МИНОБРНАУКИ РОССИИ
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ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ
«БЕЛГОРОДСКИЙ ГОСУДАРСТВЕННЫЙ НАЦИОНАЛЬНЫЙ
ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ» (НИУ «БелГУ»)

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№ _____ от _____

Charles University in Prague
Czech Republic

Dear colleagues,

In order to develop cooperation and promotion of scientific and educational exchanges between Belgorod State National Research University (BelSU) and Charles University in Prague we ask you to consider the possibility of concluding cooperation agreement, subject of which could be:

a) development of various forms of networking of Institute of Engineering and Natural Sciences concerning master and doctoral students training programs: 06.04.01 Biology. Human and animals Physiology, 06.06.01. Biological Sciences. Physiology.
b) development of joint research plans, processing and submission of joint applications for grants;
c) expansion of publication activity, publications of the results of joint researches in highly rated scientific journals;
d) development of academic mobility programs, including scientific internships for masters, doctoral and post-doctoral students and teachers in the field of Biological Sciences. Physiology.

The Belgorod State National Research University has the capacity to carry out research in the field of physiology and cell biophysics. The Laboratory of adaptation processes physiology has a unique high-tech equipment – atomic force microscope INTEGRA VITA (based on inverted optical microscope configuration Olympus IX-71, producer NT-MDT. Zelenofrad, Russia), confocal laser scanning microscope Nikon DIGITAL ECLIPSE C1 plus (producer Tokyo Byoke, Japan), complex of hardware-software visualization of morphological preparations, analysis and recording of optical and morphological indices of cells (producer VideoTesT, СПб, Russia).

At the moment we are conducting research in the field of normal physiology of blood cells and oncohematology. The direction of this research is connected with the search for early markers-indicators on the cell surface that allow identifying the beginning development of tumor processes in the blood system, before the emergence of blast forms in the bloodstream, as well as studying the mechanisms of drug resistance of tumor cell clones mediated by a change in biophysical properties of cellular membranes. Patents for inventions developed in the laboratory, using different approaches to atomic force microscopy, allow to study the mechanisms of interaction of antitumor drugs and biologically active substances of a diverse spectrum (including hormones,

cytokines, etc.) with the surface of various subpopulations of blood cells both in the normal stage and in leukemia development conditions, in particular, changes in the surface charge and elasticity of the cell surface, adhesion forces in the system "tumor cell-healthy cell».

At the same time the laboratory has possibilities for studying the mechanisms of intracellular signaling triggered by various ligands in normal and tumor cells of the blood. Using different operating modes of the confocal laser scanning microscope, it is possible to study the interaction of ligand substances with receptors, the dynamics in membranes of lipid molecules that perform the signal role, the mobility of cytoskeleton elements in the sub-membrane space.

We think that there are prospective areas of research and possible topics for cooperation:

- studying tyrosine kinase and purinergic receptors of tumor blood cells activity based on multiplex analysis technologies;
- molecular-cellular principles of targeted therapy for lympho- and myeloproliferative processes in the blood system;
- use of atomic force microscopy to study the structure and properties of tumor cells of the blood;
- detection of molecular-cell markers of neoplastic processes in the blood system;
- studying of target action mechanisms of drugs group of inhibitors tyrosine kinase receptors on a subset of tumor and normal blood cells.

We hope for close and mutually beneficial cooperation.

Sincerely,

Vice-Rector for International Cooperation  Vladislav Kuchmistyy