Control signals of E. coli cell growth when exposed to a bioresonance apparatus therapy

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SUMMARY

The paper presents the results of experimental studies of the growth rate of E. coli cells in culture, which were subjected to a distant effect of another bacterial culture by means of the "IMEDIS-BRT-A" apparatus. It has been shown that changing the operating mode of the "IMEDIS-BRT-A" apparatus allows for regulation (stimulation or inhibition) of the growth of E. coli culture cells during the transmission of an informational electromagnetic signal from one culture to another.

Key words: bioresonance therapy, bacterial growth, E. coli, "IMEDIS-BRT-A".

Introduction

Recently, the issues of intercellular communication in microorganisms, occurring without the mediation of molecular information carriers, began to pay more and more attention [1]. One of the first studies of intercellular interactions, carried out through physical factors, was carried out by A.G. Gurvich, who established the phenomenon of mitogenetic radiation [2]. In later studies, V.P. Kaznacheev experimentally established the phenomenon of distant intercellular interactions between two identical cell cultures. This phenomenon, which manifests itself when one of the cultures is exposed to biological, chemical or physical factors in the form of a characteristic reaction of another culture, is called the "mirror cytopathic effect" [3]. In later studies, it was shown that the cultureVibrio costicola in the process of its death under the influencechloramphenicol sends a signal that stimulates the growth of another culture, separated from it by a layer of glass [4]. The nature of the physical factors transmitting information has not been established, but it is assumed that this is either electromagnetic radiation in the UV range, or acoustic emission.

In a series of preliminary studies, we have shown that with the help of the device "IMEDIS-BRT-A" it is possible to carry out both suppression and stimulation of cell growth in bacterial cultures (BC). Since the acceleration of cell growth was noted in the culture of lactobacilli [5], and suppression of growth was observed in culturesE.coli and S.aureus [6], this allows us to consider the impact as a regulatory one. One of the promising approaches to the study of distant intercellular interactions is the creation of a constructive model that makes it possible to experimentally study the role of signals in the exchange of information between populations of microorganisms. Based on the assumption about the physical nature of the factors of intercellular communication in microorganisms, we set the task to study the effect of one culture of microorganisms, conventionally called BC-donor, on another culture, also conventionally called BC-recipient. By selecting the operating modes of the "IMEDIS-BRT-A" apparatus, a change in the rate of cell growth is achieved, both in the direction of acceleration and in the direction of deceleration.

Purpose of the study

Experimentally show the existence of two oppositely directed influences obtained under different operating modes of the "IMEDIS-BRT-A" apparatus, which accelerate or decelerate the growth rate of culture cells E. coli.

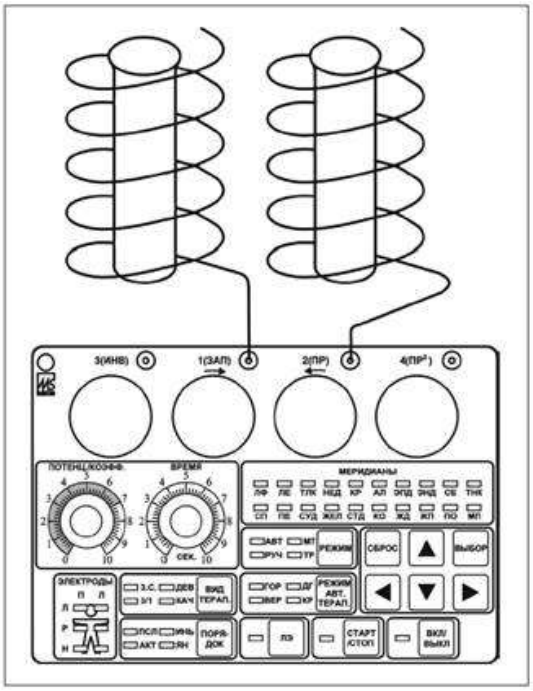
Materials and methods

Research was carried out on cells E. coli, strain J5-3, which were cultured on liquid LB. In the experiments, we used two experimental cultures (BC-donor and BC-recipient) and one control (BC-control), each with a volume of 25 ml, which were placed in glass tubes with a capacity of 50 ml. BC-donor and BC-recipient were cultivated in the same thermostat, BC-control - in

separate. The incubation time was 6 hours 45 minutes. (stage of logarithmic growth of culture) for experimental and control cultures at a temperature of 37 ° C.

