

Personal Details

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Impacted publications: 21, WoS H-index 7, 5-year H-index 7.

Scientific interest

I am a senior postdoctoral researcher with great experience in the field of translation immunology and inflammation, especially in biology of innate immune cells and its contribution to serious septic shock. I already authored the studies addressing the changes of monocytes subsets and PMNs together with their activation status in patients affected by septic shock, identifying them as novel predictive markers for early death in ICU (JCMM, 2020, Front. Immunol 2021, Front. Immunol 2023). These markers can be used for early stratification of patients, who will not respond for conventional therapy and are candidates for personalized treatment at the time of their admission to ICU. I also authored a review addressing the role of phagocytosis in the outcome of septic shock, (Shock, 2020). I wrote a manuscript dealing with the metabolic choices of immune cells (BioEssays, 2021). In total, I am author or co-author of 21 publications, H index 7 according to WOS. I am participating in european initiative - COST action "Converting Molecular Profiles of Myeloid Cells into Biomarkers for Inflammation and Cancer (Mye-InfoBank)." I already have experience in the field of research project management, I led and successfully finished the project NV18-06-00529 as lead investigator with final evaluation: A "excellent with international significance".

Professional experience

2021 – pres. – senior postdoctoral fellow

2018 – 2021 – postdoctoral fellow

FNUSA-ICRC, Cellular and Molecular Immunoregulation group

Translation research project focused on molecular signaling and metabolism of innate immune cells during acute inflammation and septic shock. Conceptualization of research projects and grant proposals preparation.

Supervision of undergraduate students and their projects.

2012 – 2018 – research specialist - CEITEC-MU, Division of Cellular and Molecular Biology

Scientific work elaborates with induction of inflammatory conditions in Schwannoma cells, primary Schwann cells and neurons and monitoring their response to these stimuli.

2007 – 2012 – student - MUNI, Division of Experimental biology

Master degree work based on differentiation embryonic stem cells into neural lineage by application the diverse cultivation schemes and treatments

Education

2012 - 2020 – Masaryk University, Fac. of Medicine, PhD programme – Neuroscience. Dissertation thesis: "Early cytokine production changes in Schwann cells after inflammatory stimuli in vitro."

2010 - 2012 – Masaryk University, Fac. of Science, Master's degree programme - General Biology and Immunology.

Master thesis: "The Role of Intracellular Redox Balance in Embryonic Stem Cells Neurogenesis."

2007 - 2010 – Masaryk University, Fac. of Science, Bachelor's degree programme – General Biology and Immunology.

Bachelor thesis: "Cell division – Asymmetry x Symmetry."

Acquired research grants and awards

Research grants

AZV - NU21-06-00408 – "Predictive potential of dynamic changes in neutrophil and monocyte subsets in SIRS and sepsis development after surgery or trauma." Member of research team.

AZV – NU18-06-00529 – "Role of monocyte metabolism and transcription factor networks in progression of human sepsis". Lead investigator - final evaluation – A (evaluation: "excellent with international significance")

IPR project 2022 (FNUSA) – "Development of a diagnostic procedure for determining the immunological pattern in the development of septic shock." Lead investigator.

Awards

2023 - Travel award for best abstracts, World Immune Regulation Meeting (WIRM), Switzerland 2023.

2023 – Poster award for best poster of conference, Colours of sepsis 2023.

2022 – Poster award for best poster in section "Autoimmunity and anti-infection immunity", CSAKI 2022.

2022 – Prize for best scientific publication for young researchers (2nd place), awarded by Czech Immunol. Society.

Internships abroad

November 2021 – group of Rafael Arguello, Centre for Immunology (CIML), Marseille, France.

May 2014 – group of Lars Klimaschewski, Division of Neuroanatomy, Faculty of Medicine, Innsbruck, Austria.

October 2013 – group of Stefano Geuna, Department of Clinical and Biological Sciences, University of Torino, Italy.

Training and membership in scientific societies

Training courses and workshops

2023 - Science communication workshop, COST EU action, Brussel, BE.

2022 - Leadership course – The ethics of working relationship; provided by FNUSA-ICRC, Brno, CZ.

2021 - EMBO Lab Leadership Course; provided by European Molecular Biology Organization, online.

2020 - Workshop of advanced flow cytometry; provided by Czech society for Analytical Cytometry, Prague, CZ.

