STIMULATING ACTION OF ENDOGENOUS SERUM PYROGEN ON ANTIBODY-FORMING CELLS IN THE SPLEEN OF RABBITS IMMUNIZED WITH CORPUSCULAR TYPHOID VACCINE

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In rabbits immunized intraperitoneally with corpuscular typhoid vaccine the endogenous serum pyrogen formed in the animals in response to parenteral injection of the bacterial lipopolysaccharide pyrogenal increased the number of antibody-forming cells in the spleen.
KEY WORDS: typhoid vaccine; pyrogenal; endogenous serum pyrogen; antibody-forming cells.

The writers previously studied the stimulant action of endogenous serum pyrogen (ESP), a substance appearing in the blood of rabbits after parenteral injection of the bacterial lipopolysaccharide pyrogenal, on antibody production [1, 3, 4].

The object of the present investigation was to study the action of ESP on the antibody-forming cells (AFCs) of the spleen in rabbits immunized intraperitoneally with corpuscular typhoid vaccine.

EXPERIMENTAL METHOD

Experiments were carried out on 140 male chinchilla rabbits (half of which were ESP donors) weighing 2.2-3 kg. Each group contained an average of 4-5 animals. The rabbits were immunized intraperitoneally with corpuscular typhoid vaccine in a dose of $5 \cdot 10^9$ bacterial cells/kg body weight and ESP also was injected intraperitoneally in a dose of 8 ml/kg. The animals of the control group received normal rabbit

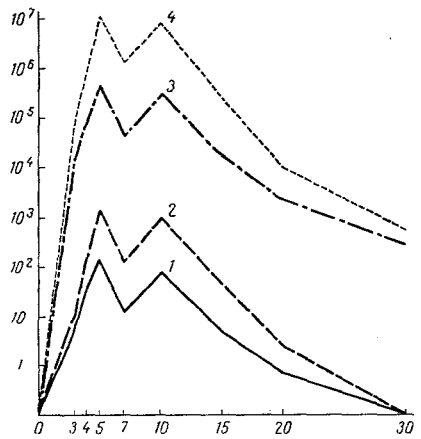

Fig. 1. Effect of ESP on number of AFCs in spleen of rabbits immunized with typhoid vaccine: 1) number of AFCs per 10^6 nucleated spleen cells after injection of vaccine; 2) number of AFCs per 10^6 nucleated spleen cells after injection of vaccine +ESP; 3) number of AFCs in spleen after injection of vaccine +ESP. Ordinate, number of AFCs; abscissa, days after immunization.

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serum instead of ESP. The rabbits were killed 3-5, 7, 10, 15, 20, and 30 days after immunization. The method of obtaining the ESP, like that of determining the number of AFCs in the spleen of the experimental animals, was described previously [1, 2]. All indices except the weight of the spleen were calculated in $\log_{10}$ units and subjected to statistical analysis.

EXPERIMENTAL RESULTS

The results are given in Fig. 1. The number of AFCs per 10^6 nucleated spleen cells of the animals of the control group had two maxima on the 5th and 10th days after the beginning of the experiment. Similar changes were obtained when the number of AFCs in the whole spleen was determined. The maximum of the titers of O-hemagglutinins in the serum of the control animals was observed on the 10th day (1:8000).

Injection of ESP led to an increase in the number of AFCs by 5-14 times when calculated per 10^6 nucleated spleen cells on the 4th, 5th, 7th, 10th, and 15th days after immunization. Similar changes also were found in the number of AFCs in the whole spleen (5-25 times higher than in the control). ESP increased the total number of nucleated cells in the spleen on the 5th day after the beginning of the experiment by 3 times and the titers of O-hemagglutinins in the blood serum on the 4th, 7th, and 10th days after injection of the preparations by 6-8 times. No difference was found in the weight of the spleens between the groups.

The results show that ESP stimulates antibody formation in rabbits immunized intraperitoneally with corpuscular typhoid vaccine, chiefly on account of an increase in the relative number of AFCs in the spleen. As was shown previously, administration of pyrogenal, a compound leading to the formation of ESP in rabbits in vivo, stimulates immunologic responses chiefly through a general intensification of proliferative processes. Injection of the lipopolysaccharide did not cause an increase in the relative number of AFCs in the lymphoid organs [2]. The reasons for this discrepancy could be, first, that in the experiments with pyrogenal the ratio between the doses of adjuvant and antigen was not optimal, and second (in the writers' opinion, this is most likely), that the stimulant action of the bacterial lipopolysaccharide pyrogenal on immunogenesis is the algebraic sum of different, and perhaps even conflicting processes.

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