The influence on the culture of the recipient BC was carried out by placing an appropriate test tube in a solenoid connected to container No. 1 of the IMEDIS-BRTA apparatus, while a similar solenoid was connected to container No. 2, in which the test tube with the donor BC was placed. During the incubation of all cultures, the device "IMEDIS-BRT-A" was switched on in the "automatic" mode. Then all cultures (BC-donor, BC-recipient, and BC-control) were titrated (in a ratio of 1: 108), after which they were plated on Petri dishes. Cell counting was carried out in a conventional manner. To assess the change in the cultural properties of the experimental and control samples, the difference in the number of colony-forming units in the culture (number of CFU) was used. The experiment included nine series of experiments, differing in the operating mode of the IMEDIS-BRT-A apparatus, each of which consisted of 20 experiments. The operating modes of the "IMEDIS-BRT-A" apparatus were set by setting the gain / potency regulator in the following positions: 7; 6; 5.85; 5.75; 5.6; 5.55; 5.4; 4.6 and 4.

Statistical processing of the experimental data was carried out using the sign criteria [7] and Wilcoxon rank sums in accordance with the version given in [8].



Rice. 1. Scheme of the experiment.

Results and its discussion

The experimental results obtained are shown in Table 1. Enhancement or suppression of the growth of one BC in relation to another is understood as:

- acceleration of growth: a greater number of CFU / ml in the titrated solution of the first culture in relation to to the same solution the second;

- growth suppression; lower number of CFU / ml in the titrated solution of the first culture by in relation to the titrated solution of the second.

For convenience, in the given tab. 1, each experimental series - corresponding to a mode with a given amplification factor - corresponds to three series of comparisons: the BC-donor with the BC-recipient, the BC-recipient versus the BC-control, and the BC-donor versus the BC-control.

The technical design of the experimental setup assumes the presence of weak electromagnetic oscillations in the range from 1 to 500 kHz. During the operation of the "Imedis-BRT-A" apparatus, the selection of oscillations corresponding to the operating mode of the apparatus takes place. Since in the experimental work carried out, the only factor influencing the change in the growth rate of BC is the operating mode of the apparatus, we assume that electromagnetic oscillations in the range from extremely low frequencies to 500 kHz exhibit the ability to control the rate of growth of BC and can be considered

as control signals.

Table 1

The number of cases of acceleration or suppression of the growth of the experimental BC

Соотношение БК -донора, БК-рецепиента, БК-контроля	Число случаев								
	К.У. / потенция	7	6	5,85	5,75	5,6	5,55	5,4	4,6	4
БК-донора > БК -рецииента		9	8	9	11*	11*	13	10	11	2*
БК-донора < БК-рецииента		11	10	9	5*	5*	7	10	9	17*
БК-донора > БК-контроля		12	13	10	7	14**	6	10	14	8
БК-донора < БК-контроля		8	6	10	9	1**	14	10	6	11
БК-рецииента > БК-контроля		15*	14	15*	4*	13*	6	10	12	12
БК-рецииента < БК-контроля		5*	6	5*	11*	3*	14	10	8	8

Note.

In modes with a gain of 5.75 and 5.6, 16 experiments were performed. Experiments in which the growth of both BC was the same were not taken into account and were not included in the table.

* highlighted values, where p ≤ 0.05.

* * highlighted values, where p ≤ 0.01.

conclusions

1. The existence of control signals carrying different biologically significant information, presumably of an electromagnetic nature in the range from 1 to 500 kHz capable of regulating (accelerating or suppressing) the growth of cells in culture E. coli.

2. The specified control signals can be obtained by changing the coefficient amplification of the "IMEDIS-BRT-A" apparatus.

Literature

1. Nikolaev Yu.A. Distant informational interactions in bacteria // Microbiology. - 2000. - T.69, No. 5. - S.597-605.

2. Gurvich A. and L. Mitogenetic radiation. Physicochemical foundations and applications in biology and medicine. - M .: Medgiz, 1946 .-- 289 p.

3. Kaznacheev V.P., Mikhailova L.P. Superweak radiation in intercellular interactions. - Novosibirsk: Nauka, 1981 .-- 144 p.

4. Nikolaev Yu.A. Distant interactions between bacterial cells // Microbiology. - 1992. - T.61, No. 6. - S.1066-1071.

5. Gotovsky M.Yu., Ogorodnikov I.G., Esiev S.S., Ilyin V.K., Mkhitaryan K.N., Roik O.A. Experimental data on the optimization of the growth properties of lactobacilli by means of their energy-information transfer of known and necessary properties. and reports. 13 Int. conf. "Theoretical and clinical aspects of the use of bioresonance and multiresonance therapy." - M .: IMEDIS, 2007. - Part 1. - S.81-85.

6. Gotovsky M.Yu., Ilyin V.K., Morozova Yu.A., Mkhitaryan K.N., Roik O.A. Transfer biologically significant information from one bacterial culture to another // Tez. and reports. 14 Int. conf. "Theoretical and clinical aspects of the use of bioresonance and multiresonance therapy." - M .: IMEDIS, 2008. - Part 2. - S.225-224.

7. Van der Waerden B.L. Math statistics. - M .: Publishing house of IL, 1960 .-- 434 p.

8. Gmurman V.E. Theory of Probability and Mathematical Statistics. 7th ed., Erased. - M .: Higher school, 1999 .-- 479 p.

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