



Medical University of Vienna

**Department of Pediatrics &
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**Division of Neonatology, Pediatric
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Doctoral candidates in the field of virology, metabolomics & antiviral immunology

The Medical University of Vienna is a long-established international cutting-edge university for medicine and a research hub as well as an innovation driver for medical sciences – in the triad of the triple track of research, education and patient care. At one of the largest and most innovative academic medical institutions in Europa, the brightest minds are at work to promote scientific research, impart forward-looking knowledge and to ensure the best possible care for patients. For this, the University uses and actively promotes cooperation. Our main campus is located in Vienna, Austria. Diversity is part of who we are, and we actively work to ensure diversity and inclusiveness in the future of our research group. Therefore, we kindly invite and warmly encourage qualified candidates from all backgrounds to join our multidisciplinary and diverse research team.

The Neonatal & Pediatric Systems Immunology group (www.wisgrill-lab.com) at the Comprehensive Center for Pediatrics at the Medical University of Vienna is looking for two outstanding

Doctoral candidates

to carry out experimental research on the recently funded WWTF Life Science Grant project *NOSE-Combating viral susceptibility in premature infants*. The project will be conducted in close collaboration with Dr. Monika Redlberger-Fritz (Department of Virology) and Dr. Benedikt Warth (University of Vienna). The overarching aim of the proposed study is to decipher the complex host-virus-microbe interplay on nasal epithelial cells detecting beneficial strains enhancing the host's antiviral epithelial immune response. The proposed project is of outstanding relevance in the field of pediatric research as preterm-born infants are highly susceptible to viral respiratory infections leading to higher morbidity and mortality. Thus, pinpointing novel mechanisms of viral susceptibility of premature infants is highly likely to detect novel prophylactic and therapeutic strategies to improve the sequelae-free survival of this high-risk patient group. In the end, we expect to identify bacterial strains, metabolic compounds and cellular targets paving the way for future precision medicine approaches in premature neonates such as nasal probiotics, targeted antibiotics, or local immunomodulatory metabolite application.

Your role and goals

Doctoral candidate #1 will work in the establishment of the clinical cohort, collecting and analyzing microbial and epithelial cell samples from the enrolled infants using microbial sequencing (16s, metagenomics, viral PCR) and bulk-RNAseq to generate a holistic analysis of our cohort. We hypothesize that the nasal microbiome, shaped by host and environmental factors, has an impact on host viral susceptibility. Therefore, we will closely monitor a cohort of extremely premature infants and term newborns for the first year of life, investigating the development of host epithelial immunity, nasal microbiome, and viral "hits" using a cross-omics approach. Utilizing a closely-monitored patient cohort and integrative bioinformatic approaches, we aim to decipher highly relevant microbial patterns affecting the host immunity against respiratory viruses.



Doctoral candidate #2 will work with established air-liquid interface nasal epithelial cell cultures for co-culture experiments (sc-RNAseq, bulk-RNAseq, metabolome) investigating mechanistic of the host-virus-microbiome interactions. Using single-cell RNAseq of nasal epithelial cell cultures, we aim to untangle the molecular and cellular choreography during nasal airway epithelial differentiation to delineate key drivers during differentiation dynamics and pathological responses in extreme premature infants. Furthermore, cell models will be stimulated separately and concomitantly with identified bacteria and viruses to elucidate how certain microbes influence the antiviral epithelial cell response. By integrating RNAseq and untargeted LC-HRMS metabolome data layers during viral stimulation of nasal cell cultures, we will investigate protective and harmful mechanisms of bacterial colonization of viral infections to unravel the underlying infectiology-relevant mechanisms. Based on the experimental results, further metabolomics experiments will investigate modulated metabolic pathways and specifically explore if certain endogenous metabolites of the host offer protective potential for the cell.

Your experience and ambitions

For this highly interdisciplinary & challenging research, we seek to recruit brilliant and open-minded individuals who are passionate for medical translational research. We require MSc or MD degree with a focus on biology, chemistry, and/or biomedicine. Experience with hands-on lab research, or skills in bioinformatics/data analysis, are considered significant assets.

What we offer

The Wisgrill Lab team is a young and ambitious research group with a good team spirit and cooperation culture. Our research work focuses on the neonatal and pediatric immune system and interactions of microbes on the developing human organism. We offer a highly interdisciplinary environment, including experts in neonatal medicine, immunology, metabolomics and virology, thus providing a broad and deep education for two young researchers. The positions are filled for a total of three years. The salary follows the current personnel costs for PhD students according to the FWF.

Ready to apply?

The deadline for application is the 31st of August, 2021. To apply for the open positions, please send a motivational letter and your CV to lukas.wisgrill@meduniwien.ac.at.