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Identifying allo-antibodies outside of pre-transfusion requests

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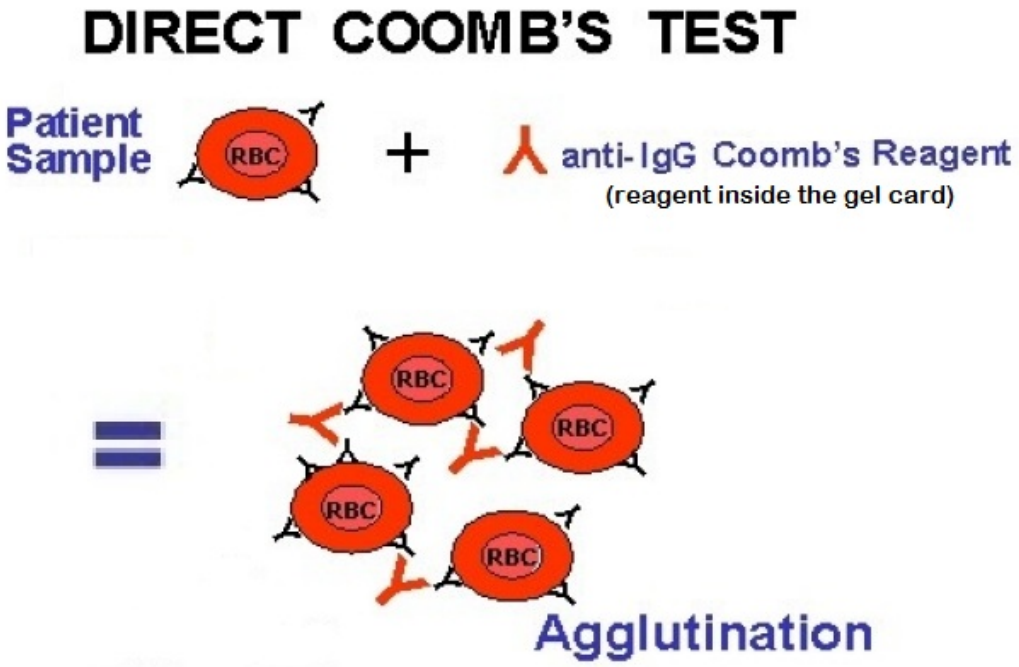

Common Causes of Positive DAT

DATP Comment:

Causes of a positive DAT include:

- Autoimmune antibodies,
- Drug induced autoantibodies,
- Passively acquired antibodies from plasma containing blood products,
- **Alloantibodies bound to recently transfused red cells,**
- Antibodies formed post allogeneic transplant (tissue or HSCT).

If known to have received a red cell transfusion in the last month and haemolysis is suspected, further testing to exclude possible haemolytic transfusion reaction should be considered.

A haematologist is available for advice if required.

