Anti-C as a Naturally-Occurring Antibody

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Anti-C was detected in the serum of a 49-year-old man who had no history of transfusion. The thermal range of reactivity of the antibody, as well as its characterization as an IgM globulin, are consistent with the behavior of a naturally-occurring antibody. This is believed to be the first report of such an antibody with anti-C specificity.

It is accepted generally that antibodies directed against red blood cell antigens in the Rh system result from isoimmunization either by transfusion or pregnancy and rarely can be considered "naturally-occurring." Diamond *et al.* reported the first example of a naturally-occurring antibody within this system in 1942.[3] They described an antibody, apparently anti-D, in the serum of a five-year-old Rh-negative boy who had no history of prior transfusion. Naturally-occurring anti-D is extremely rare,[9] as there are only three reports of its occurrence in the literature.[1, 3, 5] Naturally-occurring anti-E is somewhat more common. Race and Sanger,[11] Dunsford,[4] Jenkins,[7] and Grove-Rasmussen and Levine,[5] have reported examples of sera containing anti-E in patients with no history of appropriate antigenic stimuli. Other described specificities of such antibodies in this system include two examples of anti-C^w [2, 8] and one of anti-C^x.[10] This report recounts another example of a "naturally-occurring" Rhesus antibody—the hitherto unreported specificity of anti-C (anti-rh').

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Case Summary

M. R., a 49-year-old Caucasian man of Polish extraction, with severe osteoarthritis of the right hip was admitted to the University of Michigan Medical Center for a vitalium cup arthroplasty. Pre-operative blood studies showed that his erythrocytes were group AB, Rh-negative (dce/dce). A room temperature-active irregular antibody was detected, which on further testing was shown to have the specificity of anti-C. Anti-H also was present in his serum.

Extensive questioning of the patient revealed no history of previous transfusion or of injection of blood or blood products. This was confirmed by his parents. At the time of admission no medication, except occasional aspirin, was being taken by the patient. Routine hematologic and blood chemistry studies were within normal limits.

Serologic Studies. The patient's serum was tested against four different panels of selected group O human erythrocyte specimens at 4 C, 12 C, 25 C, and 37 C. At 12 C and at 25 C, only the C-positive cells were agglutinated. Slightly stronger reactions were obtained with cells suspended in bovine albumin; however, there was no activity by the indirect anti-human globulin technic using an anti-IgG reagent. Premodification of the test cells with ficin, followed by the indirect anti-human globulin test, also gave negative results.

At 4 C, the patient's serum agglutinated all of the group O red blood cell specimens tested. Weak agglutination was observed with group A_2 cells and there was no agglutination of group A_1 or group O cord cells. This cold-reactive antibody was shown to be anti-H by inhibition tests with group O secretor saliva. Only anti-C was detected after absorption of the patient's serum with group O, Rh-negative red blood cells.

C-positive red blood cells incubated with this antibody were not agglutinated subsequently by anti-C'3, indicating that the antibody did not bind complement for this test. Treatment of the serum with 2-mercaptoethanol[9] removed all antibody activity. The patient's serum was subjected to column chromatography, using Sephadex G 200. All of the anti-C was present in the initial collections, indicating a molecular weight in excess of IgG.

Subsequent family studies revealed that the patient's mother was group B, Rh-positive (ccDEe);

the patient's father was group A, Rh-negative (ccdee); and the patient's brother was group A, Rh-positive (ccDEc). No atypical antibodies were detected in their sera.

Discussion

This case represents another example of the presence of an antibody in the serum of an individual who has not been exposed to an obvious source of antigenic stimulus. Although naturally-occurring examples of anti-C^w and anti-C^x have been reported, we could find no previous report of pure anti-C existing as a "naturally-occurring" antibody.

The temperature range of reactivity of the anti-C and its likely occurrence as an IgM globulin are consistent with the behavior of a naturally-occurring antibody. The remote possibility that this patient's antibody is a residual of sensitization by maternal erythrocytes is excluded by the absence of the C antigen on his mother's cells.

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Separation of Le^a and A Human Plasma Antigens

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The A and Le^a specific soluble blood group activities of human plasma were separated from most other proteins by gel filtration on Sepharose columns and from each other by precipitation on dialysis against 1 mM potassium phosphate buffer, pH 6.5. Both antigens emerged from Sepharose columns in fractions normally containing high molecular weight proteins. The Le^a antigen was soluble on dialysis, whereas the A antigen was fully precipitated.

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HUMAN plasma contains specific soluble ABO and Lewis blood group antigens. Andresen, Henriksen, and Jessop, in as yet unpublished experiments, separated plasma ABO antigens from Le^a by dialysis against