

Ecosystem Czech Republic

RESEARCH INSTITUTIONS

Masaryk University

- CEITEC MU (Jozef Hritz)
- Faculty of Medicine (Dáša Boháčiková)
- Loschmidt Laboratories (Martin Marek)

COMPANIES

BioVendor (Martina Hložánková)

POLICY MAKERS

South Moravian Innovation Centre (Veronika Štěpánková)

SOCIETAL ACTORS

Czech Brain Aging Study (FNUSA-ICRC) - Kateřina Sheard

Czech Alzheimer Society (Martina Mátlová)

Ecosystem Czech Republic

Masaryk University, CBAS	AD Diagnostics – research, strategy, education
Masaryk University, BioVendor	Assay Development, intersectoral collaboration, education
CBAS, Czech Alzheimer Society, Masaryk University	Campaign to raise awareness about modern AD diagnostic methods
South Moravian Innovation Centre, Masaryk University	Alignment of R&I strategy with RIS, education and intersectoral networking
<i>All partners</i>	Communication, dissemination and exploitation

CEITEC MU



- Independent university institute established at Masaryk University as part of the CEITEC Centre of Excellence
- Key part of the state-of-the-art research infrastructure built in 2014
- Basic and applied research in field of life sciences

- ❖ 381 Researchers - 44 % International
- ❖ 52 % international PhD students
- ❖ 29 Research groups
- ❖ 12 Core Facilities



STRUCTURAL BIOLOGY



GENOMICS AND PROTEOMICS OF PLANT SYSTEMS



MOLECULAR MEDICINE



BRAIN AND MIND RESEARCH

CEITEC MU – Highlights



European Research Council
Established by the European Commission

3 current ERC holders



Horizon2020 - HEALTH

European
Innovation
Council



EIC Pathfinder project – epilepsy research



MSCA Fellowships



Linking Pre-Diagnosis Disturbances of
Physiological Systems to Neurodegenerative
Diseases



WideSpread projects –
Twinning, ERA Chair...

