DISTRIBUTION OF ANTIBODIES AGAINST DOUBLE-HELICAL RNA AND RIBOSOMAL RNA IN PATIENTS WITH ALLERGOSES, RHEUMATIC FEVER, AND RHEUMATOID ARTHRITIS

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The distribution of antibodies against a synthetic double-helical polynucleotide (polyI:polyC) was investigated. Antibodies against double-helical RNA were found in 14% of patients with allergoses and healthy subjects, in 40.9% of patients with rheumatic fever, and in 50% of patients with rheumatoid arthritis. It is postulated that the more frequent discovery of antibodies against double-helical RNA in the patients with rheumatic fever and rheumatoid arthritis is due to persistence of RNA-containing viruses.

KEY WORDS: allergoses; rheumatic fever; rheumatoid arthritis; antibodies against double-helical RNA.

The view that viruses participate in the pathogenesis of rheumatic fever was expressed first in the 1950s [2, 3]. According to the latest data in the literature [4, 6-10] antibodies against double-helical RNA are found more often and in higher titers in patients with systemic lupus erythematosus than in patients with other diseases or in healthy subjects.

This fact could evidently be attributed either to a change in immunologic reactivity or to persistence of a possible viral agent with a role in the pathogenesis of the disease.

The cause of the appearance of antibodies against double-helical RNA in patients with rheumatic fever can be explained indirectly by their observed absence in patients with a disturbance of immunologic reactivity in other diseases, in the etiology and pathogenesis of which viruses do not play a role, and in particular, in allergoses accompanied by the formation of antitissue autoantibodies [1].

TABLE 1. Frequency of Discovery and Titers of Antibodies against PolyI:polyC in Patients with Various Diseases and in Healthy Subjects

Group investigated	Total number tested	No. tested in whom antibodies present		Frequency of discovery of antibodies in undermentioned titers						
		abs.	%	1:5	1:10	1:20	1:40	1:80	1:160	1:320
Healthy	50	7	14	7	—	—	—	—	—	—
Patients with:										
pollinosis	21	3	14,3	1	1	1	—	—	—	—
allergic dermatosis	15	2	13,3	2	—	—	—	—	—	—
rheumatic fever in active phase	66	27	40,9	4	10	8	4	—	1	—
rheumatoid arthritis	20	10	50,0	—	3	2	1	2	2	—

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It was accordingly decided to study the distribution of antibodies against double-helical and ribosomal RNA (rRNA) in patients collectively classified as suffering from allergoses: patients with pollinoses, allergic dermatoses (urticaria, Quincke's edema), rheumatic fever, and rheumatoid arthritis.

EXPERIMENTAL METHOD

Antibodies against double-helical and rRNA in the subjects' sera were detected by the passive hemagglutination test (PHT) [4, 5]. The test sera were inactivated by heating for 30 min at 56°C and exhausted with formalinized red cells (0.1 ml of a 50% suspension of formalinized red cells to 3 ml serum). After incubation for 30 min the red cells were removed on the centrifuge and the sera tested in the PHT with red cells sensitized with polyinosinic–polycytidylic acids (polyI:polyC). To obtain comparable results when each group of sera was tested, red cells sensitized with polyI:polyC were tested with the corresponding standard antiserum*. Antibodies against single-helical RNA and the ability of the serum to react with red cells loaded with nucleic acids were determined in all the sera in parallel tests.

EXPERIMENTAL RESULTS

Antibodies against double-helical RNA and rRNA were detected in 122 patients and 50 clinically healthy subjects. Altogether 36 patients with allergoses (21 with pollinoses, 15 with allergic dermatoses: urticaria or Quincke's edema), 66 patients with rheumatic fever in the active phase, and 20 patients with rheumatoid arthritis were investigated.

The sera from the patients and healthy subjects, with rare exceptions, did not react with rRNA in the PHT.

The results of determination of antibodies against polyI:polyC in the sera of the patients and healthy subjects are given in Table 1.

As Table 1 shows, antibodies against double-helical RNA were found in only 14% of the healthy subjects and in titers not exceeding 1:5. A similar pattern was found with the patients with allergoses.

Antibodies against polyI:polyC were found about three times as often in the patients with rheumatic fever and rheumatoid arthritis (in 40.9 and 50%, respectively). In the overwhelming majority of patients with rheumatic fever the titers of antibodies against double-helical RNA were higher than in healthy subjects and patients with allergoses, and their mean values ranged from 1:10 to 1:160.

It can be concluded from these results that disturbances of reactivity observed in patients with allergoses do not stretch to the immunologic identification of RNA. At the same time, antibodies against double-helical RNA are widely distributed among patients with rheumatic fever and rheumatoid arthritis. Naturally such patients over a period of many years could have become sensitized by nonspecific RNA-containing viruses, and this could account for their positive reaction and the nonspecific allergy, the cause of the more frequent appearance of antibodies against double-helical RNA.

The wide distribution of antibodies against double-helical RNA in patients with rheumatic fever may thus reflect the immunologic response of the body to the presence of a virus. Meanwhile, the low frequency of detection of antibodies against double-helical RNA in patients with allergoses and in healthy subjects, who, naturally, in the course of their life could also be in contact with viruses, suggests that RNA-containing viruses may persist in patients with diffuse connective-tissue lesions.

LITERATURE CITED

1. A. D. Ado, Abstracts of Proceedings of the Fourth All-Union Conference on Immunopathology [in Russian], Leningrad (1973), p. 3.
2. G. D. Zalesskii, Trudy Novosibirsk. Med. Inst., 47, 13 (1966).
3. G. D. Zalesskii and N. N. Vorob'eva, in: Rheumatic Fever [in Russian], Moscow (1958), p. 9.
4. V. A. Nasonova and A. M. Poverennyi, Ter. Arkh., No. 11, 24 (1972).
5. A. M. Poverennyi and M. I. Levi, Biokhimiya, No. 1, 80 (1964).
6. P. Koffler and R. Carr, Science, 166, 1648 (1969).

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7. P. Koffler and R. Carr, J. Exp. Med., 134, 294 (1971).
8. P. Schur and B. Stollar, Arth. Rheum., 12, 695 (1969).
9. P. Schur and M. Monroe, Proc. Nat. Acad. Sci. U.S.A., 63, 1108 (1969).
10. P. Schur and B. Stollar, Arth. Rheum., 14, 342 (1971).