DEPARTMENT OF BIOCHEMISTRY AND MICROBIOLOGY

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Full Professors:

Milan Miko, PhD, DSc.;

Associate Professors:

Daniela Hudecová, PhD.; Soňa Jantová, PhD.; Mária Mikulášová, PhD.

Assistant Professors :

Barbora Dudová; Helena Paulíková, PhD.; Martin Šimkovič, PhD.; Andrea Šovčíková, PhD.; Richard Pokorný

Research Fellows:

Boris Lakatoš, PhD.

PhD Students:

Petra Olejníková; Roman Hudec, Martina Hunová, Michal Kaliňák; Silvia Letašiová, Peter Vargovič, Zuzana Ondrušová, Lucia Birošová, Marica Theiszová

Technical staff:

Eva Drobná-Secretary; Dagmar Adamíková; Margita Kosárová; Ján Škvara; Eva Sameková

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching laboratories:

Laboratory of Animal Cell Cultures
Laboratory of Biochemistry of Cancer Cells
Laboratory of Fungal Biochemistry and Physiology
Laboratory of Immunochemistry
Laboratory of Microbiology

B. Research laboratories:

Laboratory of Animal Cell Cultures
Laboratory of Biochemistry of Cancer Cells
Laboratory of Fungal Biochemistry and Physiology
Laboratory of Immunochemistry
Laboratory of Microbiology

III. TEACHING

A. Undergraduate Study:

1. semester (Bc)	Biology	2/0/0	Jantová, Mikulášová
	Laboratory Practices in Biology	0/0/1	Olejníková, Birošová, Šovčíková, Letášiová, Theiszová
3. semester (Bc)	Microbiology I	2/0/0	Hudecová
	Laboratory Practices in Microbiology I	0/0/2	Hudecová, Mikulášová, Kaliňák
4. semester (Bc)	Biochemistry I	2/0/0	Varečka
	Laboratory Practices in Biochemistry I	0/0/2	Paulíková, Lakatoš, Šimkovič, Hudec, Kaliňák
5. semester (Bc)	Principles of Human Nutrition	2/0/0	Miko
6. semester (Bc)	Laboratory Project	0/0/4	Miko, Varečka, Hudecová, Jantová, Mikulášová, Paulíková
1. semester (MSc)	Biochemistry II	2/0/0	Varečka
	Laboratory Practices in Biochemistry II	0/0/2	Paulíková, Hudec, Šimkovič,
	Microbiology II	2/0/2	Hudecová, Mikulášová, Kaliňáková, Olejníková
	Immunochemistry	2/1/2	Šovčíková, Hudec
	Laboratory project I	0/0/5	Miko, Varečka, Hudecová, Jantová, Mikulášová, Paulíková
2. semester (MSc)	Molecular Biology and Genetics	2/1/0	Mikulášová, Paulíková
	Applied Microbiology	2/0/0	Hudecová
	Bioenergetics	2/0/2	Miko
	Mechanisms of Action of Natural Compounds	2/0/2	Varečka, Šimkovič, Pokorný, Kaliňáková
	Laboratory project II	0/0/5	Miko, Paulíková, Varečka, Hudecová, Jantová, Mikulášová
3. semester (MSc)	Genetic Manipulations	2/2/0	Čertík
	Clinical Biochemistry	2/0/0	Varečka, Lakatoš
	Clinical Biochemistry-Laboratory Practices	0/0/2	Lakatoš, Šimkovič
	Cell cultures	2/0/2	Jantová
	Laboratory project III	0/0/5	Miko, Paulíková, Varečka, Hudecová, Jantová, Mikulášová
	Lab. Practices of the branch Biomedical Engineering	0/0/2	Miko, Paulíková, Varečka, Hudecová, Jantová, Mikulášová
4. semester (MSc)	Master's Thesis	0/0/27	Miko, Paulíková, Varečka, Hudecová, Jantová, Mikulášová