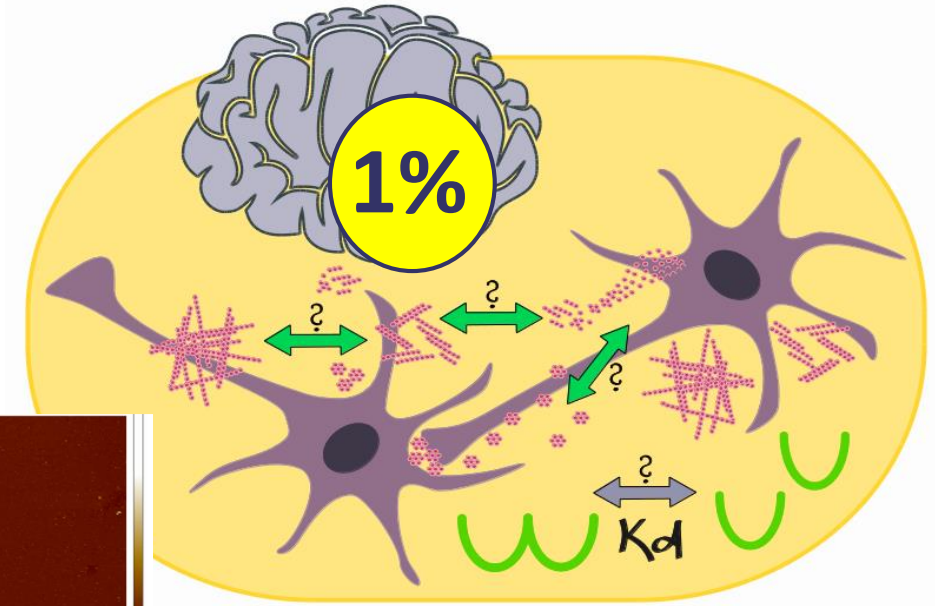
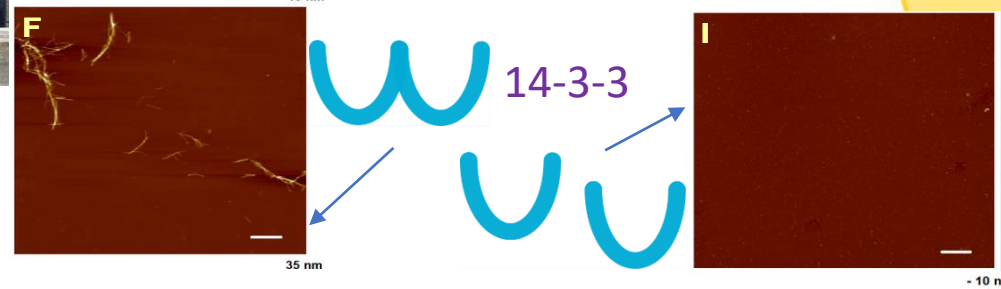
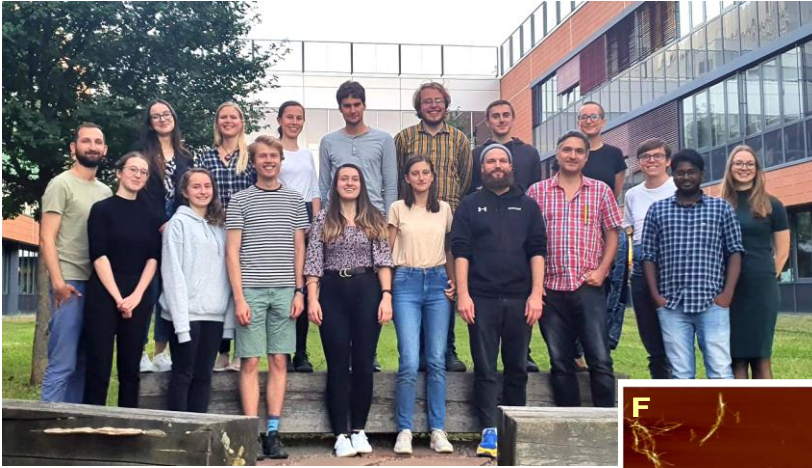


Horizon2020 – INFRA – Infectious Diseases
Outbreak research



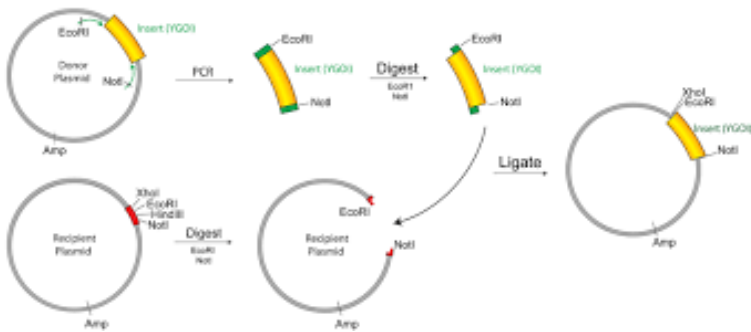
National grants

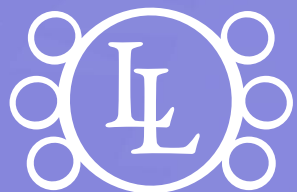
CEITEC MU - JOZEF HRITZ team: protein complexes relevant for Alzheimer disease



