CHANGES IN THE SERUM COMPLEMENT TITER OF RABBITS DURING THE DEVELOPMENT OF BROWN-PEARCE CARCINOMA

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Many contradictory opinions have been expressed on the role of humoral immunity factors in tumor growth [1, 3, 5, 6, 10, 12, 13]. A number of works have clearly shown their importance in the organism's fight against malignant neoplasms [8, 9, 11, 12, 19].

A large number of investigations have been devoted to studying the role of antibodies associated with malignant neoplasms, whereas relatively little is known about the importance of other humoral factors, in particular complement, in antitumor immunity.

It has been established that complement (alexin), appearing, as a rule shortly after birth, is found in the blood of animals as a constant, independent of their age or sex [17, 21]. It is also known that the immunological reactions of antigen-antibody occur in the presence of complement; this is observed even in the case where tumor tissue serves as the antigen, and the antibodies specific for the tumor are contained in antitumor sera.

On the basis of this, it may be postulated that complement holds a definite role in antitumor immunity; this is supported by certain works. Thus, Flax [15], adding guinea pig complement to the gamma-globulin fraction of antitumor serum and injecting this mixture into experimental mice with Ehrlich's carcinoma, observed prolongation of the experimental animals' lives by two times as compared with the control. Kidd and co-workers [18, 20] noted regression of mouse lymphosarcomas when the mice were injected with antitumor serum mixed with fresh serum prepared from the blood of a guinea pig.

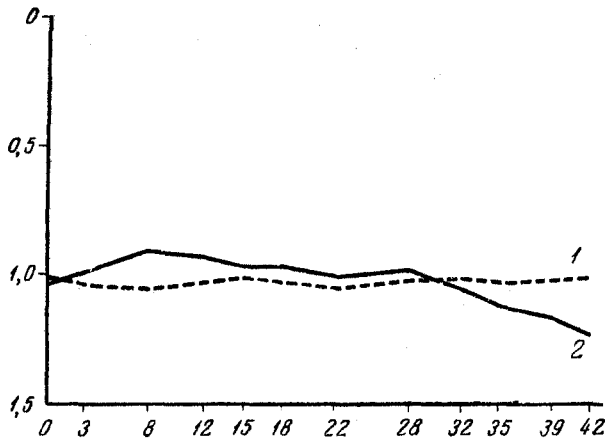
There also exist a number of works devoted to studying the role of complement in humans afflicted with tumors but the opinions of the authors on this question are inconsistent. I. N. Maiskii [7] writes that the complement titer in the blood of cancer patients only partially reflects the general picture of the organisms's defense reactions, and by no means serves as a specific indicator for this disease process. Geronimus and Vaisfel'd [2] connect the loss of the serum's lysing property with a fall in the complement titer of cancer patients. Peltsar [22] found that in cancer patients, the complement titer not only did not fall, but was even elevated in 70% of the cases. A. A. Dokhkuzyan [4] noted that the titer of complement in cancer patients was 70% lower than in healthy subjects. It may be postulated that the contradictions between these data are due to the complement titer changing at different stages of the tumor disease.

The goal of this investigation was to determine dynamically the complement titer of rabbit sera during the development of Brown-Pearce carcinoma.

EXPERIMENTAL METHOD

The experiments were performed on 34 adult male rabbits of the chinchilla family, weighing 2.5-3 kg.

Investigation of the complement properties of the sera was carried out in the following manner. The complement titer of the normal sera was determined in all the rabbits, 7 days and 1 day prior to their inoculation with the tumor. After this, 23 of the 34 rabbits were inoculated in the testicle with Brown-Pearce carcinoma, using 0.5 ml of a 10% suspension. The remaining 11 animals served as the control. Then, the dynamics of the serum complement titer were followed by measurements in all 34 rabbits, up to the moment the animals with tumors died. Complement titration was carried out according to the generally accepted method: the sera were diluted by 1:10, and titrated in



Dynamics of the complement titer in rabbits with Brown-Pearce tumors. 1) Control; 2) experimental.

Wassermann test tubes, kept in an incubator for 60 min at 37°. The complement titer was determined by complete hemolysis of sheep erythrocytes.

EXPERIMENTAL RESULTS

Titrating the sera of the healthy rabbits, it was established that the concentration of complement, as a rule, underwent significant fluctuations. Thus, for example, the titer of complement in rabbit No. 1106 was equal to 1 ml, then after 3 days, 1.4 ml; after 8 days, 1.2 ml; and after 22 days, 1.05 ml. Analogous results were found in the other rabbits. In connection with this, it should be noted that among the rabbits used in our experiments we encountered animals in which the complement titer was sometimes so low that when 1.5 ml of the sera were used in the reaction (at a dilution of the whole serum of 1 : 10), there was no complete hemolysis of the sheep erythrocytes.

The complement titer of healthy rabbits, on the average, stayed at a relatively low level (0.6-1.45 ml).

The complement titer also fluctuated in the sera of the rabbits with progressively enlarging Brown-Pearce carcinomas but, on the whole, it was possible to detect a certain regular pattern. On the 5th-8th day after inoculating the rabbits with the tumor, the complement titer of the sera in 16 of the 23 animals (69.6%) was elevated in comparison with the complement titer prior to inoculation. The concentration of complement in these rabbits remained elevated, on the average, up to the 20th-25th day, and then began to drop, falling sharply up to the moment of death of the experimental animals (see figure).

This is obviously explained by the Brown-Pearce tumor injuring vital organs during its development in the organism of the rabbit, mainly the liver, which, according to the data in the literature [14, 16, 24], is the site of a complement production.

In 3 rabbits (13%), the complement titer remained at the original level, with minimal fluctuations, and in 4 (17.4%), the titer was lower throughout the entire investigation than it was prior to the inoculation.

As a result of the experiments performed, it was established that complement in the sera of healthy rabbits and rabbits with a tumor is found in low titers, and undergoes fluctuations within greater bounds than that seen in other animals [23].

The results obtained serve as evidence that complement apparently serves a definite role in the defense reactions of the organism during the process of tumor growth.

SUMMARY

The serum complement titer is subject to marked variations both in healthy and cancer-affected rabbits.

It increases in 69.6% of the rabbits suffering from Brown-Pearce carcinoma for the period of 5-8 days following its inoculation. This is retained up to the 20th-25th day, and then with the development of the tumor affection, it decreases with a very marked drop by the time of the animal's death.

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