IV. CURRENT RESEARCH PROJECTS

A. VEGA Project No 1/1173/04 Cytotoxicity of novel xenobiotics and their mode of action (Soňa Jantová)

The overall aim of the project is to develop the new potential anticancer drug. Therefore the cytotoxic, genotoxic and antimicrobial properties of the chemical compounds of the different structure will be evaluated. Special attention will be focused to the mechanism of the action and the cytotoxic activity of chosen most active derivatives of oracine, organic ammonium salts, Cu++ complexes, ITC and quinazolines; notably the interference on the biosynthesis of macromolecules, the interference with the cell cycle, their ability to induce apoptosis in different tumor cell lines as well as the influence actin cytoskeleton and the intracellular pH. The series of phenolic compounds and polyphenolic lignin derivatives will be investigated from the view point of their antimutagenic, antioxidative and adsorptive effect. The mechanism of these effects will be studied. Modulation of glutathione metabolism can provide a strategy for more efficacious sensitization of tumor cells to the standard anticancer drugs (doxorubicin) in chemotherapy and anticancer activity of new modulators of glutathione relative enzyme will be investigated.

Project duration: from **1. 1. 2004** to **31.12. 2006**

B. VEGA Project No 1/0109/03 Transport processes in filamentous fungi and their adaptative mechanisms (Ľudovít Varečka)

In the project devoted to study the transport processes in filamentous fungi several aspects of transport and physiology were studied.

In Trichoderma viride the process of chloride transport was studied by means of 36Cl radionuclide. It was found that chloride anions enter the vegetative mycelia in a saturatable, pH- and temperature-dependent manner with selectivity for chlorides and bromides. Further properties of transport suggest that chloride anions are transported by a specific and electrically silent transport protein. In Penicillium simplicissimum the process of citrate transport into the vegetative mycelia has been described and the conditions were found which led to the induction of novel citrate uptake system driven by protonmotive force. Its role in the citrate metabolism is being currently analysed.

Project duration: from **01.01. 2003** to **31.12.2005**

C. VEGA Project No 2/3188/23 Characterisation of basal transport of Ca2+ in non-excitable cells (Ľudovít Varečka)

The main goal of the project is to prove or disprove the existence of the carrier in mediating the inward basal passive Ca2+ transport and to find out whether this process proceeds using and electrogenic or electroneutral mechanism. Further goals of the project is to find out information about factors which determine the magnitude of the basal Ca2+ influx, particularly, to find out whether it responds to the immediate conditions, or it is predetermined by (genetic) mechanisms.

Project duration: from **01.01.2003** to **31.12.2005**

D. Bilateral Cooperation Austria-Slovakia - Membrane transport of organic acids in filamentous fungi (Ľudovít Varečka)

This project is a continuation and expansion of our previous collaboration, where we investigated citrate uptake in P. simplicissimum. Additionally, this priject is carried out in colleboration with the Austrian Science Fund Project P 15491 ("Energetics of citrate transport

through the plasma membrane of Penicillium simplicissimum. A study using plasma membrane vesicles").

The aims of this proposal are: 1.) To study the induction of high affinity uptake systems for pyruvate, citrate, 2-oxoglutarate and succinate in Trichoderma viride, P. simplicissimum, Beauveria brongniartii and Aspergillus nidulans.

2.) To improve and validate the measurement of the plasma membrane potential using di-S-C3(3) or di-S-C3(5) in T. viride, P.simplicissimum, B. brongniartii and A. nidulans.

3.) To measure the PMF using method above and a method to determine the proton gradient.

4.) To find out if the induction of these uptake systems is accompanied by a change in the proton motive force and by an increased expression on the plasma membrane H^+-ATPase

Project duration: from **01.06.2003** to **31.5.2004**

E. VEGA Project No 1/9247/02 New coordinating compounds of zinc, their preparation, study of physico-chemical properties and their biological activity (Daniela Hudecová)

The main goal of this project is the preparation of new coordinating compounds of zinc binding the molecules of ligands with predicted biological activity with emphasis on the study of their physico-chemical properties (spectroscopic and thermic properties, structure and stability in solutions) and their biological activity. In the frame of project is selected wide scale of complexes of zinc from the reason of their perspective using in the pharmacy, food and cosmetic industry.

