

body to anti-Y_ta, the predicted anti-Y_tb. This possibility was supported by the frequency of positive reactions. The specificity of the antibody was established by testing six known Y_t(a-) samples, kindly supplied by Dr. M. M. Pickles, Dr. P. A. Tippett and Miss M. J. Polley, with an eluate containing only the unknown antibody in Mrs. B.'s serum. All were found to react positively. A family investigation of the original Fy(b-) Y_t(b+) donor showed that her father and uncle were, in fact, Y_t(a-). Of the 19 random positive samples, 18 reacted with anti-Y_ta, but one was found to be Y_t(a-).

Family investigations and random testing are now being undertaken in Zurich and London and will be reported in detail in due course. Already one family has shown independence of the Y_t blood group system from Kell, Duffy and Kidd systems. Eaton *et al.* have already shown independence of Y_t from ABO Rh and MNS systems and Allen *et al.*³ have described a family showing independence from the Lutheran system.

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¹ Eaton, B. R., Morton, J. A., Pickles, M. M., and White, K. E., *Brit. J. Haemat.*, 2, No. 4, 333 (1956).

² Cleghorn, T. E. (in the press).

³ Allen, F. H., Milkovich, Lucille, and Corcoran, Patricia A., *Vox Sang.*, 8, No. 3, 376 (1963).

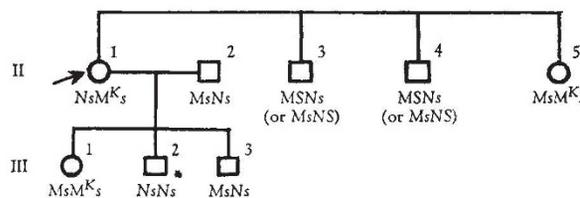
M^K: an Apparently Silent Allele at the MN Locus

In the course of investigations on M^G positive blood samples with an anti-N serum, A.P.¹, which, when used undiluted at room temperature, agglutinates NN but not MN red cells, attention was directed to a blood donor, Mrs. E. W.-K., whose cells were being used as a control: Mrs. W. had previously been grouped as M- N+, and her genotype was therefore thought to be NN, but her cells, contrary to expectation, were not agglutinated by serum A.P., which suggested that her true genotype was heterozygous rather than homozygous. Strong support for this was obtained when it was found that the red cells of Mrs. W.'s daughter gave the reactions M+ N-, since these are usually interpreted as representing the genotype MM, which, if it were the daughter's true genotype, would exclude Mrs. W.'s maternity. Such an exclusion, however, is not supported by the other blood groups of mother and daughter (and of Mr. W.), and it is rendered highly improbable by the fact that the daughter's cells, when tested with suitable anti-M sera, give a 'single dose' of M.

A plausible explanation of these findings is that Mrs. W. and her daughter both possess, at the MN locus, a rare allele of M and N; for this the symbol M^K, in which K stands for Mrs. W.'s maiden name, is proposed. Further evidence for the existence of such a gene is provided by the MNSs groups of Mrs. W.'s two brothers and her sister, which are shown in Table 1. According to these, the genotypes of Mrs. W. and her sister, P. K., appear to be

Table 1. MNSs GROUPS OF FAMILY K

| | Test sera | Anti-M | -N | -M ^o | -S | -s |
|----------------|-----------|--------|----|-----------------|----|----|
| Propositus: | Mrs W. | II-1 | + | + | - | + |
| Her husband: | A. W. | II-2 | - | + | - | - |
| " 1st brother: | H. K. | II-3 | + | + | - | + |
| " 2nd brother: | M. K. | II-4 | + | + | - | + |
| " sister: | P. K. | II-5 | + | - | - | + |
| " daughter: | R. W. | III-1 | + | - | - | + |
| " 1st son: | H. W. | III-2 | - | + | - | - |
| " 2nd son: | K. W. | III-3 | + | + | - | - |



* That the genotype of III-2 is NN (and not NM^K) has been inferred from the fact that his red cells give a clear double dose of N with serum A.P.

Fig. 1

NsNs and MsMs, respectively, which, if correct, would allow of only one genotype in their parents (both of whom are dead), namely, MsNs. On the other hand, the genotype of both Mrs. W.'s brothers is MSNs (or MsNS), and this makes it impossible for them to be the sons of MsNs parents. Since the cells of Mrs. W.'s sister give a single dose of M, it may safely be assumed that she, too, possesses the hypothetical gene M^K. The genetical interpretation of the MNSs groups of Mrs. W.'s family is shown in Fig. 1.

Tests with undiluted and serially diluted anti-N sera on the red cells of Mrs. W.'s sister and daughter, both of whom are assumedly MM^K, have failed to reveal any more N reactivity than that found in MM cells, and Mrs. W.'s own cells (NM^K) are not agglutinated by any anti-M sera with which they have been tested so far. Several hundred normal human sera have been screened against the cells of Mrs. W. or her sister in the hope of finding a specific anti-M^K antibody, but none was found. Dr. T. E. Cleghorn, Sutton, has examined several thousand donor sera in the same way, with as little success². An attempt at producing anti-M^K in rabbits was also a failure.

There is thus no evidence so far that the postulated gene M^K gives rise to a specific antigen, or even to any antigen at all. This contrasts with the behaviour of other rare alleles at the MN locus, such as M₂, N₂, M^c, all of which produce distinct amounts of M or N antigen (or both). Even M^G, whose corresponding antigen was first thought to be entirely devoid of M or N reactivity³, gives rise to slight but clearly detectable amounts of N, as was first observed over a year ago and is reported here for the first time. In connexion with the possibility that M^K is a 'silent' gene, the question arises whether it is accompanied by an equally inactive gene of the Ss series. The results of dosage investigations with anti-s sera on the cells of Mrs. W. and her sister, however, have not been clear-cut. Since none of the carriers of M^K is S positive, the question whether the hypothetical complex M^Ks produces any s antigen remains unanswered.

In view of what has been said, the symbol M^K might seem unnecessary and its replacement by a - or -- in the genotypes of Mrs. W., her sister and her daughter more appropriate. However, so long as there is no certainty as to the activity or inactivity of the postulated gene, it appears preferable to give it a name, particularly as this is more practical for reference purposes.

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³ Allen, F. H., Corcoran, P. A., Kenton, H. B., and Breare, N., *Vox Sang.*, 3, 81 (1958).