



December 20 - 21, 2021

Microbiology: yesterday, today, tomorrow

International conference devoted
to the 100th anniversary of Microbiology
Department at Kazan University



KAZAN FEDERAL UNIVERSITY

MICROBIOLOGY

YESTERDAY, TODAY, TOMORROW

ABSTRACT BOOK

**of International conference devoted to the 100th anniversary
of Microbiology Department at Kazan University**

Kazan, December 20–21, 2021



KAZAN

2021

UDC 579
LBC 28.4
M65

*Reprinted on the recommendation
of the IFMB KFU Academic Council (Kazan)*

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M65 **Microbiology: yesterday, today, tomorrow** [Electronic resource]: abstract book of International conference devoted to the 100th anniversary of Microbiology Department at Kazan University (Kazan, December 20–21, 2021). – Electronic text data (1 file: 2,40 Mb). – Kazan: Kazan University Press, 2021. – 168 pp. – System requirements: Adobe Acrobat Reader. – Access mode: <https://kpfu.ru/portal/docs/F619339839/ABSTRACT.BOOK.MB.100.pdf>. – Heading from title screen.

ISBN 978-5-00130-549-1

The conference will consider the fundamental and applied aspects of modern microbiology. The main attention will be paid to the medical, molecular, and agricultural areas of microbiology, modern methods of researching microorganisms, new biotechnologies using microorganisms and microbial enzymes, problems of biocorrosion and counteracting it, as well as promising microbial drugs. The plenary reports will touch upon the history of microbiology in Kazan, problems of modern virology, highlight the role of microbial biofilms in medicine and biology, molecular mechanisms of antitumor and antiviral action of bacterial enzymes, prospects of microbial biotechnology and the role of microorganisms in environment. The purpose of the event is to acquaint the audience with a wide range of studies in the field of microbiology and significant results obtained by KFU scientists and their Russian and foreign colleagues to date. An important outcome of the conference will be the joint development of promising strategies for the development of microbiology. One of the main tasks of the conference will be to attract young people to science.

UDC 579
LBC 28.4

ISBN 978-5-00130-549-1

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STUDY OF ISOLATED RAT HEART AFTER ASISTOLIA

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Cardioplegic cardiac arrest is the most popular method of providing open-heart surgery. Strategies of cardioplegic protection that allow to neutralize negative effects of ischemia during asistolia and reperfusion allow to achieve the best clinical results. The attachment of various infectious microflora, both in the preparatory and postoperative periods of cardioplegia, is very dangerous. Studies of cardioplegic solutions are often carried out on different experimental models with different types of cardioplegic solutions, which makes it difficult to directly compare them with each other. The aim of our study was to evaluate the efficacy and safety of a new extracellular crystalloid CPR developed at Kazan Federal University in an experiment on an isolated rat heart model.

Isolated hearts were perfused on a Langendorff apparatus (ADInstruments) with an oxygenated Krebs-Henseleit solution (KH) (37°C, pH=7.3-7.4) at a constant pressure of 80–82 mmHg. After stabilization of the heart activity, the initial values were recorded. The work was performed according to the following protocol: new solution was administered for 3 minutes, then ischemia was prolonged for 20 minutes, after which time the heart perfusion was resumed with a solution of KH. The heart rate was recorded during 40 minutes of reperfusion. The assessment of the contractility of the myocardium was carried out according to the indicator of left ventricular developed pressure (LVDP). The signals were recorded on the PowerLab 8/35 setup using the "LabChart Pro" program. Statistical processing of the obtained results was carried out using the Student's t-test.

Asystole was achieved within 1 minute of CPR administration. Recovery of spontaneous cardiac activity after myocardial ischemia induced by the new CPR occurred within the first minute of reperfusion in 100% of cases. Decrease in myocardial contractility compared to the initial values was not observed during the entire reperfusion period ($LVD P_{initial}=52\pm 5.2$ mmHg and $LVD P_{reperfusion}=58\pm 5.8$ mmHg), what allows us to conclude about the effectiveness of myocardial protection by the new CPR. In our experiment on a model of an isolated rat heart, which is widely used for the study of various CPR, we showed that the new solution is able to quickly and effectively cause myocardial plegia, and also does not interfere with the rapid and full recovery of its function after the start of reperfusion.

The research was carried out at the expense of the grant of the Russian Science Foundation No. 21-15-00121, <https://rscf.ru/project/21-15-00121/>.