size to list all the transgressions against the correct use of blood group terminology that these authors have had the misfortune to see. As outlined above, at both the antigen and phenotypic level the rules for the use of single letter, superscript and numerical terminology are relatively straightforward. An extraordinary feature of common errors is that often the terms are harder to create than the correct ones. Compassion requires that we leave unreferenced a paper that used the terms Jk^a and JK^b throughout. Symbols such as K1+, K:1+, K+1, K:+1 are harder to write than the correct phenotypic term K:1. One of our favorites is K^+ that we think is intended to mean K+ or K:1 but actually means potassium ions. We are never sure if K(+) means K+ with weak expression of K or K+ from an author who did not know that the + should not have been in parentheses; $K+^w$ always tells us that the K antigen that is present is weakly expressed. Table 1-2 lists examples of correct and incorrect terms in the various nomenclature systems. It should be remembered that the rules outlined (involving both correct and incorrect symbols) can be extrapolated to other blood group systems (129) that use the same type of terminology. Table 1-3, that is by no means all inclusive, lists examples of the correct use of each type of terminology.

Antibodies

The most common mistake made in writing antibody names is to omit the hyphen, e.g. anti A and anti D instead of anti-A and anti-D. Since anti is a prefix it cannot stand alone. The name of the antibody must include the name of the antigen it defines (A and D in the examples). Thus anti-A and anti-D are each single words and are incorrectly written if the hyphen is omitted. In writing a list of antibodies it is permissible to use only the first as a full name, providing the hyphens are used for other specificities. For example "the serum contained anti-D, -E, -Fy^a, -Jk^a and -S". It is often grammatically tidier to rephrase the sentence "the serum contained antibodies to the D, E, Fy^a, Jk^a and S antigens".

The most common mistake in verbal descriptions of antibodies is to omit the anti entirely. Statements such as "this serum contains Fy^a (or worse, $Duffy^a$, or still worse, Duffy)" do not correctly describe the situation since Fy^a is an antigen and is not found in soluble form in serum.

TABLE 1-2 Examples of Correct and Incorrect Terminology

Term describes	Correct	Incorrect
Phenotypes	ARh+, BRh-	A+, B- (B-negative means negative for B antigen)
Phenotype	P_1+, P_1-	P_1^+, P_1^-, $P_1^{(+)}$, $P_1^{(-)}$
Phenotype	M+N- or M	M(+), MM (infers unproved genotype)
Antigen	K	Kell (name of sytem)
Antibody	Anti-K	Anti-Kell (still name of system)
Phenotypes	K:1, K:-1	K1+, K:1+, K(1), K:(1), K1-, K:1-, K1-negative
Phenotype	K-k+Kp(a+b+)	K^-, k^+, $Kp^{a+}Kp^{b+}$ K-k+$Kp^{a+}Kp^{b+}$
Antigens	Rh1, Rh2	Rh:1, Rh:2 (no colon in antigen names)
Phenotype	Rh:1,-2,3,4,-5	Rh:+1,-2,+3,+4,-5 Rh:1+,2-,3+4+5- Rh1,-2,3,4,-5
Antibody	Anti-Rh32	Anti Rh32, Anti-Rh^{32}, Anti-$\bar{\bar{R}}^N$ (See Chapter 12)
Phenotype	Le(a+)	Le^{a+}, Lea(+), Lea+, Le^{a+}, $Lewis^{a+}$, $Lewis^a$-positive
Phenotype	Lu(a+b+)	Lu^{a+b+}, $Lu^{a+}Lu^{b+}$, Lu(a+)(b+), Lu^a+Lu^b+, Lua+b+
Antibody	Anti-Fy3	Anti-Fy^3, Anti-Duffy3
Phenotype	Fy(a+b-)	Fy^{a+b-}, $Fy^{(a+b-)}$, $Fy^{a(+)b(-)}$, Fy^a-posFy^b-neg
Antigens	Jk^a, Jk^b	JK^a, JK^b
Phenotype	At(a+), At(a-)	At^a(a+), At^a(a-)