2020 - Workshop “How to write a competitive project proposal”; provided by FNUSA-ICRC, online.

2019 - Course of scientific writing; provided by Insight Editing London, London

Membership in scientific societies and working groups

2021 - pres. - COST action – Pan-European working group, topic: Converting molecular profiles of myeloid cells into biomarkers for inflammation and cancer

2021 - pres. - Czech Immunological Society (CIS)

2020 - pres. - Young European Federation of Immunology societies (yEFIS)

2019 - pres. - Czech Society of Analytical Cytometry (CSAC)

Educational and mentoring activities

2023 – pres. – supervisor of 2 PhD students. Biomedical Science (Fac. Of Medicine), Immunology (Fac. of Science), Masaryk University

2023 – pres. - participation in teaching Advanced methods in Immunology, Faculty of Science, Masaryk University

2022 - pres. - participation in teaching Modern Imaging and Analytical Methods in Cellular Biology and Immunology, Faculty of Medicine, Masaryk University

2021 - pres. - supervisor of 2 bachelor and 2 diploma students and their theses, 2 successfully defended bachelor student, supervisor of 1 rigorous project. EMBO Lab Leadership Course; training students in various laboratory methods and techniques, design of experiment, help with discussion and interpretation of analyzed data.

2021 - pres. - Participation in ICRC academy – Advisory Board member. Presenting of science to high school and bachelor students and trying to recruit talents to study biological sciences. Involved as scientific speaker and member of evaluation committee for students' graduation projects. 2 successfully defended projects.

2021 - Participation in teaching of pre-gradual students of Immunology – Faculty of Science, Charles University, Prague.

Scientific publications

Hortová-Kohoutková M, Skotáková M, Onyango IG, Slezáková M, Panovský R, Opatřil L, Slanina P, De Zuani M, Mrkva O, Andrejčinová I, Lázníčková P, Dvončová M, Mýtníková A, Ostland V, Šitina M, Stokin GB, Šrámek V, Vlková M, Helán M, Frič J. „Hepcidin and ferritin levels as markers of immune cell activation during septic shock, severe COVID-19 and sterile inflammation.“ *Frontiers of Immunology*, 2023 Jan; doi: 10.3389/fimmu.2023.1110540. PMID: 36776891.

Čarna M, Onyango IG, Katina S, Holub D, Novotny JS, Nezvedova M, Jha D, Nedelska Z, Lacovich V, Vyvere TV, Houbrechts R, Garcia-Mansfield K, Sharma R, David-Dirgo V, Vyhnalek M, Texlova K, Chaves H, Bakkar N, Pertierra L, Vinkler M, Markova H, Laczo J, Sheardova K, **Hortova-Kohoutkova M**, Frič J, Forte G, Kaňovsky P, Belaškova S, Damborsky J, Hort J, Seyfried NT, Bowser R, Sevlever G, Rissman RA, Smith RA, Hajduch M, Pirrotte P, Spacil Z, Dammer EB, Limbäck-Stokin C, Stokin GB. „Pathogenesis of Alzheimer's disease: Involvement of the choroid plexus.“ *Alzheimers Dementia*, 2023 Feb; doi: 10.1002/alz.12970

Hortova-Kohoutkova M; Filep JG; Fric J. “Editorial: Lactate metabolism and regulation of the immune response.” *Frontiers of Immunology* 2022 Dec, doi: 10.3389/fimmu.2022.1103379

Jedlicka M; Feglarova T; Janstova L; **Hortova-Kohoutkova M**; Fric J. “Lactate from the tumor microenvironment - A key obstacle in NK cell-based immunotherapies.” *Frontiers of Immunology* 2022 Oct; doi:

10.3389/fimmu.2022.932055.

