

**ABID CASE #19** Case Study by Jim Perkins MD (©, 2009)

**History:** This 86 year old woman with a history of hypertension and a hemorrhagic stroke of the thalamus was admitted with a hip fracture after falling. The patient has not been recently transfused, but she is a poor historian and it is unclear whether she was transfused in the distant past.

**ABO and Rh Typing**

|    |    |          |         |        |    |        |     |        |
|----|----|----------|---------|--------|----|--------|-----|--------|
| <A | <B | A1 cells | B cells | 6% alb | <D | <D/AHG | CCC | Interp |
| 4+ | 0  | 0        | 4+      |        | 4+ |        |     |        |

**Antibody Screen**

|     |     |
|-----|-----|
|     | Gel |
| OI  | 2+  |
| OII | 4+  |

**Direct Antiglobulin Test**

|           |      |     |     |
|-----------|------|-----|-----|
|           | Poly | IgG | <C3 |
| AHG       | vw+  | 0   | vw+ |
| 5' incub. | vw+  | 0   | vw+ |
| CCC       | 2+   | 2+  | 1+  |

**Initial Panel**

| Lot #8RA205 |       | Rh system |   |   |   |   |   | Kell |   |                 |                 |                 |                 | Duffy           |                 | Kidd            |                 | Xg              | Lewis           |                 | MNSs |   |   |   | P  | Lutheran        |                 | Other   |                |     |    |
|-------------|-------|-----------|---|---|---|---|---|------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------|---|---|---|----|-----------------|-----------------|---------|----------------|-----|----|
| Cell        | Rh    | D         | C | E | c | e | V | K    | k | Kp <sup>a</sup> | Kp <sup>b</sup> | Js <sup>a</sup> | Js <sup>b</sup> | Fy <sup>a</sup> | Fy <sup>b</sup> | Jk <sup>a</sup> | Jk <sup>b</sup> | Xg <sup>a</sup> | Le <sup>a</sup> | Le <sup>b</sup> | S    | s | M | N | P1 | Lu <sup>a</sup> | Lu <sup>b</sup> | Typings | Cell           | Gel |    |
| 1           | R1wR1 | +         | + | 0 | 0 | + | 0 | 0    | + | 0               | +               | 0               | +               | +               | +               | +               | 0               | +               | 0               | +               | +    | + | + | + | 0  | +               | 0               | +       | C <sup>w</sup> | 1   | 3+ |
| 2           | R1R1  | +         | + | 0 | 0 | + | 0 | +    | + | 0               | +               | 0               | +               | +               | 0               | +               | +               | 0               | 0               | +               | +    | + | 0 | + | +  | 0               | +               |         | 2              | 4+  |    |
| 3           | R2R2  | +         | 0 | + | + | 0 | 0 | 0    | + | 0               | +               | 0               | +               | +               | +               | 0               | +               | +               | 0               | +               | +    | 0 | + | 0 | +  | 0               | +               |         | 3              | 3+  |    |
| 4           | Ror   | +         | 0 | 0 | + | + | + | 0    | + | 0               | +               | 0               | +               | 0               | +               | 0               | +               | 0               | 0               | +               | +    | + | + | 0 | +  | 0               | +               |         | 4              | 3+  |    |
| 5           | r'r   | 0         | + | 0 | + | + | 0 | 0    | + | 0               | +               | 0               | +               | 0               | 0               | +               | +               | +               | 0               | 0               | 0    | + | + | 0 | +  | 0               | +               |         | 5              | 3+  |    |
| 6           | r''r  | 0         | 0 | + | + | + | 0 | 0    | + | 0               | +               | 0               | +               | 0               | +               | +               | +               | +               | 0               | +               | 0    | + | + | + | +  | 0               | +               |         | 6              | 3+  |    |
| 7           | rr    | 0         | 0 | 0 | + | + | 0 | +    | + | 0               | +               | 0               | +               | 0               | +               | +               | 0               | +               | 0               | +               | 0    | + | 0 | + | +  | 0               | +               |         | 7              | 4+  |    |
| 8           | rr    | 0         | 0 | 0 | + | + | 0 | 0    | + | 0               | +               | 0               | +               | +               | 0               | 0               | +               | +               | +               | 0               | +    | + | + | 0 | +s | 0               | +               |         | 8              | 3+  |    |
| 9           | rr    | 0         | 0 | 0 | + | + | 0 | 0    | + | 0               | +               | 0               | +               | 0               | +               | +               | +               | +               | 0               | +               | +    | 0 | + | 0 | 0  | 0               | +               |         | 9              | 3+  |    |
| 10          | rr    | 0         | 0 | 0 | + | + | 0 | 0    | + | 0               | +               | 0               | +               | 0               | +               | +               | 0               | +               | 0               | +               | +    | + | + | 0 | 0  | 0               | +               |         | 10             | 3+  |    |
| 11          | R1R1  | +         | + | 0 | 0 | + | 0 | 0    | + | 0               | +               | 0               | +               | 0               | +               | +               | 0               | +               | 0               | 0               | +    | + | + | + | +  | 0               | +               |         | 11             | 3+  |    |
| Patient     |       |           |   |   |   |   |   |      |   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |      |   |   |   |    |                 |                 |         | AC             |     |    |

