

THYMECTOMY EFFECT ON THE ANTISTREPTOLYSIN TITER IN EXPERIMENTAL MYOCARDITIS AND ARTHRITIS

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The antistreptolysin titer is an indicator of the presence of antibodies against beta-hemolytic streptococcus, and is essential for immune state of the organism determination in rheumatism and in its experimental model in animals.

The classical experiments of I. Miller (1962) have provided convincing evidence of the role played by the thymus in immunogenesis. Thymectomy in newborn mice and rats leads to immune protection loss, whilst in adult animals — to a considerable inhibition of immune protection. According to I. Miller (1962), A. Gross et al (1964) thymectomy interferes with antibody production. B. G. Arnason et al (1962), I. B. Bridges et al (1966), Z. Kemileva (1966), H. Szeri et al (1968) state that the thymus has an essential practical bearing on the immune processes of the organism, while Rokicka et al (1969) point out that the production of immune bodies is the primary role of the thymus gland. B. H. Waksman (1963) is in the opinion that the small lymphocytes, arising from the spleen and lymph nodes, acquire their own immune capacity only after passing through the thymus.

On the basis of the listed above literature data we undertook the task to follow dynamically the influence of the thymus gland on the level of antistreptolysin titer in grown-up, thymectomized and non-thymectomized, rats with experimentally induced myocarditis and arthritis.

Material and Method

In the experiment a total of 263 male white rats of the Wistar line, aged 3 months and weighing from 150 to 200 g were used. The animals were divided up in 4 groups: group I — 86 intact, and group II — 92 thymectomized rats were used as experimental animals, while group III — 53 intact, and group IV — 32 thymectomized rats were used as controls. Myocarditis and arthritis were experimentally induced in the laboratory animals after the method of Z. Kemileva and co-workers (1963). Beta-hemolytic streptococcus at dose 0.2 cc 1,000,000 th suspension was injected in the tail vein of the animals three times, at weekly intervals. Studies in dynamics were performed on the third day after each injection, and for three weeks in a row after the last (third) injection, or else, a total of six investigations were performed per group. The antistreptolysin titer was assessed after the method of Kalbak (1947).

Results and Discussion

The data from the study are submitted in Table 1.

The initial antistreptolysin-titer value among the intact animals averages 21.2 U, and complies with the data reported by K. Berchev and S. Milanov (1966). The level of antistreptolysin titer increases to 75.5 U already after

Table 1

| Groups | Indicators | Antistreptolysin Titer | | | | | | P — relative to initial values | |
|--------|------------|------------------------|--------|---------|----------|--------------------------|----------|--------------------------------|-----------------------|
| | | Initial values | After | | | After, the III infection | | | |
| | | | I inf. | II inf. | III inf. | Ist week | 2nd week | | 3d week |
| II | X | 53 | 16 | 16 | 15 | 15 | 12 | 12 | <0.001 |
| | | 21.2 | 73.5 | 163.6 | 233.8 | 267.2 | 305.5 | 356.5 | |
| TI | X | 32 | 16 | 16 | 15 | 15 | 15 | 15 | <0.001 |
| | | 7.2 | 15.2 | 44.9 | 69.1 | 104.4 | 117.0 | 161.9 | |
| TI | II | — | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | P — relative to TI/II |

the first injection with beta-hemolytic streptococcus. The rise is much better pronounced during the subsequent investigations, and amounts to 357.5 U at the end of the experimental period. The results are statistically reliable compared to the initial value ($p < 0.001$). Our data are in line with those of K. Berchev and S. Milanov (1966), A. G. Artemova (1967), L. N. Bandurko (1969) and I. A. Alov et al (1969) who found an increase in the antistreptolysin titer of animals injected with beta-hemolytic streptococcus, and with the data of V. I. Joffe (1962), V. Tzonchev (1962), A. D. Angulova (1966) and H. I. Yabnaeva (1966) — in humans.

In thymectomized animals the mean initial value of the antistreptolysin titer is substantially lower (7.2) as compared to intact animals. However, after injecting beta-hemolytic streptococcus, the titer of antibodies increases to 15.2 U, and continues to raise reaching 161.9 U by the end of the experiment. Except for the results of the first investigation, all the remainder are statistically reliable relative to the initial value ($p < 0.001$).

Statistical reliability of the data is likewise established in either group of infected animals (non-thymectomized and thymectomized) in all investigations.

The results show that antibody production among infected thymectomized animals is considerably reduced as compared to infected non-thymectomized animals.

It can be seen from the figure that there is a rapid increase in the values of antistreptolysin titer among non-thymectomized infected animals in comparison with thymectomized infected animals where the antibody production

is inhibited. A lower antibody production is likewise displayed by thymectomized uninfected animals as compared to intact uninfected animals.

The above data point unequivocally to the inhibition of antibody production by thymectomy not only when it is made immediately after birth, but in adult animals as well.

Hence, proceeding from the results obtained the assumption is warranted that regardless of the age-related involution of this particular gland, it continues to control the immune reactions in the organism. The latter effect is rather appreciably manifested in the presence of antigenic stimulation, such as in the described experiments with beta-Streptococcus haemolyticus.

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ВЛИЯНИЕ ТИМЭКТОМИИ НА АНТИСТРЕПТОЛИЗИНОВЫЙ ТИТР ПРИ ЭКСПЕРИМЕНТАЛЬНОМ МИОКАРДИТЕ И АРТРИТЕ

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РЕЗЮМЕ

Исследован антистрептолизиновый титр у взрослых тимэктомированных и контрольных мужских особей белых крыс, у которых был вызван экспериментальный миокардит и артрит в *Streptococcus haemolyticus* группы А. Исследования проводились в динамике.

Результаты показывают, что антистрептолизиновый титр во много раз выше у нетимэктомированных зараженных животных, в сравнении с тимэктомированными зараженными. От средних исходных показателей 21,2 Е в конце опытов оно повышается до 357,5 Е у нетимэктомированных, а у тимэктомированных от 15,2 Е достигает до 161,9 Е. Результаты статистически достоверны.

В заключение можно сказать, что тимэктомия значительно угнетает иммунологическую реактивность организма, о чем говорит и указанное во много раз более слабое образование антител у тимэктомированных животных.