TABLE 1-3 Some Examples of Gene, Antigen and Phenotype Terms

System	Genes	Antigens	Phenotypes
ABO	*A A^1 A^2 B*	A A_1 A_2 B	A A_1 A_2 B
MN	*M N S s Ny^a*	M N Ṡ s Ny^a	M+N+S-s+Ny(a+)
P	*P^1*	P_1	P_1+ P_1-
Lewis	*Le le*	Le^a Le^b	Le(a+) Le(a-b+)
Duffy	*Fy^a Fy^b Fy^5*	Fy^a Fy^b Fy5	Fy(a+b+) Fy:5
Lutheran	*Lu^a Lu^b Lu*	Lu^a Lu^b	Lu(a-b-) Lu:-3
Rh	*D C^w Go^a*	D C^w Go^a	D+ C^w- Go(a+)
Rh	*R^1 R^8 R^{30}*	Rh1 Rh8 Rh30	Rh:1,-8,30
Kell	*K k Kp^a*	K k Kp^a	K-k+Kp(a+)
Kell	*K^1 K^2 K^3*	K1 K2 K3	K:-1,2,3
Scianna	*Sc^1 Sc^2 Sc*	Sc1 Sc2	Sc:-1,-2,-3
Colton	*Co^a Co^b*	Co^a Co^b Co3	Co(a-b-) Co:-3

On rare occasions an antibody may be misnamed by implication that it detects a gene, not an antigen. In the Rh blood group system (see Chapter 12) the rare genes $\overline{R}^N$ and R^{oHar} encode production of the low incidence antigens Rh32 and Rh33 respectively. Some workers, who should know better, talk about anti-$\overline{R}^N$ and anti-R^{oHar}. Since $\overline{R}^N$ and R^{oHar} are genes and since antibodies define antigens, the terms are obviously nonsensical.

Some Other Common Errors

Although not relating strictly to blood group antigen names, there are a number of other errors that creep (sometimes gallop) into the immunohematologist's vocabulary. The word titer is a noun; the verb is to titrate. Thus, an antibody can be titrated; it cannot be titered. The titer is correctly expressed as the reciprocal of the serum dilution; it is incorrect to use the serum dilution as a synonym for titer. For example, if a serum dilution of 1 in 64 is the endpoint of the titration, the titer is 64; it is not 1 in 64. A dilution of 1 in 64 should not be written as 1:64 since that term describes a ratio, that is 1 part to 64 parts or a dilution of 1 in 65. While the difference between 1 in 64 and 1 in 65 is not often important, the term 1:2 creates a more serious error. 1:2 implies 1 part to 2 parts or a dilution of 1 in 3; 1 in 2 implies equal parts, clearly there is a 50% variance between the two.

The word data is plural. Thus the commonly used "the data is" and "the data shows" are incorrect and should be "the data are" and "the data show". A single piece of information is a datum.

The terms homozygous and heterozygous refer to genes not antigens. Thus red cells cannot correctly be described by either of those terms. Statements such as "homozygous Jk^a red cells" are incorrect, red cells of the type being described can be said to be "from a Jk^a homozygote". The use of the immediate spin compatibility test (the correct term for the slang "crossmatch") and the introduction of antibody-screening cells from three instead of two donors has led to a plethora of statements about the use of homozygous (for Jk^a, Jk^b, Fy^a, Fy^b, etc.) red cells when, all the time, the cells come from (presumed) homozygous donors.

The ISBT Terminology

When computers first became available, it was natural that blood groupers would use them to store information. By 1980 there was concern that since no standard system existed, individual workers were devising their own terminologies thus eliminating a major benefit of the use of computers, namely the capability of electronic transfer and exchange of information. In response to these concerns, Dr. B.P.L. Moore, the then President of the International Society of Blood Transfusion (ISBT), initiated formation of a Working Party on Terminology for Red Cell Surface Antigens. The charge to this Working Party was to devise a uniform nomenclature that would be both eye and machine readable and in keeping with the genetic basis of the blood groups. It is important to note that in its very first report (130) a statement appeared that "the ISBT Working Party is not try-