

# FORMATION OF COMPLETE AND INCOMPLETE ANTIBODIES IN RABBITS IMMUNIZED WITH SHEEP'S RED CELLS

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A parallel determination of incomplete and complete antibodies in rabbits immunized with different doses of sheep's red cells showed that the decrease in titers of complete antibodies takes place more rapidly than that of incomplete. Complete 7S-antibodies appear in the blood of animals immunized with large doses of red cells or after repeated injections of small doses of the antigen. Incomplete 7S-antibodies can be detected in the blood of rabbits after primary immunization with both large and small doses of sheep's red cells. The titers of incomplete hemagglutinins in the reaction with native and trypsinized red cells are almost identical. The titers of complete hemagglutinins, on the other hand, are higher in the reaction with trypsinized red cells than in the reaction with native cells and they are similar in value to the titers of incomplete antibodies.

Key words: immunization; complete and incomplete antibodies – their dynamics.

The problem of the relationship between incomplete antibodies detected by the Coombs' test and complete antibodies detected by the ordinary serologic reactions has not yet been solved. There is evidence that the appearance of incomplete antibodies in the blood serum does not always coincide with the appearance of complete antibodies [1, 2]. Data in the literature on the dynamics of elimination of complete and incomplete antibodies from the blood stream of immunized animals are contradictory [2, 4].

The object of this investigation was to compare the dynamics of the titers of complete and incomplete antibodies in the blood of rabbits immunized with different doses of antigen.

## EXPERIMENTAL METHOD AND RESULTS

Experiments were carried out on 20 rabbits immunized intravenously with 1 ml of a 5% or 50% suspension of sheep's red cells. The titers of incomplete antibodies were determined by the indirect Coombs' test and the titers of complete antibodies by the direct hemagglutination test in the sera of the experimental animals 5, 10, 15, 20, 30, 40, 60, and 80 days after immunization. The 7S-antibodies were determined after treatment of the sera with 2-mercaptoethanol [5]. Native sheep's red cells and red cells previously treated with trypsin [3] were used as the test antigen.

After immunization of the animals with the 5% suspension of sheep's red cells the titers of complete and incomplete antibodies, detected by native and trypsinized red cells, reached their maximum by the 10th day after injection of the antigen. At all periods of the investigation the titers of incomplete antibodies to native red cells were higher than the titers of complete antibodies. The dynamics of the titers of incomplete antibodies differed from the dynamics of the titers of the complete antibodies: between the 10th and 40th days of the experiment the titers of complete agglutinins fell sharply whereas those of the incomplete antibodies remained almost at the previous high level. The content of the complete antibodies detected by trypsinized red cells was higher at all periods of the experiments than the content of antibodies detected by the test with native red cells. The titers of incomplete antibodies detected by the two test antigens were almost identical. Treatment of the red cells with trypsin probably alters the configuration of the surface

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of the red cell and exposes additional antigenic determinants. These determinants react with serum antibodies formed against the analogous determinants of red cells exposed by the action of macrophage enzymes.

An increase in the immunizing dose of antigen caused practically no change in the relationship between the dynamics of the titers of complete and incomplete antibodies.

Incomplete 7S-antibodies were detected in rabbits after immunization with both low and high doses of antigen, whereas complete 7S-antibodies were detected only after injection of high doses of antigen.

These investigations thus revealed a definite difference between the dynamics of the titers of complete and incomplete antibodies in the blood of the immunized rabbits. The difference was particularly marked with respect to the 7S-antibodies. This could indicate some degree of independence of the synthesis of the complete and incomplete antibodies, possibly because the complete and incomplete antibodies are formed against different antigenic determinants of the red cells. This hypothesis would explain the observed increase in titers of the complete hemagglutinins after treatment of the test red cells with trypsin whereas the titers of incomplete antibodies remained identical in the reactions with trypsinized and nontrypsinized red cells. However, the possibility cannot be ruled out that the difference in the dynamics of the antibody titers determined by the Coombs' test and the direct hemagglutination test can be explained not by differences in the metabolism of these immunoglobulins but by unequal changes in the sensitivity of the two serologic phenomena in the course of the immune response. The reason for this inequality could be switching from the synthesis of 19S-antibodies to the formation of 7S-immunoglobulins.

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