Project duration: from **01.01.2002** to **31.12.2004**

V. COOPERATION

A. Cooperation in Slovakia

Institution	Type of cooperation	Responsible person	Duration
Institute of Molecular Physiology and Genetics, SAS, Bratislava	Characterisation of basal Ca2+ transport in non-excitable cells (Joint grant)	Dr. Jozef Orlický, Senior Research Scientist, Vlárska 5, 833 34 Bratislava	01.01.1990 -
Cancer Research Institute, SAS, Bratislava	Cytotoxicity of Novel Xenobiotics and Their mode of Action	Dr. Darina Slameňová, Head of Group, Vlárska 7, 833 91 Bratislava	01.01.1991 -
Tissue Bank, Hospital Ružinov, Bratislava	Cultivation and growth of human and animal tissue cultures on new biomaterials	Dr. Jana Dragúňová, Ružinovská 6, 826 06 Bratislava	01.01.1998 -
Dept. of Chem. Theory of Drugs, Fac. of Pharmacy, Comenius University, Bratislava	Study of antimicrobial activity of newly synthesized copper complexes	Dr. Aladár Valent, Associate professor, Kalinčiakova 8, 832 32 Bratislava	01.01.1999 -
Institute of Chemistry, Faculty of Science, PJŠU, Košice	New coordinating compounds of zinc, their preparation, study of physico-chemical properties and their biological activity (Joint grant)	Prof. Katarína Gyoryová, Full Professor, Moyzesova 11, 040 01 Košice	01.10.2001 -
Institute of Chemistry, SAS, Bratislava	Preparates for biological protection of plants on Trichoderma fungus basis (Joint grant)	Dr. Vladimír Farkaš, Senior Research Scientist, Dúbravská cesta 9, 845 38 Bratislava	01.01.2001 -

B. International Cooperation

Institution	Type of cooperation	Responsible person	Duration
Laboratoire du Biomembranes et Messagers Cellulaires, Orsay	Apoptosis in dexamethasone treated murine thymocytes	Dr. Francoise Giraud, Director of Research, BMC CNRS - UMR 8619, Bat.440 Universite Paris XI, Orsay 914 05, France	01.01.2000 -
Institute of cellular and molecular botany, Friedrich Wilhelms Universität, Bonn	Characterisation of microorganisms indigenous to low-rank coal, study of solubilisation of lignite by these microorganisms	Dr. Udo Hoelker, Head of group, Kirschallee 1, 53 115 Bonn, Germany	01.01.2001 -
Institut für Mikrobiologie, Universität zu Innsbruck	Membrane transport of organic acids in filamentous fungi (Joint grant)	Dr. Wolfgang Burgstaller, Head of Group, Technikerstrasse 25, 6020 Innsbruck, Austria	01.01 2002 -
Institute of Food Research, Norwich	Rapid, specific detection of Listeria monocytogenes by antibody-based techniques and on-line sensor technology	Dr. Gary Wyatt, Senior Research Scientist, Norwich Research Park, Colnay, NR47UA - Norwich, Great Britain	01.01.1997 -
Institute of Chemical Technology, Prague	Rapid, specific detection of Listeria monocytogenes by antibody-based techniques and on-line sensor technology	prof. Pavel Rauch, Head of Department, Technická 5, 166 28 Prague, Czech Republic	01.01.1997 -

