

Immunomodulating Activity of Lactic Acid Bacteria and Bacillus Microorganisms on Experimental Models

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Introduction

One approach for the. creation of high-performace probiotic preparations is a comparative study of their immunomodulating activity in experiments in vitro and in vivo, The aim of this work a comparative study of the immune activity of probiotic cultures Lactobacillus delbrueckii subsp. bulgaricus LB86 БКПМ-B-5788, L. rhamnosus LB3 ИМВ B-7038 and Bacillus subtilis 83, Bacillus subtilis 44-p on experimental models.

Methods

Researched cultures in vitro experiments were characterized. by the phagocytosis-stimulating activity and enhancement of bactericidal activity of peritoneal macrophages (PMs). Incubation of PMs for 8-24 hours with the cells of experimental cultures stimulated synthesis of IFNs and TNF. It was shown that the peak of TNF falls on 6 hour after the stimulation and surpasses the synthesis of IFN. For 4 days the mice of the CBA line were administrated orally with the pre-established optimal doses of lactic acid bacteria or aerobic bacilli.

Results

The introduction of experimental cultures cells to the mice as well as in models in vitro influenced on the absorption ability of PMs - the index of phagocytosis and the intensity or phagocytic function of macrophages. Thus, in the time of infusion to the animals or the cells Bacillus subtilis 44-p and. Bacillus subtilis 83 the absorbing activity of PMs was increased respectivel y to $62,2 \pm 1,8 \%$ and $61,0 \pm 1,2 \%$ against $58,3 \pm 2,4 \%$ in the control. The tendency of the activation of phagocytosis was observed during the use of Lactobacillus delbrueckii subsp. bulgaricus LB86 БКПМ-B-5788 and L. rhamnosus LB3 was at level $60,1 \pm 1,4 \%$ and $63,1 \pm 1,6 \%$ against $58,3 \pm 2,4 \%$ in the control.

In the animals organism under the influence of cells of experienced lacto- and spore-forming cultrues remained the intensification of phagocytic function of macrophages on an average $7,0 \pm 1,8$ against $5,7 \pm 1,5$ RU in control. The cytotoxicity index in the killer-target for inactivated Lactobacillus delbrueckii subsp. bulgaricus LB86 БКПМ-B-5788 and L. rhamnosus LB3 was 35,2% and 39,7 % ($P < 0,02$) respectively against 31,6% in the control and there was only an upward tendency for bacillary cultures.

During the oral administration of Lactobacillus delbrueckii subsp. bulgaricus LB86 БКПМ-B-5788 advanced level of circulating IFN was observed on 3-d day of the experiment with a peak of the IFN production at 6-th day. After administration Bacillus subtilis 83, Bacillus subtilis 44-p or L. rhamnosus LB3 advanced titers of circulating IFN were observed , starting from 1-st day (4,0; 4,2; 4,1 log₂ units/ml), respectively with maximum level on 3th day. In the animals serum on 8 hour after the introduction of all experimental cultures TNF was registered.

Discussion

Selected cultures demonstrated the ability to induce the synthesis of IFN and TNF in vivo, therefore, are able to change the differentiation of T-helper cells towards TH1 subpopulation, taking part in the formation of cell- mediated immunity. Cytokines production in vivo has been correlated with the production of cytokines in vitro system.

Keywords: lactic acid bacteria, bacillus microorganisms, interferon, phagocytic cells