Transfusion in the presence of anti-k in regional Western Australia.
Regional WA

- Small satellite laboratories
- Basic transfusion resources
- Limited blood supply
- DISTANCE!
- Albany – 4 hours by road and 1 hour by air from Perth. Population 34 000
- Interesting fact – first non direct blood transfusion coincides with the ANZAC’s in Albany in 1914.

July 2008 – Albany Pathwest

- 75 year old male
- Previous history of transfusions, but not in the last 3 months
- Hb 75 g/L (NR 135-180 g/L)
- MCV 86 fL (NR 80-100 fL)
- Request for 4 unit xmatch
- O Positive
- Antibody screen positive in all screening cells
- Sample referred to Perth for antibody ID and xmatching
July 2008 – QEII Pathwest, Perth

- Screen and panel weakly positive in all cells (1+)
- Auto – negative
- Second panel and papain produce similar results
- Anti-k suspected
- Patient phenotype little k negative
- Little k negative panel cells found in other panels screen as negative
- Anti-k confirmed and units supplied by ARCBS
- Patient transfused 3 units 5 days after initial request
Anti-k

- Also known as Cellano
- Big K and little k differ by a single amino acid
- Antibodies and usually IgG in nature (occasionally IgM)
- Can produce transfusion reactions, HDNB
- Usually less severe than Anti-K

### Phenotyping:

<table>
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<tr>
<th>K-k+</th>
<th>90.9%</th>
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<tr>
<td>K+k+</td>
<td>8.7%</td>
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<tr>
<td>K+k-</td>
<td>0.4%</td>
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- Only 1 out of approximately 250 donors are compatible
- Difficult to find screening cells that are k negative so excluding other antibodies can be difficult

### Screening cells

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<th>Donor Number</th>
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*Patient Cells*

Shaded columns indicate those antigens which are destroyed or depressed by enzyme treatment.

**Ortho Clinical Diagnostics**

**Reagent Red Blood Cells**

0.8% Surgiscreen®

©Ortho-Clinical Diagnostics, Inc. 2010

**PathWest**

LABORATORY MEDICINE WA
### Panel B

#### Phenocell B 0.8% Antigen Composition Sheet

**Batch No:** 2653 127

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<th>JK</th>
<th>MNS</th>
<th>P1</th>
<th>LE</th>
<th>LU</th>
<th>CO</th>
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*This product is manufactured from blood donated by voluntary donors to the Australian Red Cross Blood Service (ARCBS).*

*Note: Cells 6, 7 and 8 form the RhD Negative Screening Cell Subset, formulated for antenatal RhD antibody screening in the presence of Prophylactic Anti-D.*

---

*PathWest LABORATORY MEDICINE WA*
### Bio-Rad panel

<table>
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<th>Rh-hr</th>
<th>Spender</th>
<th>Rh-hr</th>
<th>Kell</th>
<th>Duffy</th>
<th>Kidd</th>
<th>Lewis</th>
<th>P</th>
<th>MNS</th>
<th>Luth.</th>
<th>Xg</th>
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1. **Spender**
2. **Rh-hr**
3. **Kell**
4. **Duffy**
5. **Kidd**
6. **Lewis**
7. **P**
8. **MNS**
9. **Luth.**
10. **Xg**

PathWest

LAbORATORY MEDEICINE WA
June 2010 - Albany

- FBC had been monitored regularly with Hb 132-156 g/L and MCV consistently in the 90’s fL
- Patient request for GAS preop TURP
- Screening and panel cell reactions stronger: 2+ to 3+
- Two units provided for operation, but were returned to stock
May 2014 - Albany

- Patient presents to ED Albany with request for FBC and troponin
- Hb = 83 g/L         MCV = 85 fL       Troponin = normal
- 3 units requested for xmatching
- Due to history of antibodies sample sent directly to Perth
- Patient now reacts 3+ with all screening and panel cells
- Several antibodies including E, Fya, Fyb, Jka, S and Lea cannot be excluded when tested the few k negative cells available
- 3 units obtained from ARCBS and transfused to patient 2 days after request
July 2014 - Albany

- Patient presents at GP with request for FBP and Iron Studies
- Hb = 84 g/L
  MCV = 85 fL
  Ferritin = 20 µg/L (NR 30-620 µg/L)
- IDA has developed
- Patient was retested 1 month later
- Hb = 73 g/L
  MCV = 82 fL
  Ferritin = 31 µg/L
- 4 units requested and sample sent to Perth for testing
September 2014 - Perth

- Patient reacts 3+ with all screening and panel cells
- Only 1 unit out of 4 units provided by ARCBS are compatible
- Clearly another antibody has developed
- How do we solve the puzzle of the hidden antibody?
  - Using the donor that reacts strongest with the patient the antibody is adsorbed from the patient’s plasma
  - The antibody is then eluted from the donor cells (remember the donor is known to be little k negative so would not pick up the anti-k antibody)
  - The eluate and last wash are then tested against a panel of cells
Elution

- Last wash is clear rendering test valid
- Adsorbed plasma doesn’t react with cell 2 the only k negative cell (remember hidden antibody removed, but anti-k is still present)
- Eluate containing no anti-k and only the hidden antibody reacts with the Jka positive cells 1 and 7 only
### Phenocell C 0.8% Antigen Composition Sheet

**Batch No:** 9653 068  
**Expiry Date:** 23/09/2014

<table>
<thead>
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<th>Cell No</th>
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**Additional Typings:**
- Js(a+)

**Note:**
- The MUT antigen will also react with anti-M<sup>a</sup> antibodies.
- Phenotype predicted from genotype analysis.
Donor units

• This shows the eluate only compatible with unit 597 (Jka-,k-)
• The last wash is clear rendering the test valid
• The adsorbed plasma (hidden antibody removed) does not react with any unit as only the anti-k is still present and all units are k negative
Outcome

- Anti-Jka is detected
- The compatible donor bag is confirmed to be Jka negative
- This unit was transfused 3 days after initial request
- ARCBS report that the Jka(a-b+) phenotype is present in 23.6% of the population
- So now we are faced with supplying blood in a remote town with only 1 in approximately 1000 donors being compatible
- Blood was sourced from the Eastern states and these were compatible with a new sample from the patient
- Another 2 units transfused 9 days after initial request
The Future...

- The doctor was contacted to find out the patients history and future blood requirements
- Aortic Stenosis, Angiodysplasia and vWD
- Likely to require ongoing frequent transfusions
- What can we consider when dealing with patients with known rare antibodies?
Ideas...

- ARCBS Patient Blood Management Guideline Adherence
- Minimise transfusions
- Autologous Blood
- Phenotype compatible blood
- Directed blood from family members
- Frozen Blood
- Known donor on call
- Prevent development of new antibodies