**Antibody screening cells phenotype**

| Lot #8S759 |      | Rh system |   |   |   |   |   | Kell |   |                 |                 |                 |                 | Duffy           |                 | Kidd            |                 | Xg              | Lewis           |                 | MNSs |   |   |   | P  | Lutheran        |                 | Other   |     |    |  |  |
|------------|------|-----------|---|---|---|---|---|------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------|---|---|---|----|-----------------|-----------------|---------|-----|----|--|--|
| Cell       | Rh   | D         | C | E | c | e | V | K    | k | Kp <sup>a</sup> | Kp <sup>b</sup> | Js <sup>a</sup> | Js <sup>b</sup> | Fy <sup>a</sup> | Fy <sup>b</sup> | Jk <sup>a</sup> | Jk <sup>b</sup> | Xg <sup>a</sup> | Le <sup>a</sup> | Le <sup>b</sup> | S    | s | M | N | P1 | Lu <sup>a</sup> | Lu <sup>b</sup> | Typings | Gel |    |  |  |
| OI         | R1R1 | +         | + | 0 | 0 | + | 0 | +    | + | 0               | +               | 0               | +               | +               | 0               | +               | +               | +               | 0               | +               | 0    | + | 0 | + | +  | +               | 0               | +       |     | 2+ |  |  |
| OII        | R2R2 | +         | 0 | + | + | 0 | 0 | 0    | + | 0               | +               | 0               | +               | +               | +               | +               | 0               | +               | +               | 0               | +    | + | + | + | +s | 0               | +               |         | 4+  |    |  |  |

