



# Experimental Medicine at UPJS

Institute of Experimental Medicine  
Faculty of Medicine  
Pavol Jozef Šafárik University in Košice



## THE CONCEPT OF THE INSTITUTE'S ACTIVITIES

### The main objective

- Build up the research institute of the highest international level focusing on research in the prevention and treatment of chronic diseases
- Interdisciplinary approach and teamwork
- Implement the Institute into international consortia of research projects in the European Union Framework Programme for Research and Innovation Horizon 2020

## THE CONCEPT OF THE INSTITUTE'S ACTIVITIES

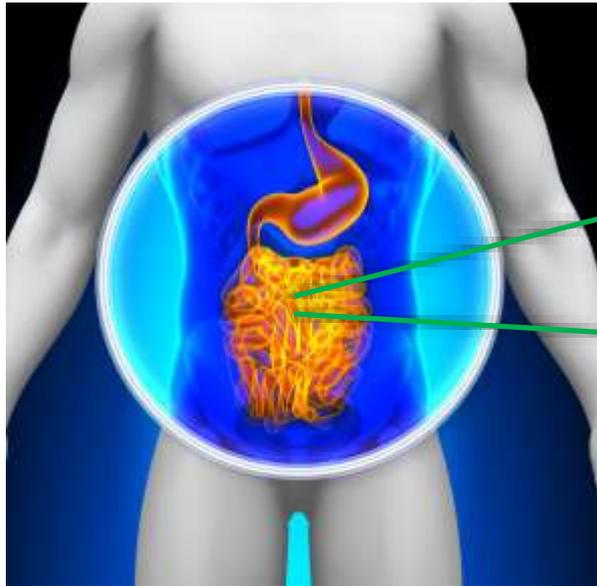
### Partial goals

1. Long-term research program
2. Research team
3. Financial resources
4. Institute infrastructure
5. Domestic cooperation
6. International cooperation
7. Teaching activities

## LONG-TERM RESEARCH PROGRAM

The role of gut microbiota in pathogenesis of chronic diseases and possibilities of its modulation in their prevention and treatment

# INTRODUCTION



**Gut microbiota**



**Key questions:**



**What is the role of gut microbiome in health and pathogenesis of chronic diseases?**

**What are possibilities for prevention and treatment of chronic diseases using targeted modulation of gut microbiome?**

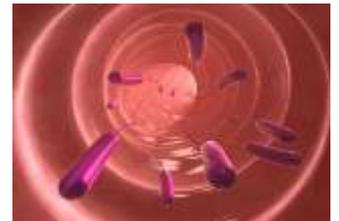


# GUT MICROBIOTA, HEALTH AND DISEASE



## GUT MICROBIOTA IN HEALTH AND DISEASE

- Better understanding of the bacterial communities inhabiting human gut and properties of healthy microbiota
- The role of dysbiosis in various disease states
- New therapeutics in the treatment of diseases using microbiota



# GUT MICROBIOTA MODULATION IN CHRONIC DISEASE PREVENTION AND TREATMENT

- Probiotics
- Prebiotics
- Autoprobiotics
- Collections of defined microorganisms
- Fecal microbiota transplantation



# Probiotic preparation developed by Institute of Experimental Medicine FM PJŠU in Košice

## Charakteristika:

**Lacto-Pro** je výživovo nekompletná dietetická potravina na báze živých mliečnych baktérií rodu *L. Lactobacillus plantarum* LS/07, určená:

- na diétny režim pri poruchách mikrobiálnej flóry tráviaceho traktu pri liečbe antibiotikami,
- dlhodobej umelej enterálnej výživy,
- poruchách kinetiky čreva a priepustnosti črevnej steny

## Zloženie:

1 g prášku obsahuje:

**Probiotická zložka:** *Lactobacillus plantarum* LS/07 1x10<sup>8</sup> CFU

## Použitie:

Určené pre diétny režim pri chorobách tráviaceho traktu. Svojím zložením pomáha pri kolonizácii tráviaceho traktu prospešnou mikrobiotou optimalizujúcou proces trávenia, čím napomáha vyrovnávať nedostatok vznikajúci z obmedzeného príjmu prirodzenej výživy pri diétnej liečbe.

Odporúčaná denná dávka **Lacto-Pro** je závislá od veku a zdravotného stavu pacienta.

Dávkovanie je individuálne a musí byť pravidelne upravované lekárom.