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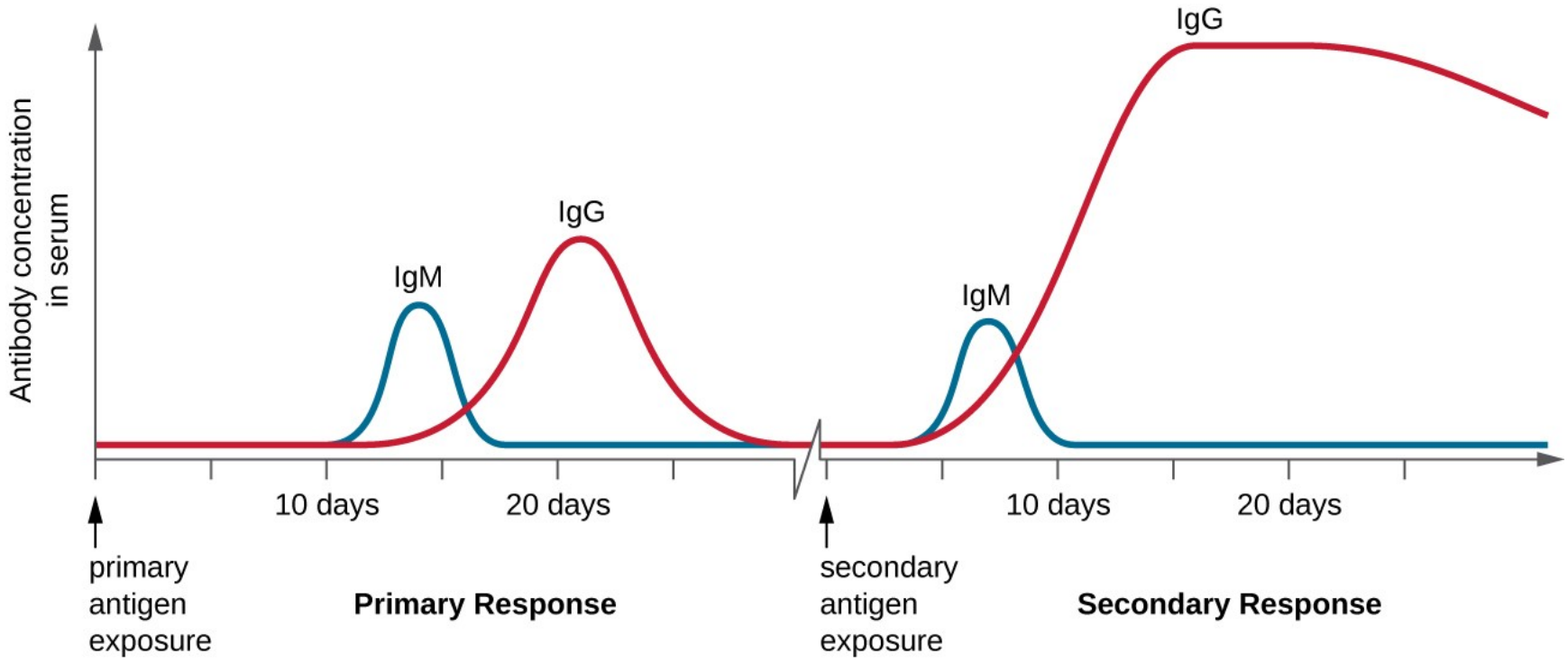
Development of Antibodies

- Primary immune response: Initial response to exposure of a foreign antigen.
- Secondary Immune response (anamnestic): The rapid reappearance of antibody in the blood, following re-introduction of an antigen, previously formed from an immune response.
- Complement: group of serum proteins that enhance the immune response.

Time frame for antibody development

- DHTR occur in approx 1:2,500 transfusions



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Case Study 1
(before SNP did further testing on DAT only requests)

An 80 year old female was admitted to cardiology

- Day 1: transfused 6 units of packed cells, 1 unit of platelets.
- Days 8-14: tests indicate active haemolysis with no other requests for blood transfusions
- Day 10: a positive DAT was reported as part of a haemolytic screen.
- Day 15: transfused emergency trauma packs and requested additional crossmatched units.

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Case Study 1: Day 15

- Transfused emergency trauma packs and requested additional crossmatched units.
- On this sample, anti-Jk^a was detected in the antibody screen and eluate. The trauma packs tested Jk^a positive and IAT crossmatch incompatible.
- Retrospectively, an antibody screen and elution was performed on the DAT request from day 10.
  - **The antibody screen was negative, but anti-Jk^a was eluted.**

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What happenned next…

- Lots of audits and review of current DAT elution policies
- Lots of meetings with haematologists
- LOTS of elutions being performed in the last 2 years
- Until we found…

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Case Study 2

(after implementing further testing on DAT only requests)

- Surgical Patient
  - Day 1: G&H request: O Pos, negative antibody screen. Hb=77 post op. Transfused 2 units.
  - Day 4: Hb=130 post 2 unit transfusion.
  - Day 11: Hb=84. Occasional spherocyte noted on blood film. Increased retics and LDH (bilirubin in reference range).