C. Membership in Domestic Organizations and Societies

Name	Organisation or Society	Position	Valid date
Miko Milan	Slovak Society for Biochemistry and Molecular Biology, Bratislava	member	
Miko Milan	Editorial board of journal Biológia	member	
Miko Milan	Editorial board of journal Acta fytotechnica et zootechnica	member	
Miko Milan	Commission for evaluation of DrSc (DSc) thesis in Biochemistry	member	
Hudecová Daniela	Czecho-Slovak Society for Microbiology, Bratislava	member	01.01.1984 -
Hudecová Daniela	Scientific grant agency (VEGA)– Commission for cell and molecular biology, Bratislava-	member	30.04.2002 -
Hudecová Daniela	Commission for evaluation of PhD thesis in Microbiology	member	20.10.1997 -
Jantová Soňa	Slovak Medical Society, Bratislava	member	01.01.1980 -
Jantová Soňa	Slovak Society for Biochemistry and Molecular Biology, Bratislava	member	01.01.2002 -
Jantová Soňa	Scientific grant agency (VEGA)– Commission for cell and molecular biology	member	30.04.2002 -
Mikulášová Mária	Czecho-Slovak Society for Microbiology, Bratislava	member	01.07.1992 -
Mikulášová Mária	Czecho-Slovak Society for Biology, Brno	member	01.01.1993 -
Varečka Ľudovít	Editorial Board of journal General Physiology and Biophysics (GPB)	member	01.01.1993 -
Varečka Ľudovít	Slovak Society for Biochemistry and Molecular Biology, Bratislava	member of advisory board	01.10.1996 -
Varečka Ľudovít	Scientific board of Institute of molecular physiology and genetics SAS, Bratislava	member	01.01.2001 -
Lakatoš Boris	Slovak Society for Biochemistry and Molecular Biology, Bratislava	member	01.01.2002 -
Andrea Šovčíková	Slovak Society for Biochemistry and Molecular Biology, Bratislava	member	01.01.2003 -
Martin Šimkovič	Slovak Society for Biochemistry and Molecular Biology, Bratislava	member	01.01.2002 -

D. Visitors from abroad

Name	Organisation or Institution	State	Date / Duration
Daussant, J	C.N.R.S., Meudon	France	November 2004 (5 days)

E. Visits of Staff Members and Postgraduate Students in Foreign Institutions

Name	Organisation / Institution / Conference	State	Date / Duration
Hudec, R.	University of Padova	Italy	March-June 2004 (90 days)
Hudec, R.	EMBO Workshop on Calcium signaling and disease, Capri	Italy	20. - 23. 9. 2004
Hudec, R.	International Symposium on Calcium in Health and Disease, Rovaniemi	Finland	5. - 7. 7. 2004
Hudec, R.	FEBS Forum for Young Scientists, Warsaw	Poland	24.-26. 6. 2004
Hudec, R.	29th Meeting of the Federation of the European Biochemical Societies, Warsaw	Poland	26.6. - 1.7. 2004
Varečka, Ľ.	XIX. Meeting of Czech and Slovak Societies for Biochemistry and Molecular Biology, Olomouc	Czech Republic	31.8.-3.9. 2004
Šimkovič, M.	XIX. Meeting of Czech and Slovak Societies for Biochemistry and Molecular Biology, Olomouc	Czech Republic	31.8.-3.9. 2004
Miko, M.	XIX. Meeting of Czech and Slovak Societies for Biochemistry and Molecular Biology, Olomouc	Czech Republic	31.8.-3.9. 2004
Letašiová, S.	XIX. Meeting of Czech and Slovak Societies for Biochemistry and Molecular Biology, Olomouc	Czech Republic	31.8.-3.9. 2004
Letašiová, S.	18th Meeting of the European Association for Cancer Research, Innsbruck	Austria	3.- 5. 7. 2004
Letašiová, S.	International Conference „Using Science to Solve Environmental Health problems…", Praha	Czech Republic	24.-27.10.2004
Olejníková, P.	Institut für Mikrobiologie, Universität zu Innsbruck	Austria	7.1.2004-28.1.2004
Olejníková, P.	Institut für Mikrobiologie, Universität zu Innsbruck	Austria	August 2004 (30 days)
Olejníková, P.	23rd. Meeting of czecho-slovak microbiological society, Brno	Czech Republic	6.9.-9.9.2004
Hunová, M.	University of Ghent	Belgium	1.1.2004-31.8.2004
Kaliňák, M.	Institut für Mikrobiologie, Universität zu Innsbruck	Austria	January-Februry 2004 (50 days)

