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STUDIES ON THE EFFECT OF GAMMA GLOBULIN ON  
COMBS REAGENT TO NATURAL AND TO ACQUIRED  
ISOHAMAGGLUTININS OF THE GROUP A SYSTEM

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## ABSTRACT

The present investigation was undertaken to elucidate the difference between the natural occurring anti-A isocagglutinins and the immune anti-A isocagglutinins. Four antisera were prepared; Coombs serum to purified human gamma globulin AHG, Coombs serum to eluted natural anti-A AHG "A" (Halvorson), Coombs serum to eluted immune anti-A AHG "A" (Penner), and Coombs serum to eluted cord anti-A AHG "A" (Boadway). Antiglobulin tests were performed with the prepared Coombs sera on both the natural occurring and immune forms of anti-A isocagglutinins. Antiglobulin test on both forms of anti-A were also performed with Coombs serum AHG "A" (Halvorson) after the addition of gamma globulin some of the gamma globulin treated antisera were further added with AHG. Micro-estimations of the nitrogen contents of the precipitin to gamma globulin were performed on all the prepared Coombs sera.

The antiglobulin tests showed that the natural occurring anti-A was inactive to AHG but active to all other Coombs sera, and that approximately eight times more anti-A isocagglutinins were required for a positive antiglobulin tests with Coombs sera to immune anti-A than that required with the Coombs serum to natural anti-A. Eluted immune anti-A from Penner serum and from Boadway cord serum were active to all the Coombs sera including AHG. For a positive antiglobulin test, the amount of immune isocagglutinin required

was about the same with each Coombs serum. The absorbed cord serum in place of eluate was found to be inactive to AHS. Approximately 6.25 % of gamma globulin were able to inhibit the agglutinating ability of 0.2 ml. of AHS "A" (Halverson) when tested with natural anti-A isoeagglutinin whereas 2.34 % were required for the same amount of AHS "A" (Halverson) when tested with immune isoeagglutinin. The addition of 0.1 ml. of AHS 1/10 diluted to the neutralized Coombs serum reactivated its agglutinating ability in all cases. The milligram nitrogen contents of the precipitin to gamma globulin of the Coombs sera per unit gamma globulin at maximal precipitation were as follows: 1.46 for AHS; 3.52 for AHS "A" (Halverson); 0.965 for AHS "A" (Penner); and 6.92 for AHS "A" (Bondway).

## TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
HISTORICAL	2
MATERIALS AND METHODS	12
Preparation of Coombs Reagents	13
Treatment of Antiglobulin Sera	14
Antiglobulin Test	14
"Neutralization" with Human $\gamma$ globulin	15
Addition of Anti-human $\gamma$ globulin	15
quantitative Micro-estimation of Antibody to $\gamma$ globulin in Coombs Reagents	15
Graphing of Precipitin Nitrogen	16
RESULTS	20
DISCUSSION	48
CONCLUSION	52
REFERENCES	53

LIST OF TABLES AND FIGURES

PAGE

24	Table 1.	Gross fraction of eluted anti-A on $\gamma_1$ cells with anti-globulin sera
24	1A	Eluted anti-A Halverson
25	1B	Eluted anti-A Fenner
26	1C	Eluted anti-A Bodway
27	2.	Reaction of eluted anti-A, diluted 1:20, coated on $\gamma_1$ cells with coombs sera "A" treated with human $\gamma$ globulin
27	2A	Eluted anti-A Halverson
28	2B	Eluted anti-A Wong
29	2C	Eluted anti-A Turbovsky
30	2D	Eluted anti-A Bayback
31	2E	Absorbed Bodway cord serum
33	Table 4.	Qualitative precipitin test on coombs sera
33	3.	Micro-estimation of the nitrogen content of precipitin
39	3A	Precipitin to anti-human $\gamma$ globulin
40	3B	Precipitin to anti-human anti-A
41	3C	Precipitin to anti-natural anti-A
42	3D	Precipitin to anti-placenta cord anti-A
43	Figure 1.	Micro-estimation of the nitrogen content of the precipitates formed by the coombs sera and with varying amount of $\gamma$ globulin

- 44      Micro-estimation of the nitrogen content of the precipitates formed by the combs sera ANG "A" (Femur) with varying amount of  $\gamma$  Globulin
- 45      Figure 2.
- 46      Micro-estimation of the nitrogen content of the precipitates formed by the combs sera ANG "A" (Haverson) with varying amount of  $\gamma$  Globulin
- 47      Figure 3.
- 48      Micro-estimation of the nitrogen content of the precipitates formed by ANG "A" (Roadway) with varying amount of  $\gamma$  Globulin
- 49      Figure 4.
- 50      Micro-estimation of the nitrogen content of the precipitates formed by all the prepared combs sera with varying amount of  $\gamma$  Globulin
- 51      Figure 5.

## INTRODUCTION

It is well known that antibodies to the A and B antigens in the blood group system occur in reciprocal relationship to the antigens; that is, they are distributed so that antibody is lacking in sera of an individual whose red cells contain the corresponding antigen. The concept that the isocagglutinins anti-A and anti-B are inherited by a set of genes completely linked to those determining the inheritance of the antigens was introduced by Furuhata (16) in 1927. Furthermore, since A and B antigens are present in most body tissues and, according to Race and Sanger (38), in the body fluids of approximately 80% of the world population, isocimmunization by ABO incompatible pregnancy is not infrequent. The antibodies thus produced have been variously termed "blocking", "incomplete", "univalent" and "immune". For the purpose of uniformity the term "immune" will be used in this paper.

To differentiate between the natural and the immune antibodies, a number of criteria have been advocated by various workers notably Reopmaker and van Loghem (39) who have listed eight tests by which the natural and the immune anti-A and anti-B can be distinguished. The present study was undertaken to elucidate the difference, if any, between the natural anti-A and the isocimmune anti-A.

One of the means by which immune antibodies may be demonstrated is the antiglobulin test. The basis of