**Saline/tube cold panel and IAT**

| Lot #06776 |       | Rh system |   |   |   |   | Kell |   |                 |                 |                 |                 | Duffy           |                 | Kidd            |                 | Lewis           |                 | P  | MNSs |   |   |   |                 | Lutheran        |                      | Xg     | Other Typings | RBCs in saline, 2 drops plasma |    |     |     |     |     | Prewam |
|------------|-------|-----------|---|---|---|---|------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----|------|---|---|---|-----------------|-----------------|----------------------|--------|---------------|--------------------------------|----|-----|-----|-----|-----|--------|
| Cell       | Rh    | D         | C | c | E | e | K    | k | Kp <sup>a</sup> | Kp <sup>b</sup> | Js <sup>a</sup> | Js <sup>b</sup> | Fy <sup>a</sup> | Fy <sup>b</sup> | Jk <sup>a</sup> | Jk <sup>b</sup> | Le <sup>a</sup> | Le <sup>b</sup> | P1 | M    | N | S | s | Lu <sup>a</sup> | Lu <sup>b</sup> | Xg <sup>a</sup>      | Cell   |               | IS                             | RT | 14° | 37° | AHG | AHG |        |
| 1          | R1R1  | +         | + | 0 | 0 | + | +    | + | 0               | +               | 0               | +               | +               | +               | +               | 0               | 0               | +               | +  | +    | + | 0 | + | 0               | +               |                      | 1      | 2+            | 1+                             | 3+ | 0   | 4+  | 3+  |     |        |
| 2          | R1wR1 | +         | + | 0 | 0 | + | 0    | + | 0               | +               | 0               | +               | 0               | +               | 0               | +               | 0               | +               | +  | +    | + | 0 | + | 0               | +               | Co <sup>b+</sup>     | 2      | 0             | 0                              | 3+ | 0   | 0   | 0   |     |        |
| 3          | R2R2  | +         | 0 | + | + | 0 | 0    | + | 0               | +               | 0               | +               | +               | 0               | 0               | +               | 0               | +               | +  | +    | 0 | 0 | + | 0               | +               |                      | 3      | 0             | 0                              | 3+ | 0   | 1+  | 1+  |     |        |
| 4          | Ror   | +         | 0 | + | 0 | + | 0    | + | 0               | +               | +               | +               | 0               | +               | +               | 0               | 0               | +               | +  | +    | 0 | + | 0 | 0               | +               |                      | 4      | 0             | 0                              | 3+ | 0   | 0   | 0   |     |        |
| 5          | r'r   | 0         | + | + | 0 | + | 0    | + | 0               | +               | 0               | +               | 0               | +               | +               | +               | 0               | +               | 0  | 0    | + | 0 | + | 0               | +               |                      | 5      | 0             | 0                              | 3+ | 0   | 0   | 0   |     |        |
| 6          | r''r  | 0         | 0 | + | + | + | 0    | + | 0               | +               | 0               | +               | 0               | 0               | +               | 0               | 0               | +               | +  | +    | + | 0 | + | +               | +               |                      | 6      | 0             | 0                              | 3+ | 0   | 0   | 0   |     |        |
| 7          | rr    | 0         | 0 | + | 0 | + | +    | + | 0               | +               | 0               | +               | 0               | +               | 0               | +               | 0               | +               | +  | +    | 0 | + | + | 0               | +               |                      | 7      | 1+            | 1+                             | 3+ | 0   | 4+  | NT  |     |        |
| 8          | rr    | 0         | 0 | + | 0 | + | 0    | + | 0               | +               | 0               | +               | +               | 0               | +               | +               | +               | 0               | 0  | +    | 0 | + | 0 | 0               | +               |                      | 8      | 0             | 0                              | 3+ | 0   | w+  | vw+ |     |        |
| 9          | rr    | 0         | 0 | + | 0 | + | 0    | + | 0               | +               | 0               | +               | +               | 0               | 0               | +               | 0               | 0               | +  | +    | 0 | + | + | 0               | +               |                      | 9      | 0             | 0                              | 3+ | 0   | w+  | vw+ |     |        |
| 10         | R1R1  | +         | + | 0 | 0 | + | 0    | + | 0               | +               | 0               | +               | +               | 0               | 0               | +               | 0               | +               | +  | 0    | + | + | + | 0               | +               |                      | 10     | 0             | 0                              | 3+ | 0   | w+  | vw+ |     |        |
| 11         | r''r  | 0         | 0 | + | + | + | 0    | + | 0               | +               | 0               | +               | +               | 0               | +               | +               | +               | 0               | 0  | +    | + | 0 | + | 0               | +               | I-, Yt <sup>b+</sup> | 11     | 0             | 0                              | 1+ | 0   | 1+  | 1+  |     |        |
| Patient    |       |           |   |   |   |   |      |   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |      |   |   |   |                 |                 |                      | AC     | 0             | 0                              | 3+ | 0   | 0   | 0   |     |        |
|            |       |           |   |   |   |   |      |   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |      |   |   |   |                 |                 |                      | Cord 1 | 0             | 0                              | 1+ | 0   | 0   |     |     |        |
|            |       |           |   |   |   |   |      |   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |      |   |   |   |                 |                 |                      | Cord 2 | 0             | 0                              | 1+ | 0   | vw+ |     |     |        |
|            |       |           |   |   |   |   |      |   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |      |   |   |   |                 |                 |                      | A1     | 0             | 0                              | 3+ | 0   | vw+ |     |     |        |
|            |       |           |   |   |   |   |      |   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |      |   |   |   |                 |                 |                      | A2     | 0             | 0                              | 3+ | 0   | vw+ |     |     |        |

