Mendel University in Brno

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY
MENDEL UNIVERSITY IN BRNO (MENDELU)

- 100 employees
- More than 750 m^2 of laboratories
- World-class instrumentation
- Part of the Central European Institute of Technology (CEITEC)

Research and development of advanced materials and approaches in physiology, biology, biochemistry and chemistry are the main vision of the abovementioned team. There are several laboratories dedicated to key areas such as bioanalytical chemistry, experimental microbial and animal biochemistry and biology, and, last but not least, algae and plant biotechnology and their utilization in agriculture, environment, functional food and plant protection. The instrumental equipment available enables the researchers to participate in a large number of grant projects at all levels – internal, national and international. Recent and current ongoing projects awarded by European Commission include:

- 2018-2022: ERC-2017-STG, "ToMeTuM"
- 2017-2020: H2020-GALILEO-GSA-2017, "GreenPatrol"
- 2017-2018: H2020-WIDESPREAD-04-2017-TeamingPhase1, Back4Future
- 2015-2017: H2020-JTI-IMI2-2014-02-single, "FILODIAG"
- 2009-2013: MAS, Nanoelectronics for mobile AAL-Systems, 7 FP ENIAC

Laboratory of cancer biology and nanomedicine:

One of the research directions of the laboratory is the study of mechanisms involved in tumor processes, with a particular attention to the prostate tumors. Laboratory also explores the use of nanomaterials in medicine, especially protein cages in antitumor therapy. Experimentally, the laboratory is focused on *in vitro* work with both malignant and non-malignant cell lines.

Project idea:

Nanobiotechnologies based on nanoparticles supported by protein cages with catalytic and enzyme-mimetic activity

Partnership/cooperation possibilities:

Ferritin nanocages provide unique nanoreactor environment for the production of biocompatible metallic nanoparticles (NPs). Under certain conditions, the metallic particles remain attached to the protein surface, and thus stabilized, permitting better access to the substrate for catalytic activity. Alternatively, nanoparticles can be produced inside the ferritins cavity. MENDELU is producing various types of stable ferritin-nanoparticles complexes (Pt, Rh, Pd, Ir, Au, Ag, etc.), which have exceptional specific catalytic activity in reduction of diazo- dyes (4-nitrophenol, methyl orange, Congo red), and which could have a broad spectrum of applicability in various fields of research, including catalytic inactivation of xenobiotic, use in green industrial chemical synthesis or in bioorthogonal nanomedicine, where inactive compounds are catalytically activated in the desired tissue using actively-targeted enzyme-mimetic nanoparticles. MENDELU offers molecular biology methods and small-to-medium scale protein production and purification facility together with NPs synthesis and characterization. MENDELU is looking for partners with capability to test its nanobiotechnologies in their applications

(incl. remediation or nanomedicine). MENDLEU is also capable of providing pre-clinical *in vitro* toxicity screenings and other types of *in vitro* methods for biological characterization or estimation of biocompatibility.

Possible H2020 2018 calls:

SC1-BHC-09-2018	Innovation platforms for advanced therapies of the future
BIOTEC-04-2018	New biotechnologies for environmental remediation

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