

| Antigen | Antigen prevalence | | | Statistical analysis (p-value) | |
|---------|--------------------|--------|------------|--------------------------------|----------------------------------|
| | Patients with SCD | Blacks | Caucasians | Patients with SCD vs. Blacks | Patients with SCD vs. Caucasians |
| c | 0.986 | 0.98 | 0.8 | 0.6246 | <0.0001 |
| C | 0.226 | 0.27 | 0.68 | 0.1302 | <0.0001 |
| e | 0.992 | 0.98 | 0.98 | 0.1767 | 0.1767 |
| E | 0.175 | 0.22 | 0.29 | 0.086 | <0.0001 |
| Kell | 0.016 | 0.02 | 0.09 | 0.812 | <0.0001 |
| k | 1.000 | 1 | 0.998 | 1 | 1 |
| Kpa | 0.000 | 0.0001 | 0.02 | 0.0619 | 0.0019 |
| Kpb | 1.000 | 1 | 1 | 1 | 1 |
| Jsa | 0.166 | 0.2 | 0.0001 | 0.1882 | <0.0001 |
| Jsb | 0.996 | 0.99 | 1 | 0.4515 | 0.4995 |
| Jka | 0.907 | 0.92 | 0.77 | 0.5659 | <0.0001 |
| Jkb | 0.489 | 0.49 | 0.74 | 0.9741 | <0.0001 |
| Fya | 0.123 | 0.1 | 0.66 | 0.2659 | <0.0001 |
| Fyb | 0.174 | 0.23 | 0.83 | 0.0325 | <0.0001 |
| M | 0.733 | 0.74 | 0.78 | 0.8284 | 0.1031 |
| N | 0.730 | 0.75 | 0.72 | 0.5242 | 0.8056 |
| S | 0.254 | 0.31 | 0.55 | 0.0613 | <0.0001 |
| s | 0.935 | 0.93 | 0.89 | 0.8202 | 0.0192 |
| V | 0.247 | 0.3 | 0.01 | 0.0743 | <0.0001 |
| VS | 0.281 | 0.3 | 0.0001 | 0.5751 | <0.0001 |
| U | 0.990 | 0.99 | 0.999 | 1 | 0.0619 |
| Lua | 0.037 | 0.05 | 0.08 | 0.3934 | 0.006 |
| Lub | 1.000 | 0.998 | 0.998 | 0.3215 | 1 |
| Dia | 0.000 | 0.0001 | 0.0001 | 1 | 1 |
| Dib | 1.000 | 1 | 1 | 1 | 1 |
| Coa | 1.000 | 0.999 | 0.999 | 1 | 1 |
| Cob | 0.016 | 0.1 | 0.1 | <0.0001 | <0.0001 |
| Doa | 0.433 | 0.55 | 0.67 | 0.0003 | <0.0001 |
| Dob | 0.931 | 0.89 | 0.82 | 0.0338 | <0.0001 |
| Joa | 0.994 | 0.99 | 1 | 0.7226 | 0.2492 |
| Hy | 0.998 | 0.99 | 1 | 0.2173 | 1 |
| Lwa | 1.000 | 1 | 1 | 1 | 1 |
| Lwb | 0.000 | NA | 0.01 | NA | 0.0619 |
| Sc1 | 1.000 | 0.99 | 0.99 | 0.0619 | 0.0619 |
| Sc2 | 0.000 | NA | 0.01 | NA | 0.0619 |

Table S1. Red blood cell antigen prevalence. Antigen prevalence among this cohort was compared to reported prevalence for Blacks and Caucasians determined by serological typing in ¹⁶. Statistical analysis of frequency was performed using bivariate comparisons of categorical variables using a two-tailed chi-square test with Yates' correction or a fisher's exact test. NA, not available.

