

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

- 72 employees
- More than 350 m² of laboratories
- World-class instrumentation
- Part of the Central European Institute of Technology (CEITEC)

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:

Engineered protein cages based on apoferritins for active drug delivery and environmental-responsive intracellular disassociation and release of anticancer drugs

Partnership/cooperation possibilities:

MENDELU offers protein-based engineering of iron-transport protein ferritins. It is working with ferritins of mammalian origin (human, horse) or with special ferritins originating from extremophile microorganisms (*P. furious*, *T. maritima*, *A. fulgidus*, etc.). Ferritins work as protein cages, which can encapsulate various types of cargoes and protect them against premature release or interactions with non-target environment. The most common mechanism of loading is based on drastic pH changes, which can cause alteration of function of encapsulated molecule (*e. g.* anticancer drug). Hence, using methods of molecular biology, MENDELU is producing ferritins with special properties, including reversible assembly based on slight changes in temperature, pH or ionic strength. These approaches are more friendly to cargoes and can be further employed in nanomedicine, where loaded ferritins can be traced and cargo can be released directly in tumor tissue using hyperthermia (thermotherapy), cargo can be alternatively released by lower pH within the tumor tissue (caused by metabolic shifts and hypoxia). MENDELU also produces ferritins with various functional domains on their surface, including iRGD targeting domain known to target tumor neovasculature or domains derived from immunoglobulin binding proteins to site-directed conjugation of targeting/therapeutic antibodies. MENDELU is looking for experienced partners with strong pre-clinical *in vivo* cancer models and established ADMET protocols to accelerate the testing of its developed nanocages.

Possible H2020 2018 call:

SC1-BHC-09-2018 Innovation platforms for advanced therapies of the future

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