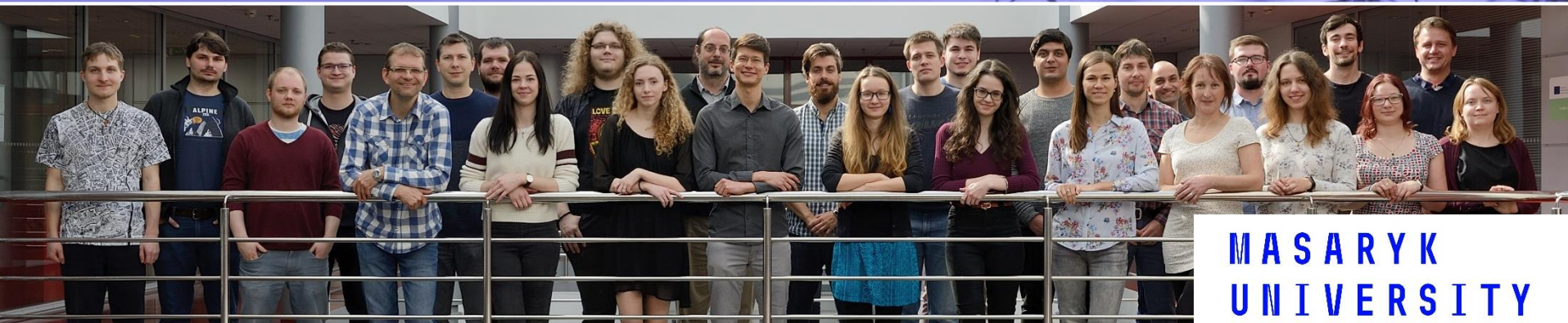
Research methodologies:

- Experimental: protein expression and purification, structural and chemical biology solution NMR, biophysical interac. methods, fluoresc. spectroscopy, cryoEM, MS, AFM
- Computational: molecular dynamics, REMD, free energy calculations, NMR param.





LOSCHMIDT LABORATORIES



MASARYK
UNIVERSITY

Research topics

- Protein biology and chemistry
- Enzyme catalysis
- Protein & enzyme engineering
- Software development

In-house software development



<https://loschmidt.chemi.muni.cz/peg/>

Research methodologies

STRUCTURAL BIOLOGY



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COMPUTATIONAL DESIGN & SW TOOLS



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ENZYME KINETICS & MICROFLUIDICS



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ARTIFICIAL INTELLIGENCE



stan.mazurenko@gmail.com

Characterization of Apolipoprotein E (ApoE)

Martin Marek, Faculty of Science - MU

Research activities and methodology

Towards better understanding the structure-function relationship of ApoE, including the mechanisms of fragmentation, aggregation, DNA-binding capacity and lipid nanodiscs formation.

&

Translational research to modernise AD-diagnostics.

Expertise and methods used

- Molecular biology methods, protein engineering
- Protein biochemistry & biophysics
- Structural biology techniques (X-ray crystallography / cryo-EM)
- Molecular modelling and bioinformatics

Dáša Bohačiaková Lab

Research Topics

- ❖ Human Pluripotent Stem Cells
- ❖ Neural Differentiation
- ❖ Cerebral organoids
- ❖ Neurons
- ❖ Neural Stem/Progenitor Cells
- ❖ Alzheimer's disease
- ❖ Glioblastoma
- ❖ microRNA
- ❖ Cell Cycle
- ❖ DNA damage



Dáša Boháčiová Lab

Collaborations

Neural differentiation

- UCLA San Diego, USA
- Institute of Animal Physiology and Genetics, Academy of Sciences CR

Alzheimer's Disease

- Amsterdam UMC, Netherlands
- Aarhus University, Denmark
- MPI Biophysics, Germany
- Loschmidt Laboratories
- RECETOX, Masaryk University
- ICRC, Brno