## Dôležité upozornenie:

- potravinu možno používať len pod lekársym dohľadom
- nie je vhodná na používanie ako jediný zdroj výživy
- je určená pre deti od ukončeného 12. mesiaca veku
- je určená výhradne pre pacientov s predpokladanou poruchou mikrobiálnej flóry tráviaceho traktu pri liečbe antibiotikami, dlhodobej umelej enterálnej výživy, s poruchami kinetiky čreva a priepustnosti črevnej steny
- potravina neslúži na perenterálne použitie

**Kontraindikácie:** nefunkčnosť tráviaceho traktu

## Uchovávanie:

Pri teplote 4 °C v suchu a tme

Číslo šarže:

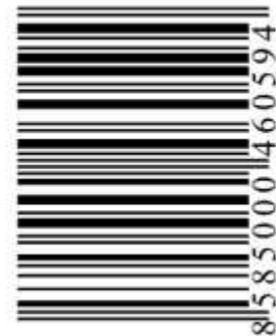
Minimálna trvanlivosť do:

## Výrobca:

**IMUNA PHARM a.s.**  
Jarková 17  
082 22 Šarišské Michaľany

# LACTO-Pro

*Lactobacillus  
plantarum*



Dietetická potravina  
na osobitné medicínske účely

# PRIZE FOR TECHNOLOGY TRANSFER IN SLOVAKIA IN 2015 IN THE CATEGORY "INNOVATION WITH THE GREATEST POTENTIAL FOR APPLICATION IN PRACTICE "





CENA  
ZA TRANSFER TEHNOLOGIJ NA SLOVENSKU

INSTITUT ZA PROMETNO INOVACIJSKI  
SISTEM (IPIS) - Ljubljana, Slovenija

Prejemnik: **Mednarodni gasilski center**  
Ljubljana, Slovenija  
Ljubljana, Slovenija  
Ljubljana, Slovenija

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IPIS Ljubljana, Slovenija



## TARGETED MODULATION OF GUT MICROBIOTA IN DISEASE PREVENTION AND TREATMENT

- Original solution of gut microbiota modulation which could possibly meet criteria of the personalized medicine approach
- Our solution eliminates the risks connected with the fecal microbiota transplantation from donor and it allows the targeted modulation according to specific needs of the patient



# PATENTS

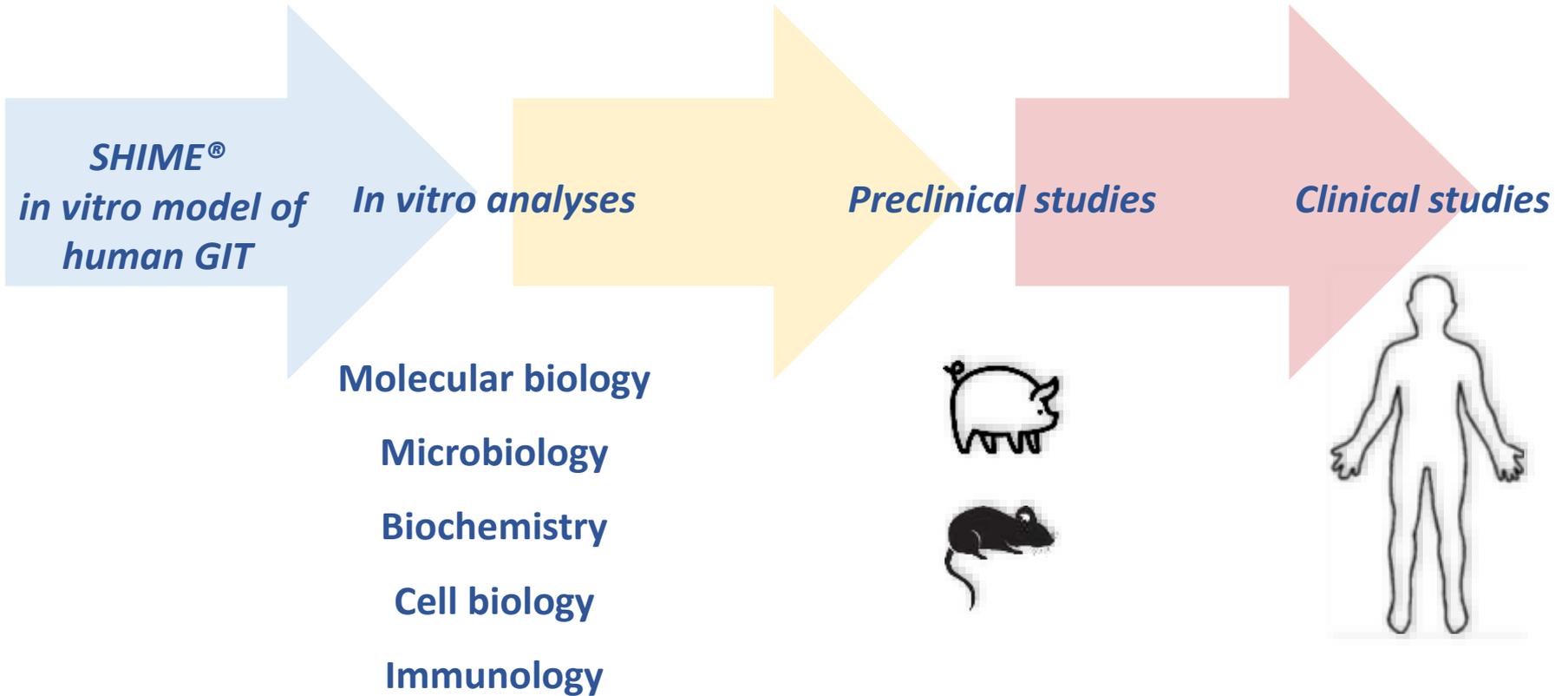
**Lactobacillus strain *Lactobacillus plantarum* LS/07 CCM 7766 targeted for improvement and stabilisation of human beneficial gut microflora**