VI. THESES AND DISSERTATIONS

A. Graduate Theses (Bc Degree) for state examinations after three years of study

Name	Title of Thesis	Supervisor
Csoroszová, E.	New antiinflamation nitrobenzoate-copper (II) complexes and their effects on cause of some mycotic diseases	Hudecová, D.
Farkašová, E.	Induction of proteolytic enzymes in Saccharomyces cerevisiae	Varečka, Ľ.
Grznárová, P.	Biological activity of berberine and its derivatives	Letašiová, S.
Hamranová, A.	Cytochromes P450 and metabolism of xenobiotics	Miko, M.
Chromá, M.	Ability of antimutagenes to decrease onset of resistence against antibiotics	Mikulášová, M.
Kadlečíková, E.	Study of anticancer effects of Cu - complexes	Paulíková, H.
Moravčíková, E.	Bioactivity of phytoalexines	Paulíková, H.
Neubauerová, E.	Possibilities of sensitivity improvement of imunochemical methods for detection of Listeria monocytogenes	Šovčíková, A.
Ondrušová, Ľ.	Antibacterial activity of new derivatives of vazocine analogue	Jantová, S.
Vaneková, M.	Properties of anion channel of human erythrocytes	Hudec, R.
Záhoranová, Ľ.	Mitochondria in Alzheimer disease	Miko, M.
Žbodáková, O.	Glutathione and oxidative stress	Paulíková, H.

B. Graduate Theses (MS Degree) for state examinations after five years of study

Name	Title of Thesis	Supervisor
Birošová, L.	The study of endogenous and exogenous factors affecting the mutation leading to antibiotic resistance	Mikulášová, M.
Čelináková, Z.	Modulation of glutathione metabolism in erythrocytes and erythroidal cell line K562	Paulíková, H.
Dubeková, K.	Indol-isothiocyanates - reactivity and anticancer properties	Paulíková, H.
Dzijak, R.	Identification of tissue specific alternative splicing of mRNA CA9	Pastoreková, S.
Ergang, P.	One-cell gel electrophoresis (comet assay) for monitoring of modulatory properties of selected synthetic compounds	Ďuračková, Z.
Fabinyová, L.	Metabolic changes during the germination of fungal conidia under the conditions of limiting nutrients	Kaliňák, M.
Lakomá, J.	Screening and mode of action of nitrobenzoatecopper (II) complexes	Miko, M.
Majerníková, K.	Developmental changes in enzyme activities involved in energetic and nitrogen metabolism in filamentous fungi	Varečka, Ľ.
Ondrušová, Z.	Copper (II) complexes with Schiff bases as biological active compounds	Hudecová, D.
Ovádeková,R.	Anticancer and antimicrobial effect of triazolochinasolines in in vitro conditions	Jantová, S.
Polláková, M.	Effects of copper complexes on the cell	Kaliňáková, B.
Porubovičová, R.	Effect of new bisammonioum salts on Salmonella infantis and Salmonella montevideo	Majtán, V.
Strnádel, J.	Modulation of signal pathways in human hematopoetic neoplastic cell lines by isothiocyanates	Sedlák, J.
Szabóová, M.	Molecular biological analysis of strains Salmonella enteritidis isolated from different sources	Majtán, V.
Theiszová, M.	Biological activity of selected heterocyclic nitrogen compounds	Jantová, S.
Vaľková, Z.	Derivatives of N-salicylideneglutamate-copper (II) complex - study of redox activity and antiproliferative compounds	Paulíková, H.
Vargovič, P.	Changes of activity and expression of enzymes related to the activation of Trichoderma viride conidiation by light and senescence	Pokorný, R.

C. Dissertations (PhD)

Name	Title of Thesis	Supervisor
Pokorný, R.	Transport and regulation processes related to the growth and differentiation of filamentous fungi	Hudecová Daniela

D. Inauguration Theses

Name	Title of Thesis	Head of board
Varečka, Ľ.	Two short stories about life	Báleš, V.