Glioblastoma Multiforme

- Institute of molecular genetics, Academy of Sciences CZ

RNA work

- CEITEC



**BioVendor
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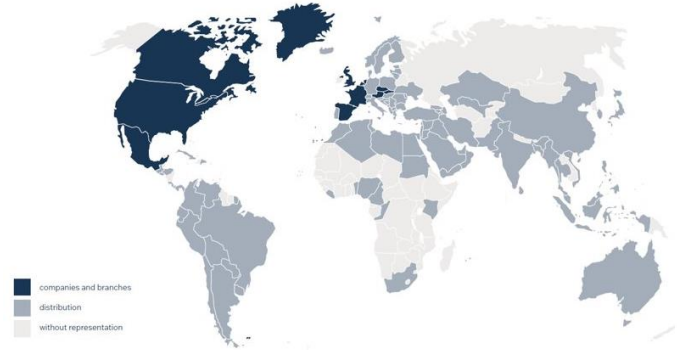


FOLLOW US

BIOVENDOR.GROUP

**We are exploring
better ways to
diagnose.**

We develop, manufacture
and distribute products
for modern diagnostics.



500+
employees
in BioVendor Group

5500+
references
of our products

115+
countries
represented by company

180+
people
in research

- **highly specialized IVD company providing development, production and distribution of innovative products for diagnostics.**
- **Development and manufacturing of specific products for particular platforms**
 - More than 200 ELISA kits, 24 CLIA kits, more than 50 microRNAs, 3 fastGEN kits, 2 LAMP tests for C-19
- **Automated technologies for quality and efficient clinical diagnostics**
 - CLIA + KleeYa analyzer, fastGEN + Bioxys SW, LAMP + FISH POCT



CZECH BRAIN AGING STUDY

Katerina Sheardova, MD, PhD

ICRC Memory Research Centre

FNUSA Brno

Czech Brain Aging Study (CBAS)

Longitudinal multi-centric memory clinic-based study

Since 2011

Memory Center ICRC
St. Anne's Teaching Hospital, Brno



Memory Clinic, Charles University
Motol Teaching Hospital, Prague



CBAS Inclusion criteria:

age 55 +
CDR 0 – 0.5
Subjective cognitive decline,
MCI
Informant available
Consecutive recruitment

„CBAS Plus cohort“:

- Reflects real memory clinic patient profile
- Dementia included
- Vascular risk factors
- Depression

Synchronized assessment

Shared database (Redcup)

Neuropsychology (UDS harmonised)
Questionnaires – life style, memory complaints
MRI, PET (ADNI harmonised)
DNA, serum, plasma!, CSF - biobank

Main research topics for 2023

Lifestyle protective factors

- Spiritual well being and positive psychology - impact on regional brain atrophy rate and the rate of cognitive decline – longitudinal data
- Sleep Study: cross-sectional data and longitudinal data
- Mindfulness interventions and longitudinal data

Non – pharma Interventions in prevention of cognitive decline

- Multimodal life style intervention in prevention of dementia in older adults
- Sleep, physical activity and mental well being in prevention of AD – multicentric –(ADDITCE)

Biomarkers

- Chemical exposome
- New liquid biomarkers tested on CBAS cohort – X Axon, Biovendor (ADDITCE)
- MRI and liquid biomarkers - Alzheon, prof. Kocis- EATRIS, Women´s Brain Project, prof. Blennow, GAP – Net Eur (Core finance)
- microRNA in AD – prospective follow up study

a...

Česká

alzheimerovská

společnost

Czech Alzheimer Society

- Founded in 1997 by gerontologists, physicians, social workers and family caretakers
- Goal: To help people with dementia and their family members
- Community-based collaboration with healthcare and social care providers
- Network of Contact Points for people with dementia
- Member of Alzheimer Europe and Alzheimer's Disease International

When business sets out to *change the world!*



- ❖ For those with great ideas to establish businesses based on their visions.
- ❖ For companies to grow, establish partnerships, and develop.
- ❖ For South Moravia to be a great place to work, do business, and live.
- ❖ For students to experience first-hand what doing business is really about.

JIC



The **Regional Innovation Strategy (RIS)** is the basic concept of the South Moravian Region and the City of Brno for the development of economic competitiveness and value creation through innovation. It is addressed to all actors in the innovation ecosystem who are interested in contributing to the growth of the standard of living in the region.