(patent pending)

**Novel method for targeted modulation of human gut microbiome**

(patent pending)

# OUR STRATEGY



## OUR TEAM



### GROUP LEADER:

Alojz BOMBA, DVM, DSc

- 5 senior scientists
- 4 postdocs
- 3 PhD student
- 3 technicians

## OUR PROJECTS



### *EU structural funds*

CEMIO – Centre of excellence for researching factors affecting health, with a focus on groups of marginalized and immunocompromised persons (3 400 237.62 €).

PROBIO – Probiotic microorganisms and natural bioactive substances for healthier population of Slovakia (873 715.00 €).

PROBIOTECH – Competence Centre for biomodulators and nutritional supplements (6 234 303.52 €).

### *Applied research*

AV 4/0028/07 project „Biomodulation of biological barriers and defense mechanisms of the digestive tract in the prevention of diseases of affluence“

### *Basic research*

Two finished projects (VEGA 1/0372/10, VEGA 1/0279/13) which focused on biomodulation of gut microbiome and possibilities of chronic diseases prevention.

One project (VEGA 1/0896/15) studying immunomodulatory and antitumour ability of patented *Lactobacillus* strain is still in progress.

# INFRASTRUCTURE



**Molecular biology Lab**



**Microbiology Lab**



**Cell culture Lab**



**Biochemistry Lab**



**Mass Spectrometry Lab**



**Immunology Lab**

# SHIME<sup>®</sup> SIMULATOR OF THE HUMAN INTESTINAL MICROBIAL ECOLOGY



# COOPERATION

## Domestic partners

- Pavol Jozef Šafárik University in Košice
- University of Veterinary Medicine and Pharmacy in Košice
- Slovak Academy of Sciences
- National Agricultural and Research Center, Nitra
- Institute of the Dairy Research a.s., Žilina
- IMUNA PHARM a.s., Šarišské Michaľany
- TEKMAR Slovensko Ltd.
- Monsea Ltd.

## Foreign partners

- ProDigest (Ghent, Belgium)
- INRA (France)

# OUR STRENGTHS

## CONFERENCE ORGANISATION

**International Scientific Conference on Probiotics and Prebiotics**  
(IPC 2008-2013 Slovakia, IPC 2014-2016 Hungary)

**International Scientific Conference on Functional Foods**  
(Food and Function 2009, 2011 Slovakia)

**International Scientific Conference GutMicroEcology**  
(GME 2010, Slovakia)

**International Scientific Conference of Society for Microbial Ecology and Disease**  
(SOMED 2013, Slovakia)

[www.probiotic-conference.net](http://www.probiotic-conference.net)

# FIRST ANNOUNCEMENT 2016



INTERNATIONAL SCIENTIFIC CONFERENCE  
**PROBIOTICS AND PREBIOTICS®**

will be held in 21st - 23rd June 2016

# TEACHING ACTIVITIES

- Student research activities
- Diploma thesis
- PhD study

## PERSPECTIVES

- The completion of a top international level research institute
- New, original and effective solution of targeted gut microbiota modulation in chronic disease prevention and treatment
- Participation in international consortia of research projects in European Union Framework Programme for Research and Innovation Horizon 2020

# Perspectives



# Perspectives



Thank you for your attention