- Tomaskova V; Mytnikova A; **Hortova-Kohoutkova M**; Mrkva O; Skotakova M; Sitina M; Helanova K; Fric J; Parenica J; Sramek V; Helan M. "Prognostic value of soluble endoglin in patients with septic shock and severe COVID-19." *Frontiers in Medicine* 2022 Aug. doi: 10.3389/fmed.2022.972040
- Bosakova V; De Zuani M; Sladkova L; Garlikova Z; Jose S; Zelante T; **Hortova-Kohoutkova M**; Fric J. „Lung Organoids—The Ultimate Tool to Dissect Pulmonary Diseases?” *Frontiers in Cell Developmental Biology* 2022 Jul, doi: 10.3389/fcell.2022.899368.
- Hortová-Kohoutková M**, De Zuani M, Lázničková P, Bendíčková K, Mrkva O, Andrejčinová I, Mytnikova A, Kočí K, Tomášková V, Šrámek V, Helán M, Frič J. "Polymorphonuclear Cells Show Features of Dysfunctional Activation During Fatal Sepsis." *Frontiers of Immunology*, 2021 Dec; doi: 10.3389/FIMMU.2021.741484. PMID: 34966382
- Vymazal O; Bendickova K; De Zuani M; Vlkova M; **Hortova-Kohoutkova M**; Fric J. "Immunosuppression Affects Neutrophil Functions: Does Calcineurin-NFAT Signaling Matter?" *Frontiers of Immunology* Nov 2021, doi: 10.3389/FIMMU.2021.770515
- Zemankova K; Pavelicova K; Pompeiano A; Mravcova L; Cerny M; Bendickova K; **Hortova-Kohoutkova M**; Dryahina K; Vaculovicova M; Fric J; Vanickova L. "Targeted metabolomics of human monocytes: Comparison of 2D-GC/TOF-MS and 1D-GC/Orbitrap-MS methods." *Journal of Chromatography B* Nov 2021, doi: 10.1016/J.JCHROMB.2021.122975.
- Hortová-Kohoutková M**, Lázničková P, Frič J. "How immune-cell fate and function are determined by metabolic pathway choice." *Bioessays*, 2021 Feb;42(2):e2000067. doi: 10.1002/bies.202000067. PMID: 33191545.
- De Zuani M, **Hortová-Kohoutková M**, Andrejčinová I, Tomášková V, Šrámek V, Helán M, Frič J. "Human myeloid-derived suppressor cell expansion during sepsis is revealed by unsupervised clustering of flow cytometric data." *Eur J Immunol.* 2021 Mar 31. Online ahead of print. doi: 10.1002/eji.202049141. PMID: 33788255
- Hortová-Kohoutková M**, Lázničková P, Bendíčková K, De Zuani M, Andrejčinová I, Tomášková V, Suk P, Šrámek V, Helán M, Frič J. "Differences in monocyte subsets are associated with short-term survival in patients with septic shock." *J Cell Mol Med.* 2020 Nov;24(21):12504-12512. doi: 10.1111/jcmm.15791. PMID: 32949213.
- Hortová-Kohoutková M**, Tidu F, De Zuani M, Šrámek V, Helán M, Frič J. "Phagocytosis-inflammation Crosstalk in Sepsis: New Avenues for Therapeutic Intervention." *Shock.* 2020 Nov;54(5):606-614. doi: 10.1097/SHK.0000000000001541. PMID: 32516170.
- Lázničková P, Kepák T, **Hortová-Kohoutková M**, Horváth L, Sheardová K, Marciniak R, Vacca C, Šiklová M, Zelante T, Rossmeislová L, Křenová Z, Štěrbá J, Bendíčková K, Frič J. "Childhood survivors of high-risk neuroblastoma show signs of immune recovery and not immunosenescence." *Eur J Immunol.* 2020 Aug 3. doi: 10.1002/eji.202048541. PMID: 32744364.
- Jose SS, De Zuani M, Tidu F, **Hortová Kohoutková M**, Pazzagli L, Forte G, Spaccapelo R, Zelante T, Frič J. "Comparison of two human organoid models of lung and intestinal inflammation reveals Toll-like receptor signaling activation and monocyte recruitment." *Clin Transl Immunology.* 2020 May 5;9(5):e1131. doi: 10.1002/cti2.1131. PMID: 32377340.
- Acerbi E, **Hortova-Kohoutkova M**, Choera T, Keller N, Fric J, Stella F, Romani L, Zelante T. "Modeling Approaches Reveal New Regulatory Networks in *Aspergillus fumigatus* Metabolism." *J Fungi (Basel).* 2020 Jul 14;6(3):E108. doi: 10.3390/jof6030108. PMID: 32674323.
- Bendíčková K, Tidu F, De Zuani M, **Kohoutková MH**, Andrejčinová I, Pompeiano A, Běláškova S, Forte G, Zelante T, Frič J. "Calcineurin inhibitors reduce NFAT-dependent expression of antifungal pentraxin-3 by human monocytes." *J Leukoc Biol.* 2020 Mar;107(3):497-508. doi: 10.1002/JLB.4VMA0318-138R. Epub 2019 Apr 1. PMID: 30934147.
- Dubovy P, Klusakova I, Hradilova-Svizenska I, Brazda V, **Kohoutkova M**, Joukal M. "A Conditioning Sciatic Nerve Lesion Triggers a Pro-regenerative State in Primary Sensory Neurons Also of Dorsal Root Ganglia Non-associated With the Damaged Nerve." *Frontiers in Cellular Neuroscience* Feb 2019, doi: 10.3389/FNCEL.2018.00457.
- Korimova A, Klusakova I, Hradilova-Svizenska I, **Kohoutkova M**, Joukal M, Dubovy P. "Mitochondrial Damage-Associated Molecular Patterns of Injured Axons Induce Outgrowth of Schwann Cell Processes." *Frontiers in Cellular Neuroscience* Nov 2018, doi: 10.3389/FNCEL.2018.00457.
- Kohoutková M**, Korimová A, Brázda V, Kohoutek J, Dubový P. "Early inflammatory profiling of schwannoma cells induced by lipopolysaccharide." *Histochemistry and Cell Biology* Dec 2017, doi: 10.1007/S00418-017-1601-5.