| Antigen | UPIN | Historical Phenotype | Genotype Predicted | Repeat Serologic Phenotype | Comments |
|------------|------------|----------------------|--------------------|----------------------------|---|
| c | 404 | - | + | + | |
| C | 492 | + | - | - | |
| | 293 | + | - | - | |
| e | 543 | - | + | + | |
| | 501 | - | + | + | |
| | 166 | - | + | NP | <i>RHCE*ceJAL</i> , weak e expression |
| E | 199 | + | - | - | |
| Jka | 7 | - | + | + | <i>JK*A 130 G>A, (JK*01W.01)</i> , weak expression |
| | 480 | - | + | + | |
| Jkb | 423 | + | - | - | |
| | 148 | + | - | - | |
| | 522 | + | - | - | |
| | 164 | + | - | - | |
| | 39 | + | - | - | |
| | 225 | + | - | - | |
| | 293 | + | - | - | |
| | 502 | + | - | - | |
| | 199 | + | - | - | |
| | 431 | + | - | - | |
| | 199 | - | + | + | |
| | 346 | - | + | + | |
| | 611 | - | + | - | <i>JK*B 191 G>A, (JK*02N.09)</i> silencing mutation |
| | Fya | 252 | + | - | - |
| 492 | | + | - | - | |
| 39 | | + | - | - | |
| Fyb | 492 | + | - | - | |
| | 561 | + | - | - | |
| | 39 | + | - | - | |
| | 590 | - | + | w+ | Heterozygous for <i>FY</i> GATA site mutation |
| | 519 | - | + | w+ | Heterozygous for <i>FY</i> GATA site mutation |
| | 566 | - | + | w+ | Heterozygous for <i>FY</i> GATA site mutation |
| | 148 | - | + | 1+ | Heterozygous for <i>FY</i> GATA site mutation |
| | 192 | - | + | 1+ | Heterozygous for <i>FY</i> GATA site mutation |
| | 191 | - | + | 1+ | Heterozygous for <i>FY</i> GATA site mutation |
| | 451 | - | + | 2+ | Heterozygous for <i>FY</i> GATA site mutation |
| | 397 | - | + | +* | Heterozygous for <i>FY</i> GATA site mutation |
| | 392 | - | + | +* | Heterozygous for <i>FY</i> GATA site mutation |
| | 83 | - | + | +* | Heterozygous for <i>FY</i> GATA site mutation |
| | 409 | - | + | NA | Heterozygous for <i>FY</i> GATA site mutation |
| | 578 | - | w+ | NP | Heterozygous for <i>FY</i> GATA site mutation Heterozygous for <i>FY*X</i> (265 C>T) |

| | | | | | |
|----------|-----|---|----|----|--|
| | 447 | - | w+ | NP | Heterozygous for <i>FY</i> GATA site mutation Heterozygous for <i>FY</i> *X (265 C>T) |
| M | 615 | + | - | - | |
| | 62 | + | - | - | |
| | 423 | + | - | - | |
| | 127 | + | - | - | |
| | 379 | + | - | - | |
| | 140 | + | - | - | |
| | 293 | + | - | - | |
| | 167 | - | + | + | |
| | 132 | - | + | + | |
| | 270 | - | + | + | |
| N | 219 | + | - | - | |
| | 326 | + | - | - | |
| | 472 | + | - | - | |
| | 522 | + | - | - | |
| | 164 | + | - | - | |
| | 498 | + | - | - | |
| | 521 | + | - | + | Under investigation |
| | 247 | + | - | NA | |
| | 39 | - | + | + | |
| | 371 | - | + | + | |
| S | 415 | + | - | - | |
| | 548 | - | + | + | |
| | 519 | - | + | + | |
| | 236 | - | + | + | |
| | 91 | - | + | + | |
| | 448 | - | + | + | |
| | 311 | - | + | + | |
| s | 5 | + | - | - | |
| | 508 | - | + | + | |
| | 351 | - | + | + | |

Table S2. Seventy-one discrepancies between historical RBC antigen phenotype determined by serology compared to genotype predicted phenotype. UPIN, unique patient identifier number; NP, confirmatory serology testing not performed because discrepancy explained by inheritance of alleles encoding weak antigen expression; NA, repeat specimen not available; w+, weak positive agglutination; 1+, 1+ agglutination; 2+, 2+ agglutination; *, strength of agglutination not available.