**Gel panel, REST\* adsorption**

| Lot #8RA206 |       | Rh system |   |   |   |   | Kell |   |   |                 |                 |                 | Duffy           |                 | Kidd            | Xg              | Lewis           |                 | MNSs            |                 |   |   |   | P | Lutheran |                 | Other Typings | Cell           | Raw             | REST ads x2 |     |
|-------------|-------|-----------|---|---|---|---|------|---|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---|---|---|---|----------|-----------------|---------------|----------------|-----------------|-------------|-----|
| Cell        | Rh    | D         | C | E | c | e | V    | K | k | Kp <sup>a</sup> | Kp <sup>b</sup> | Js <sup>a</sup> | Js <sup>b</sup> | Fy <sup>a</sup> | Fy <sup>b</sup> | Jk <sup>a</sup> | Jk <sup>b</sup> | Xg <sup>a</sup> | Le <sup>a</sup> | Le <sup>b</sup> | S | s | M | N | P1       | Lu <sup>a</sup> |               |                | Lu <sup>b</sup> | Cell        | Gel |
| 1           | R1wR1 | +         | + | 0 | 0 | + | 0    | 0 | + | 0               | +               | 0               | +               | +               | 0               | +               | +               | 0               | 0               | +               | 0 | + | + | 0 | +s       | 0               | +             | C <sup>w</sup> | 1               | 2+          | w+  |
| 2           | R1R1  | +         | + | 0 | 0 | + | 0    | + | + | 0               | +               | 0               | +               | +               | +               | +               | +               | 0               | +               | 0               | 0 | + | + | + | 0        | 0               | +             |                | 2               | 4+          | 4+  |
| 3           | R2R2  | +         | 0 | + | + | 0 | 0    | 0 | + | 0               | +               | 0               | +               | +               | +               | 0               | +               | 0               | 0               | 0               | 0 | + | + | 0 | +        | 0               | 0             | +              | 3               | 1+          | 0   |
| 4           | Ror   | +         | 0 | 0 | + | + | +    | 0 | + | 0               | +               | 0               | +               | 0               | 0               | +               | +               | +               | 0               | 0               | 0 | + | + | + | +        | 0               | +             |                | 4               | 2+          | 0   |
| 5           | r'r   | 0         | + | 0 | + | + | 0    | 0 | + | 0               | +               | 0               | +               | 0               | +               | 0               | +               | 0               | 0               | +               | 0 | + | 0 | + | +s       | 0               | +             |                | 5               | 2+          | 0   |
| 6           | r''r  | 0         | 0 | + | + | + | 0    | 0 | + | 0               | +               | 0               | +               | 0               | +               | +               | 0               | +               | +               | 0               | + | 0 | + | + | +        | 0               | +             |                | 6               | 2+          | 0   |
| 7           | rr    | 0         | 0 | 0 | + | + | 0    | + | + | 0               | +               | 0               | +               | 0               | +               | +               | 0               | +               | 0               | +               | + | + | + | + | +        | 0               | +             |                | 7               | 4+          | 4+  |
| 8           | rr    | 0         | 0 | 0 | + | + | 0    | 0 | + | 0               | +               | 0               | +               | +               | +               | 0               | +               | +               | +               | 0               | 0 | + | 0 | + | +        | 0               | +             |                | 8               | 1+          | 0   |
| 9           | rr    | 0         | 0 | 0 | + | + | 0    | 0 | + | 0               | +               | 0               | +               | 0               | +               | +               | 0               | +               | 0               | 0               | 0 | + | + | + | +        | 0               | +             |                | 9               | w+          | 0   |
| 10          | rr    | 0         | 0 | 0 | + | + | 0    | 0 | + | 0               | +               | 0               | +               | +               | 0               | 0               | +               | +               | +               | 0               | 0 | + | + | + | 0        | +               |               | 10             | +2              | w+          |     |
| 11          | R1R1  | +         | + | 0 | 0 | + | 0    | 0 | + | 0               | +               | 0               | +               | 0               | +               | 0               | +               | +               | 0               | +               | + | 0 | + | 0 | +        |                 | 11            | +2             | 0               |             |     |
| Patient     |       |           |   |   |   |   |      |   |   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |   |   |   |   |          |                 |               | AC             |                 |             | 0   |