Selected talks presented on conferences

- Hortová-Kohoutková M.** “Functional changes of monocytes and neutrophils as markers of septic shock development and severity.” CYI Mixér 2023, Praha, Czech Republic – invited keynote talk.
- Hortová-Kohoutková M, Frič J.** “Predictive capacity of innate immunity to markers of septic shock progression.” BD days 2023, Praha, Czech Republic – invited talk.
- Hortová-Kohoutková M, Frič J.** “Predictive capacity of innate immunity to markers of septic shock progression.” MESIA 2022, Praha, Czech Republic – talk selected from abstracts.
- Hortová-Kohoutková M, Frič J.** “Immune system as source of diagnostic markers and therapeutic targets: Focused on Immunometabolism.” Alliance4Life 2022, Smolenice, Slovakia – invited talk.
- Hortová-Kohoutková M, Frič J.** “Immune system in sepsis.” Colours of sepsis 2022, Ostrava, Czech Republic - invited talk.
- Hortová-Kohoutková M, Makrečka-Kuka M, Kučera L, Valčíková B, De Zuani M, Lazničková P, Zareie A, Sedláček R, Uldrijan S and Frič J.** “Immunometabolic status of activated human monocytes is altered by immunosuppressives.” 2nd Symposium on Cancer Metabolism 2021, Prague, Czech Republic - short talk.
- Hortová-Kohoutková M, Makrečka-Kuka M, Kučera L, Valčíková B, De Zuani M, Lazničková P, Zareie A, Sedláček R, Uldrijan S and Frič J.** “Calcineurin-NFAT alters the energy metabolism of activated human monocytes.” 11th International conference Analytical Cytometry 2021, Ostrava, Czech Republic - short talk selected from abstracts
- Hortová-Kohoutková M, Lazničková P, Bendíčková K, De Zuani M, Andrejčinová I, Tomášková V, Suk P, Šrámek V, Helán M a Frič J.** “Differences in monocyte subsets are associated with short-term survival in patients with septic shock.” XXXVII. congress of Czech and Slovak allergologists and immunologists 2020 – virtual conference - short talk selected from abstracts.
- Hortová-Kohoutková M, Makrečka-Kuka M, Kučera L, Valčíková B, De Zuani M, Lazničková P, Zareie A, Sedláček R, Uldrijan S and Frič J.** “Calcineurin-NFAT alters the energy metabolism of activated human monocytes.” EMBO-EMBL symposium 2019, Heidelberg, Germany – short talk selected from abstracts.
- Hortová-Kohoutková M, Bartoňová J, De Zuani M, Makrečka-Kuka M, Lazničková P and Frič J.** “Metaboprofiling of human monocytes by flow cytometry.” 10th International conference Analytical Cytometry 2019, Seč, Czech Republic – short talk selected from abstracts.
- Hortová-Kohoutková M, Bendíčková K, Buřilová P, Jose S, Tidu F and Frič J.** “Monocyte signaling cascades involved in progression of sepsis.” Immunology summer school 2018, Porto Cervo, Italy – short talk selected from abstracts.

