INSTITUTE OF EXPERIMENTAL MEDICINE

BASIC INFORMATIONS

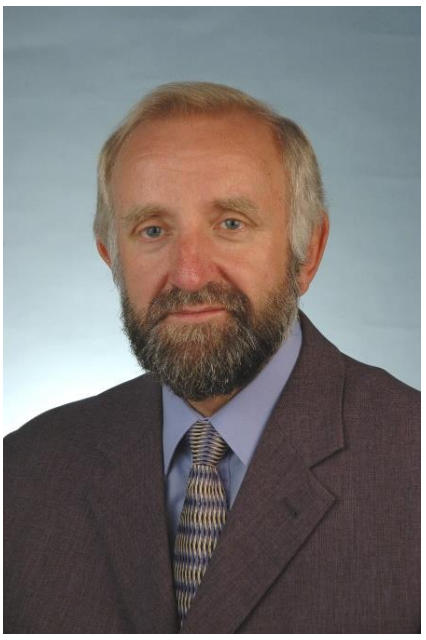
Pavol Jozef Šafárik University in Košice
Faculty of Medicine

FOREWORD

A long-term conceptual framework of the Institute has several important parts. It includes new research programme which is focused on detailed study of the human intestinal microbiota. Furthermore, strengthening of the research team, development of domestic and foreign cooperation and teaching activities are another priorities for the forthcoming period.

During the past nine years Institute has been considerably improved. With the help of EU Structural Funds, the Institute has undergone a complete reconstruction and currently is equipped with cutting-edge devices. The next step is to build a strong research team, applying teamwork and interdisciplinary approach. There will be strong effort of the Institute to apply for EU research projects within the EU Framework Programme Horizon 2020.

Current state of the Institute provides favourable conditions for the fulfilment of the Institute's objectives.



Alojz Bomba, DVM, DrSc
Head of the Institute

"My aim is to establish a cutting-edge research center focused on the targeted modulation of human intestinal microbiota in the prevention and treatment of human chronic diseases."

PROFILE OF THE INSTITUTE

RESEARCH AIM

Institute of Experimental Medicine vigorously studies the role of human intestinal microbiota in the pathogenesis of chronic diseases and possibilities of the microbiota modulation in prevention and therapy of chronic diseases. An important objective of the Institute is the application of new knowledge for the development of novel probiotics and biotechnological products. These products shall be used for targeted modulation of intestinal microbiota, which may lead to more effective prevention and treatment of chronic diseases.

COMPETENCIES

The Institute aims to use a broad range of advanced molecular biology and biochemistry analyses:

Genomics – qualitative and quantitative analysis of nucleic acids (qRT-PCR, FISH); gene expression analysis

Proteomics – analysis of complex protein mixtures; comparison of protein expression at subcellular, cellular, tissue and organism levels; identification, detection and quantification of proteins; immunohistochemistry and immunocytochemistry

Metabolomics – discovery and targeted metabolomics with profiling and identification of metabolites with spectral library and database searching; qualitative and quantitative analysis of specific organic compounds

EXPERIMENTAL MODELS

The Institute has solid know-how with *in vivo* experimental studies. The most recent update of the infrastrucutre is acquirement of the SHIME® model which shall be used for advanced *in vitro* studies.

In vivo – animal experimental models: chemically induced colorectal carcinoma and colitis, diet induced atherosclerosis, canylated and germ-free animals

In vitro – Simulator of Human Intestinal Microbial Ecosystem TWINSHIME®

COOPERATION

Institute of Experimental Medicine systematically develops cooperation with domestic partners from biomedical sciences and from the industry. Additionally, the Institute as a part of the Faculty of Medicine has a solid support in clinical studies.
The important vision of the Institute is to become a partner of the international consortia of the same research interest and to aim for top research projects in the EU Framework Programme Horizon 2020.

RESEARCH TEAM

The interdisciplinary research team includes experts from the field of biochemistry, molecular biology, microbiology and immunology. The team consists of nine scientists with a PhD degree (four of them are under the age of 35 years) and two senior scientists with scientific degree DrSc. The Institute currently supervises three internal PhD students.

PROJECTS

Since 2006, Institute of Experimental Medicine awarded several research projects funded by domestic grant agencies. The Institute carried out research within three projects of basic research and one project of applied research. Additionally, the Institute successfully applied for funding from EU Structural Funds and has received more than two million Euro for the reconstruction and modernization of laboratories. The list of the EU projects is shown below.

CEMIO *– Centre of excellence for researching factors affecting health, with a focus on groups of marginalized and immunocompromised persons* (ITMS 26220120058)

PROBIO *– Probiotic microorganisms and natural bioactive substances for healthier population of Slovakia* (ITMS 26220220104)

PROBIOTECH *– Competence Center for biomodulators and nutritional supplements* (ITMS 26220220152)

MAIN EQUIPMENT

Simulator of Human Intestinal Microbial Ecosystem TWINSHIME®

A unique, scientifically validated dynamic model of the complete gastrointestinal tract to study physicochemical, enzymatic and microbial parameters in the gastrointestinal tract in a controlled *in vitro* setting. TWINSHIME® combines two identical SHIME® systems. This setup allows to perform either placebo-controlled *in vitro* studies of probiotic microorganisms and natural compounds, or comparative study of two different products.

ProDigest

Gas chromatograph Agilent 7890A with flame ionization detector and mass spectrometer Agilent 5975 C

State-of-the-art device which enables effective separation of examined compounds, identification of organic molecules with the mass spectrometer and their quantification with the flame ionization detector.

RT-PCR Light Cycler 480 Instrument II

Highly sensitive and powerful device for qualitative and quantitative detection of specific nucleic acids.

Flow cytometer BD FACSVerse

Advanced fluorescence-activated cell analysis device designed to support cell analysis for research applications using up to 10 parameters.

Real-time cell analyser xCELLigence RTCA SP

Device for real-time and high-throughput monitoring of interactions between human cells and a broad spectrum of substances.

Biochemical multianalyser Daytona RX 3901

Compact and fully automatized biochemical multianalyser.

Microplate multianalyser BioTek Synergy H4

Versatile single-channel absorbance, fluorescence, and luminescence microplate reader suitable for high-throughput applications and measurment of kinetics.

PARTNERS

CLS CASSOVIA LIFE SCIENCES

pamida INTERNATIONAL

THE UNIVERSITY OF VETERINARY MEDICINE AND PHARMACY IN KOŠICE

INSTITUTE OF PARASITOLOGY SAS KOŠICE

INSTITUTE OF NEUROBIOLOGY SLOVAK ACADEMY OF SCIENCES

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Bryndziareň a syráreň založené 1797 Zvolenská Slatina

VÚA

ADDRESS

INSTITUTE OF EXPERIMENTAL MEDICINE

PAVOL JOZEF ŠAFÁRIK UNIVERSITY IN KOŠICE

FACULTY OF MEDICINE

TRIEDA SNP 1, 040 11 KOŠICE

SLOVAKIA

GPS:

48.723221, 21.236871699999938

Web:

http://www.upjs.sk/en/faculty-of-medicine/research-department/experimental-medicine/

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