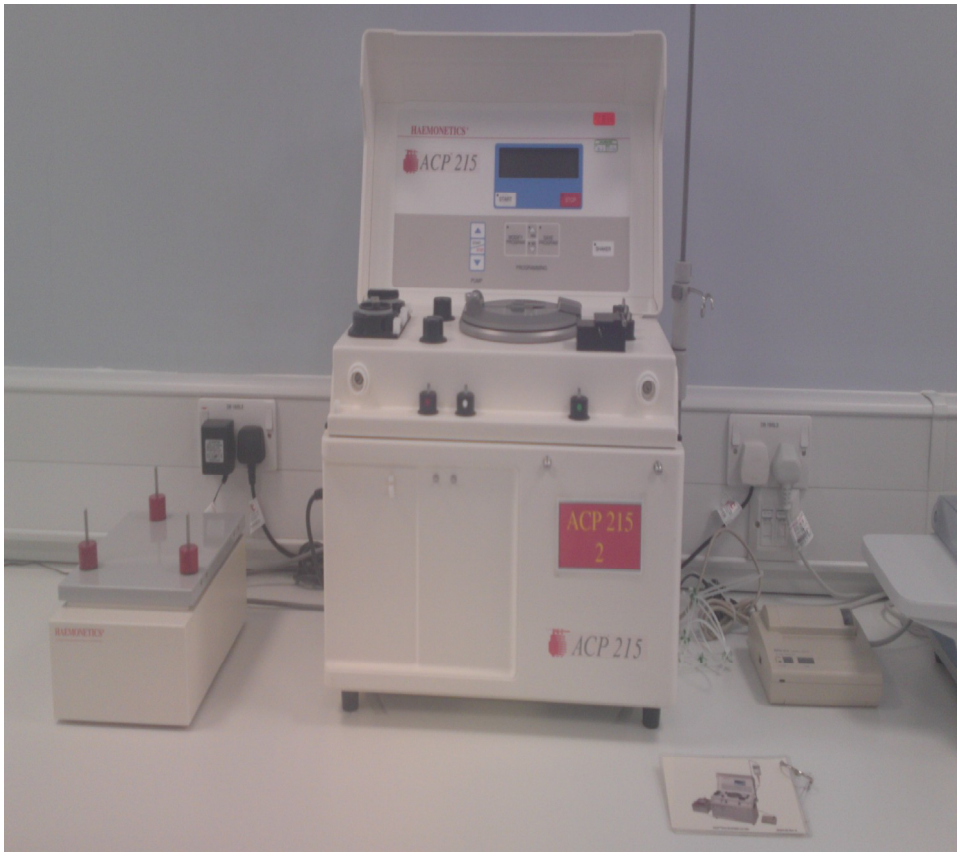
Thawing- Deglycerolisation

- Thawed in a waterbath
- 12% saline used to withdraw glycerol slowly from red cells.
- Wash with 2 litres saline
- Re-suspended in SAGM giving up to 72 hours life.
- 20% red cell loss (haemolysis)



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Granulocyte Pools

- 1 adult dose is made of 2 paediatric pools.
- Each pool will have 10 buffycoats washed with SSP+ and suspended in 70ml of plasma.
- All are irradiated
- Total granulocyte minimum content of 5x10E9 / unit
- Need to call donors to replace buffycoats used

Irradiation

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Gamma Irradiation

- Irradiated products in stock
- Red cell shelf life reduced to 14 days
- Platelets shelf life not affected
- Irradiation supported through Pulse
- Approximately 1200 units irradiated per month at Cambridge

Quality Monitoring

- Minimum of 1% of products monitored
- Mostly tested non-destructively
- Spread through the month

- Volume
- Leucodepletion
- Haematocrit
- Platelet count
- pH
- FVIII & fibrinogen conc.

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Issues in 2012/2013

- 1,768,855 Red cell units
- 264,428 Adult Platelet doses
- 52,008 paediatric red cell units
- 12,191 paediatric platelet units
- 309 IUT red cells
- 693 red cell units for exchange transfusion
- 21 hyperconcentrated platelets for IUT

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Conclusion

- What we make
- How we make it
- Challenges of production
- Challenges of supply

Thank You for Listening