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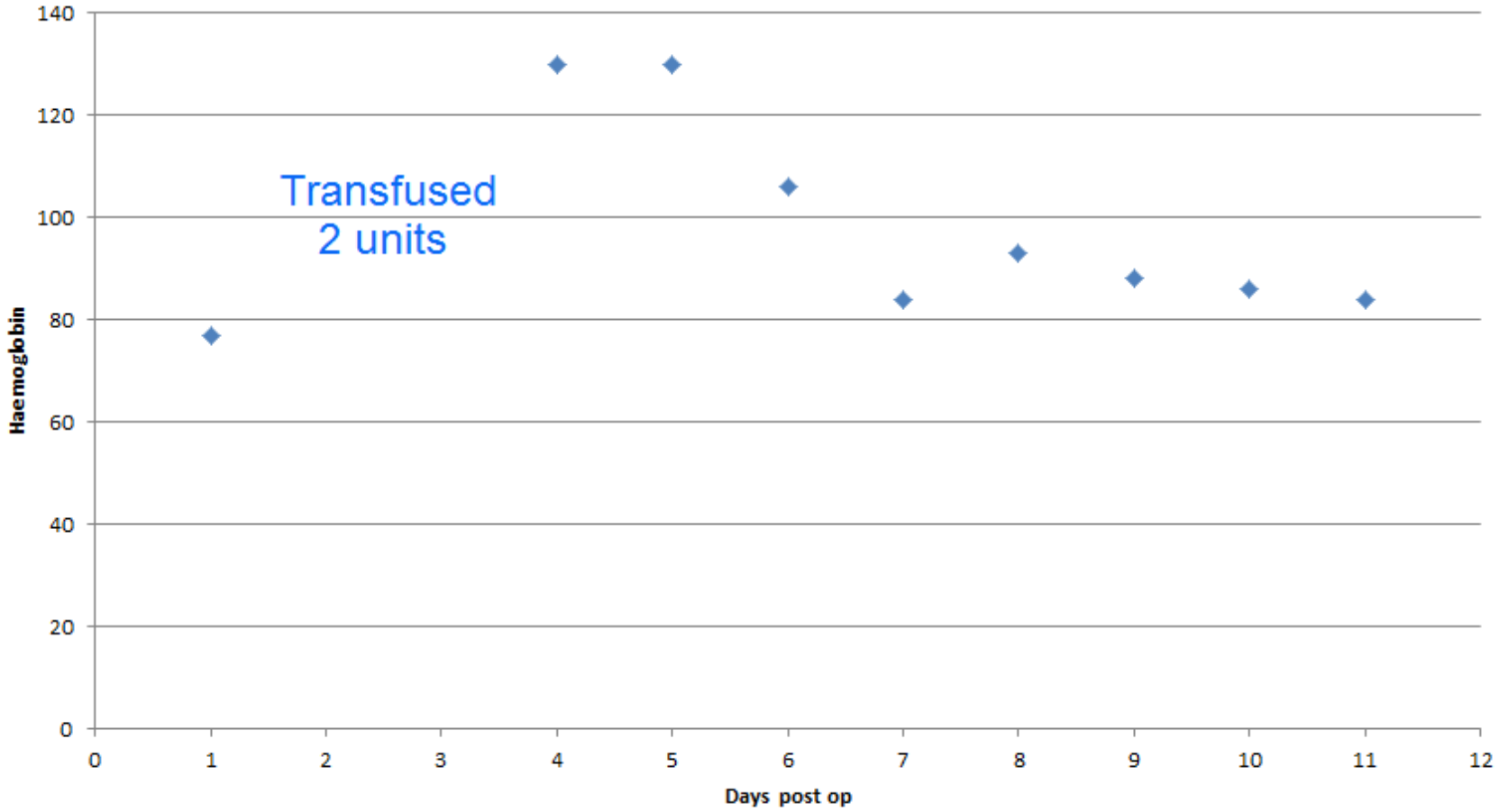
Case Study 2: Haemoglobin



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Case Study 2: Day 11

- Occasional spherocytes noted on blood film
- Laboratory performed DAT: weakly positive with both IgG and C3d
- Add on group and screen: strongly positive in plasma (2+ and 3+ reaction strengths)
  - Set-up 3x 11 cell panels and 2x 3 cell screen: only 5 negative cells across all panels

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Case Study 2: Day 11

- ?anti-Fy^a + anti-Jk^a in plasma but not enough negative cells
- Elution performed: mostly pan-reactive. Scores ranging from +/- to 3+ in strength
  - A lot of Fy^{a+} cells reactive with eluate, but some Fy^{a-} cells still reactive

    (ie: suspicious of anti-Fy^a but inconclusive)
- **Sent to Red Cross for further investigation**
- Also order Fy^{a-}, Jk^{a-} red cells ordered and kept held in laboratory, pending Red Cross findings

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Case Study 2: Day 12 & 13

Day 12:

Received report back from Red Cross:

DAT weakly positive with both IgG and C3d

Identified an anti-Fy^a and anti-Jk^a

Day 13:

- Hb=74. Dr requested 2 units blood
- Fy(a-), Jk(a-) units XM'd with minimal delays

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Summary

- It is possible to identify clinically significant alloantibodies early on in development, before they are detected in the plasma.
- While the responsibility of investigating the specific cause of ongoing haemolysis generally lies with clinical staff outside of the laboratory, if the laboratory has the means to identify alloantibodies outside of pre-transfusion requests, these should be reported as soon as possible.

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