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PROOF OF THE PRESENCE OF AGGLUTINOGEN "A" IN ALL THE ERYTHROCYTES OF TYPE AB

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The isohemagglutinins α and β in human blood are—partly, at least—distinct and separable, and the question might arise whether the agglutinogens A and B are separable, or possibly present in separate cells; in other words, whether AB cells might consist of a mixture of A cells and B cells. It is difficult to decide this question definitely by the ordinary microscopic observations. In some cases AB erythrocytes seem only partly agglutinated by A or B serum, when an equal number of B or A erythrocytes, treated similarly, are completely agglutinated. Variations in the intrinsic agglutinability of erythrocytes, even from the same individual, are difficult to control, and the isoagglutinins are not as concentrated as the immune agglutinins which may be obtained. Even complete agglutination might possibly be thought to include some mechanical trapping of otherwise unaffected cells. So, while it has doubtless been felt, reasonably enough, that it was improbable, there seems to be no actual proof that AB erythrocytes do not consist of a mere mixture of A and B cells. Genetically, also, this seems unlikely, but since there seems to be no experimental work touching the point—in fact no mention of the possibility—in the literature, we report the following experiment.

Two rabbits were immunized with type A M+N+ erythrocytes, and two with B M+N+, by means of intravenous injections, followed, after a rest, by intra-abdominal injections, the total dosage being about 25 ml. of a 30 per cent suspension. The sera were adsorbed in the cold, first with a mixture of O M+N+ and O M+N− packed cells (about 0.6 ml./ml. serum), then

with B M+N+ and A M+N+ (about 0.6 ml./ml. serum) respectively, completeness of adsorption being tested by absence of lysis or agglutination on addition of cells plus alexin to a test portion at 37°C. To each milliliter of serum 20 units of alexin (adsorbed guinea pig serum) were added, and the serum tested against various types of cells, aseptic technic being practiced throughout. The adsorbed anti-B sera did not contain a group specific lysin,[1] which is not surprising, since only 2 rabbits were used, but the anti-A did, and gave the following results.

Serum (0.2 ml.)	*Lysed completely (0.1 ml. 5 per cent cell suspension)*	
Anti-A M+N+ (after adsorption by O M+N−, O M+N+, and B M+N+ cells)	A M+N+	yes
	B M+N+	no
	A M+N+ and B M+N+ (mixture of above)	no
	AB M+N−	yes

It is evident that the factor A (it is improbable, because of the high titer of our serum—agglutination to ca. 1/500—that the lysin was anti-A_1 though the A and AB cells contained A_1) occurs in all the AB cells, as would be expected. It is likely that the use of a larger number of rabbits would have resulted in similar proof for the B agglutinogen.

The authors wish to express their gratitude to Dr. A. S. Wiener, who very kindly tested the bloods used for M, N, A_1, and A_2 agglutinogens, and demonstrated to us the technic for testing for these factors.

SUMMARY

The production of a group-specific hemolysin and an experiment indicating that the factor "A" occurs in each erythrocyte of a type AB blood, are described. There is no reason to doubt that the same is true of the "B" factor.

[1] Attempts to decide the question by means of agglutination and differential centrifugation were inconclusive.