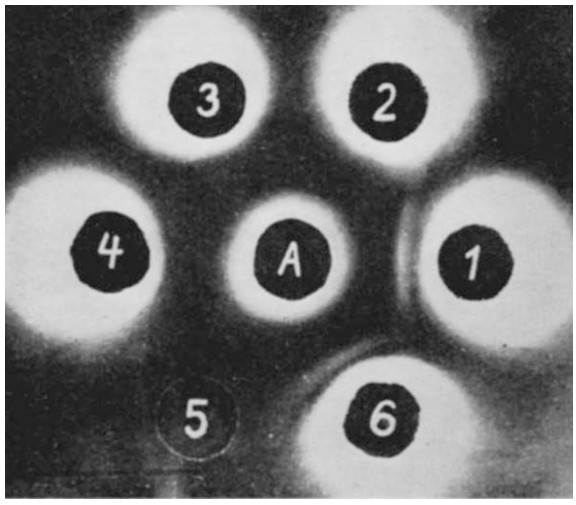

Fig. 1. Reactions in agar-gel double-diffusion experiments between serum from patient F. J. and positive (wells 1, 6) and negative (wells 2, 3, 4) reacting human sera. Serum from F. J. was placed in well *A*, well 5 contained saline

determined, it is different from all the three factors mentioned. The preliminary results of a family investigation indicate that the 'new' factor is genetically controlled.

As the precipitin in the serum from F. J. is inactive or practically inactive at 37° C, but active at lower temperatures, the designation 'cold-precipitin' seems adequate.

This property has apparently not been observed with the iso-antisera so far described. Hirschfeld[2] stated that the iso-antiserum found by him reacted well also at 37° C.

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A 'New' Blood Group Antigen, Do^a

An antibody in the serum of a white patient, Mrs. Dombrock, defines a previously unrecognized red cell antigen, Do^a. Among 258 unrelated white people of northern European extraction 166, or 64 per cent, were of the phenotype Do(a+) and 92, or 36 per cent, were of the phenotype Do(a−).

Table 1. Inheritance of the Antigen Do^a in 52 Northern European Families

Matings Type	Number Obs.	Number Exp.	Total	Children Do(a+) Obs.	Children Do(a+) Exp.	Children Do(a−) Obs.	Children Do(a−) Exp.
Do(a+) × Do(a+)	18	*21·3*	40	35	*34·4*	5	*5·6*
Do(a+) × Do(a−)	26	*24·0*	60	36	*37·5*	24	*22·5*
Do(a−) × Do(a−)	8	*6·7*	24	0	—	24	*24·0*
	52	*52·0*	124				

Tests on families show that the antigen Do^a is inherited as an autosomal dominant character (Table 1): Do(a+) × Do(a+) matings may produce Do(a+) and Do(a−) children and Do(a−) × Do(a−) matings produce only Do(a−) children. A preliminary estimate of the gene frequencies may therefore be derived as follows: calling the gene for the new antigen *Do^a* and the gene or genes responsible for the lack of the antigen *Do*, then the frequency of *Do* = √frequency of Do(a−) = 0·60 and that of *Do^a* = 1 − 0·60 = 0·40. The corresponding genotype frequencies are:

Do^{a}Do^a 0·16, *Do^{a}Do* 0·48, *Do Do* 0·36

From these genotype frequencies may be calculated the expected incidence of the three phenotypically different mating types and the proportions to be expected among children therefrom. It can be seen from Table 1 that the calculated numbers agree well with those observed.

Genetic recombination in these families shows that the gene *Do^a* is not sited at the loci for the ABO, MNSs, P, Rh, Lutheran, Kell, Duffy, Kidd or secretor genes, nor is there yet any hint that *Do^a* is within measurable linkage distance of any of these loci; it is not *X*- or *Y*-linked. The antigen *Do^a* is probably not a previously unrecognized component of the remaining autosomal systems that make useful distinctions between white people, Auberger and Yt, because the incidence of the phenotypes Do(a+) and Do(a−) within the divisions of these groups does not differ significantly from that in the general population: however, the final exclusion from these two systems will have to await happy segregations in families of rather infrequent mating types.

Preliminary tests suggest that the phenotype Do(a+) will prove less frequent in American Negroes than in northern Europeans, but this remains to be established.

The antigen Do^a appears to be well developed at birth, for it has been found in normal strength in two samples of cord blood: two other samples of cord blood gave the reaction Do(a−).

Mrs. Dombrock, whose groups are O, MN.Ss, P_1, R_1r, Lu(a−), K−, Le(a−b+), Fy(a−), Jk(a+b+), Xg(a+), Do(a−), has two children both of whom are Do(a−). Her antibody is immune in origin, for it appeared for the first time following transfusion of blood. Besides anti-Do^a, Mrs. Dombrock's serum contains anti-A, anti-B, anti-E and anti-Fy^a: these antibodies can be removed by appropriate absorption. The anti-Do^a reacts best by the antiglobulin test on papainized cells; antiglobulin sera vary in their power to demonstrate the interaction. Anti-Do^a is not inhibited by secretor or non-secretor saliva nor by hydatid cyst fluid.

If there are only two common alleles in this system, then the finding of an antithetical antibody, anti-Do^b, is to be hoped for: it would be expected to react positively with the red cells of about 84 per cent of white people. However, the reactions of anti-Do^a alone place the Dombrock system sixth in the order of potential usefulness of blood group systems as markers of autosomes of white people.

We thank Mrs. Dombrock for permission to use her name for the new system, and Miss Esther Ditmanson of the Northwestern Hospital, Minneapolis, who sent us the original samples.

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IMMUNOLOGY

An Allotypic Determinant Specific to Rabbit Macroglobulin

There is reason for supposing that rabbit macroglobulins possess allotypic determinants in common with 7*S* γ-globulin[1,2]. No allotype has yet been described on that part of the molecule unshared with the other immuno-