\*Rabbit Erythrocyte Stroma

### LISS panel

| Lot #04751 |       | Rh system |   |   |   |   |   | Kell |   |                 |                 |                 |                 | Duffy           |                 | Kidd            |                 | Lewis           |                 | P  | MNSs |   |   |   | Lutheran        |                 | Xg              | Other Typings              | LISS |     |    |
|------------|-------|-----------|---|---|---|---|---|------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----|------|---|---|---|-----------------|-----------------|-----------------|----------------------------|------|-----|----|
| Cell       | Rh    | D         | C | c | E | e | V | K    | k | Kp <sup>a</sup> | Kp <sup>b</sup> | Js <sup>a</sup> | Js <sup>b</sup> | Fy <sup>a</sup> | Fy <sup>b</sup> | Jk <sup>a</sup> | Jk <sup>b</sup> | Le <sup>a</sup> | Le <sup>b</sup> | P1 | M    | N | S | s | Lu <sup>a</sup> | Lu <sup>b</sup> | Xg <sup>a</sup> |                            | Cell | AHG | CC |
| 1          | RzR1  | +         | + | 0 | + | + | 0 | 0    | + | 0               | +               | +               | +               | 0               | +               | +               | 0               | 0               | +               | +  | 0    | + | 0 | + | 0               | +               | 0               |                            | 1    | 0   | 2+ |
| 2          | R1wR1 | +         | + | 0 | 0 | + | 0 | 0    | + | 0               | +               | 0               | +               | 0               | 0               | +               | 0               | +               | 0               | +  | +    | + | + | + | 0               | +               | 0               | C <sup>w</sup>             | 2    | 0   | 2+ |
| 3          | R2R2  | +         | 0 | + | + | 0 | 0 | 0    | + | 0               | +               | 0               | +               | 0               | +               | 0               | +               | 0               | +               | +  | 0    | + | 0 | + | 0               | +               | +               |                            | 3    | 0   | 2+ |
| 4          | Ror   | +         | 0 | + | 0 | + | + | 0    | + | 0               | +               | +               | +               | 0               | 0               | +               | 0               | 0               | +               | +  | +    | 0 | + | 0 | 0               | +               | 0               | He+                        | 4    | 0   | 2+ |
| 5          | r'r   | 0         | + | + | 0 | + | 0 | 0    | + | +               | +               | 0               | +               | +               | 0               | +               | 0               | 0               | +               | +  | +    | + | 0 | + | 0               | +               | +               |                            | 5    | 1+  |    |
| 6          | r''r  | 0         | 0 | + | + | + | 0 | 0    | + | 0               | +               | 0               | +               | +               | +               | +               | +               | +               | 0               | +  | +    | 0 | + | + | 0               | +               | +               |                            | 6    | w+  |    |
| 7          | rr    | 0         | 0 | + | 0 | + | 0 | +    | + | 0               | +               | 0               | +               | 0               | +               | 0               | +               | +               | 0               | 0  | +    | 0 | 0 | + | 0               | +               | 0               |                            | 7    |     |    |
| 8          | rr    | 0         | 0 | + | 0 | + | 0 | 0    | + | 0               | +               | 0               | +               | +               | 0               | 0               | +               | 0               | 0               | +  | +    | 0 | + | 0 | 0               | +               | +               |                            | 8    | 1+  |    |
| 9          | rr    | 0         | 0 | + | 0 | + | 0 | 0    | + | +               | +               | 0               | +               | +               | +               | +               | +               | 0               | +               | 0  | +    | + | 0 | + | +               | +               | +               | Lu:14                      | 9    |     |    |
| 10         | R1R1  | +         | + | 0 | 0 | + | 0 | +    | + | 0               | +               | 0               | +               | +               | 0               | 0               | +               | 0               | +               | +  | 0    | + | 0 | + | 0               | +               | +               | Mg+,Lu:14                  | 10   | 3+  |    |
| 11         | r''r  | 0         | 0 | + | + | + | 0 | 0    | + | 0               | +               | 0               | +               | +               | +               | 0               | +               | 0               | +               | +  | 0    | + | 0 | + | 0               | +               | 0               | Co <sup>b</sup> +, I-,Sc:2 | 11   |     |    |
| Patient    |       |           |   |   |   |   |   |      |   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |    |      |   |   |   |                 |                 |                 | AC                         |      |     |    |

### Antigen Phenotype

|             | Rh system |    |    |   | Kell |   |                 |                 |                 |                 |                 | Duffy           |                 | Kidd            |                 | Lewis           |                 | MNSs |    |    |   | p  |  | I | H | A <sub>1</sub> |
|-------------|-----------|----|----|---|------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------|----|----|---|----|--|---|---|----------------|
|             | C         | E  | c  | e | K    | k | Kp <sup>a</sup> | Kp <sup>b</sup> | Kp <sup>b</sup> | Kp <sup>b</sup> | Js <sup>a</sup> | Fy <sup>a</sup> | Fy <sup>b</sup> | Jk <sup>a</sup> | Jk <sup>b</sup> | Le <sup>a</sup> | Le <sup>b</sup> | M    | N  | S  | s | P1 |  |   |   |                |
| Patient     | 4+        | 0  | 4+ |   | 0    |   |                 |                 |                 |                 |                 | 0               | 3+              | 2+              | 0               | 0               | 3+              | 4+   | 4+ | 2+ |   | 4+ |  |   |   |                |
| Pos control | 4+        | 4+ | 4+ |   | 3+   |   |                 |                 |                 |                 |                 | 3+              | 3+              | 2+              | 2+              | 2+              | 4+              | 4+   | 4+ | 2+ |   | 2+ |  |   |   |                |
| Neg Control | 0         | 0  | 0  |   | 0    |   |                 |                 |                 |                 |                 | 0               | 0               | 0               | 0               | 0               | 0               | 0    | 0  | 0  |   | 0  |  |   |   |                |

### **ABID CASE #19**

1. What antibody/ies do you think is/are present? Are these allo- or autoantibodies? (Hints: Why is Rabbit Erythrocyte Stroma used? Why is the DAT positive?)
2. What does this workup illustrate about the sensitivity of the gel system? What other procedure could have been used to reveal the underlying alloantibodies?
3. How would one select provide compatible blood for this recipient? What percentage of donors are expected to be compatible?