**OFFER**

We offer our expertise, as well as consultancy or collaboration within a diverse range of biochemical or clinical biochemistry related topics, particularly in the fields of:

- hemoproteins (heme enzymes and heme-containing sensor proteins)
- diatomic gas molecules (NO, CO and O\(_2\)) and their interaction with heme in hemoproteins
- enzymology
- post-translation modifications of hemoproteins
- protein stability and structure-function relationship
- oxidative stress in cells
- heavy metal ions including their complexes (such as free heme) and their effect on cells
- ionizing radiation and its effect on cells

**KNOW-HOW & TECHNOLOGIES**

- Identification of new hemoproteins and description of their properties.
- Various hemoproteins production and/or isolation, their characterization including protein engineering.
- Development of new antibacterial strategies based on the research focused on heme enzymes and heme sensors.
- Development of new anticancer strategies based on the research focused on heme-containing sensor proteins that are unique for pathological bacteria.
- Detection of diatomic gas molecules (NO, CO and O\(_2\)) based on their specific interaction with heme-containing gas sensor proteins.
- Molecular modeling of hemoproteins.

„We are looking for cooperation in the fields of hemoproteins related research focused mainly on heme enzymes or heme-containing sensors.“

**transfer@natur.cuni.cz**
CONTENT OF RESEARCH

HEME-CONTAINING SENSOR PROTEINS
- structure-function relationships
- involvement in carcinogenesis - anticancer therapy
- involvement in bacterial pathogenesis - antibacterial therapy

HEME ENZYMES
- structure-function relationships
- involvement in carcinogenesis – anticancer therapy

MECHANISM OF SIGNAL TRANSDUCTION IN EUKARYOTIC AND PROKARYOTIC CELLS
- role of heme in regulatory pathways (for example in regulation of protein expression)

MAIN CAPABILITIES
Protein production, protein isolation, protein characterization, protein engineering, enzymology, protein-ligand interaction studies, immunoochemical methods, electrochemical methods, chromatography and spectrophotometry

KEY RESEARCH EQUIPMENT
Absorption spectroscopy, equipment for various chromatography approaches, mass spectrometry, standard equipment for molecular biology and protein engineering

PARTNERSHIPS & COLLABORATIONS
ACADEMIC PARTNERS
- Ecole Polytechnique, Palaiseau, France (Marten Vos and Ursula Liebl – ultrafast spectroscopy)
- Université Montpellier, France (Reinhard Lange – spectroscopy under high pressure)
- Cyprus University of Technology, Limassol and University of Cyprus, Nicosia, Cyprus (Constantinos Varotsis and Eftychia Piankoulaki – FTIR and Raman spectroscopy)
- Laboratory of Pediatric Infect. Diseases, Nijmegen, Netherlands (Marien de Jonge – microbiology)
- Tohoku University, Sendai, Japan (Kazuhiro Igarashi – euakryotic heme sensor proteins)
- Institute of Microbiology, Prague, Czech Republic (Miroslav Šulc – mass spectrometry)
- BIOCEV, Vestec, Czech Republic (Petr Man and Petr Pompach – mass spectrometry; Jan Dohnálek – X-ray)

PRIVATE AND PUBLIC SECTOR
- IPSEN Pharma, os. (France, 2014–2015)
- BEDO (Thailand, 2015–2016)
- National Radiation Protection Institute (Czech Republic, 2019–now)

MAIN PROJECTS
- 2012–2017: Modern technologies for identification and optimization of anti-tumor drugs of the new generation. Participation in the project granted to Assoc. Prof. RNDr. Miroslav Šulc, PhD. UNCE 204025/2012
- 2014–2015: Comparison of the adsorption capacity and trapping effectiveness of diosmectite and charcoal on the compounds causing the 10 most frequent intoxications in acute medicine. External sponsored study by IPSEN Pharma, os.

ACHEIEVEMENTS

SEE OUR WEBPAGES
www.natur.cuni.cz/martinkova