

REGISTRATION FORM FOR CZECH SCIENTIFIC INSTITUTION

1. Research institution data (name and address):

Faculty of Science
University of South Bohemia in České Budějovice
Branišovská 1645/31a
370 05 České Budějovice, Czech Republic

2. Type of research institution: Public university (veřejná vysoká škola)

3. Head of the institution: prof. PhDr. Bohumil Jiroušek, Dr. – rector

4. Contact information of designated person(s) for applicants:

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5. Research discipline in which the strong international position of the institution ensures establishing a Dioscuri Centre:

Life Sciences: *Human and animal immunology and infection* - immunity, immune disorders, immunotherapy, infectious and invasive diseases, microbiology, transplantology, allergology

6. Description of important research achievements from the selected discipline from the last 5 years including a list of the most important publications, patents, or other results:

Department of medical biology focuses on two main research directions – Tick-host-pathogen interaction and cancer immunotherapy. In the first research area, we published recently functional and structural characterization of tick salivary serpins, which are important for tick feeding. The publications were published in high impacted journals. The other research direction is cancer immunotherapy. The group of Jan Ženka developed very promising immunotherapeutical mixture, called MBTA. The formulation and its use are in the process of patent application. Several publications on the topic were published recently.

- Chlastáková A, Kotál J, Beránková Z, Kaščáková B, Martins LA, Langhansová H, Prudnikova T, Ederová M, Kutá Smatanová I, Kotsyfakis M, Chmelař J. Iripin-3, a New Salivary Protein Isolated From Ixodes ricinus Ticks, Displays Immunomodulatory and Anti-Hemostatic Properties In Vitro. *Front Immunol.* 2021 Mar 1;12:626200. doi: 10.3389/fimmu.2021.626200.
- Kascakova B, Kotal J, Martins LA, Berankova Z, Langhansova H, Calvo E, Crossley JA, Havlickova P, Dycka F, Prudnikova T, Kutý M, Kotsyfakis M, Chmelař J, Kuta Smatanova I. Structural and biochemical characterization of the novel serpin Iripin-5 from Ixodes ricinus. *Acta Crystallogr D Struct Biol.* 2021 Sep 1;77(Pt 9):1183-1196. doi: 10.1107/S2059798321007920.
- Kotál J, Polderdijk SGI, Langhansová H, Ederová M, Martins LA, Beránková Z, Chlastáková A, Hajdušek O, Kotsyfakis M, Huntington JA, Chmelař J. Ixodes ricinus Salivary Serpin Iripin-8 Inhibits the Intrinsic Pathway of Coagulation and Complement. *Int J Mol Sci.* 2021 Aug 31;22(17):9480. doi:10.3390/ijms22179480.
- Uher O, Huynh TT, Zhu B, Horn LA, Caisova V, Hadrava Vanova K, Medina R, Wang H, Palena C, Chmelař J, Zhuang Z, Zenka J, Pacak K. Identification of Immune Cell Infiltration in Murine Pheochromocytoma during Combined Mannan-BAM, TLR Ligand, and Anti-CD40 Antibody-Based Immunotherapy. *Cancers (Basel).* 2021 Aug 5;13(16):3942. doi: 10.3390/cancers13163942
- Uher O, Caisova V, Padoukova L, Kvardova K, Masakova K, Lencova R, Frejlichova A, Skalickova M, Venhauerova A, Chlastakova A, Hansen P, Chmelař J, Kopecky J, Zhuang Z, Pacak K, Zenka J. Mannan-BAM, TLR ligands, and anti-CD40 immunotherapy in established murine pancreatic adenocarcinoma: understanding therapeutic potentials and limitations. *Cancer Immunol Immunother.* 2021 Nov;70(11):3303-3312. doi: 10.1007/s00262-021-02920-9

7. List of no more than 3 important research projects in the selected discipline awarded in national and international calls to the institution in the last 5 years:

Serpins from the salivary glands of Lyme disease vector, tick *Ixodes ricinus*, and their role in the tick-host-pathogen interaction

PI – Jindřich Chmelař

2016-2018 – GAČR junior 16-07117Y

5 616 000,-Kč (app. 225 000 EUR)

Anti-hemostatic serpins from the tick *Ixodes ricinus* and their role in pathogen transmission

PI – Jindřich Chmelař

2019-2021 – GAČR Junior 19-14704Y

7 840 000,-Kč (app. 313 000 EUR)

The effect of tick saliva and salivary sialostatins on cellular stress responses and its implication to tick-borne encephalitis virus transmission

PI – Jaroslava Lieskovská

2019-2021-GAČR

7 840 000,-Kč (app. 260 000 EUR)

8. Description of the available laboratory and office space for a Dioscuri Centre:

1 office with 2 places is available. The office is in another building than laboratories. There are computers and internet connection with an access to the University network, free access to many scientific journals and other electronic sources.

Department of medical biology offers 3 labs for biochemistry, molecular biology and immunology, 1 lab for tissue culture work and 2 labs for work with infectious agents. Latter 3 labs are in biosafety level 2 (BSL2). SPF mouse facility is also available.

9. List of the available research equipment for a Dioscuri Centre:

Flow cytometer (ACEA, Novocyte 3000), BioTek plate reader Synergy H1 (absorbance, luminescence, fluorescence), Cell sorter BioRad S3, Pipetting robot Tecan EVO75, aggregometer Pap-8, coagulometer Ceveron 4 (Technoclone), qPCR cyclers (2 x CFX96 BioRad, 1 x CFX384 BioRad, 1 x RotorGene 6000 (Corbett research), gradient PCR cyclers (Jena), gel documentation system, Nanolive 3D cell explorer-fluo, several incubators with or without CO₂, 6 biohazard sterile benches, cooled centrifuges. Much more equipment is available in the institution, such as confocal microscope, mass spectrometers, ÄCTA pure system for protein purification, mass spectrometers for protein and small molecules.

10. List of the additional benefits (other than listed in the conditions for hosting a DC, see invitation) that the Institution declares to provide for a Dioscuri Centre (i.e.: additional funds, personal benefits, dual career options, relocation support or other):

The host institution is located on a shared campus with the Biological Center of the Academy of Sciences, a leading institution in the field of biological research in the Czech Republic. In research, the department cooperates mainly with the Institute of Parasitology BC AS CR, v.v.i. Several shared infrastructures are a great benefit of close collaboration on campus, such as electron microscopy equipment or a metabolomics center.

The host institution has also very close collaboration with the hospital in České Budějovice, where clinical data can also be processed, with the laboratories of Professors Karel Pacák and Zhengping Zhuang (NIH, Bethesda, Maryland) and with Dr. Lucas Tirloni (NIAID/NIH, Hamilton, Montana)

11. Other information about the internationalization of the research institution, international researchers employed at the institution, the availability of English language seminars etc.:

Department of Medical Biology offers the seminar Trends in Biomedicine, where the recent research is presented either in the form of invited talk by researchers or in the form of journal club, where the newest research published in top scientific journals is presented.

PhD students present their work in English at the seminars of the Department. English research seminars are organized also by other Departments, for Example Dept. Molecular and Cellular Biology and Genetics.

The Dept. Med. Biol. offers several courses in English, such as Introduction into Biomedicine, Immunology, Virology, Cell culture techniques