Curriculum Vitae

Univ.-Prof. Dr. Andreas Bergthaler

Position in CoE: Member of the Board of Directors

Personal Details

Place of birth	Salzburg, Austria
Nationality	Austrian
Children	2 (2018, 2019)
Affiliation:	Medical University of Vienna, CeMM
E-Mail	andreas.bergthaler@meduniwien.ac.at
Twitter	@abergthaler, @BergthalerLab
Profile	ReseacherID: ABG-5047-2020
List of publications	ORCID: 0000-0003-0597-1976
Academic age	15 years since PhD

Research Institution

As of January 2022, I am full professor of Molecular Immunology and head of the Institute of Hygiene and Applied Immunology at the Center of Pathophysiology, Infectiology and Immunology at the *Medical University of Vienna* (MedUni Vienna). MedUni Vienna with more than 5,500 employees (1,800 researchers and 1,600 medical doctors) is **one of the largest medical schools** in Europe and pursues strong basic and translational research programs. I also remain adjunct principal investigator at the *CeMM Research Center for Molecular Medicine* of the Austrian Academy of Sciences. CeMM represents one of the **premier flagships** of biomedical research in Austria and is a founding member of the EU-Life initiative leading European institutes in life sciences. CeMM scientists address fundamental questions in the areas of cancer, infection, inflammation and the development of new technologies. Cutting-edge core facilities for sequencing, proteomics, metabolomics and chemical biological screening as well as a vibrant community of computational biologists and data analysts provide a **highly collaborative environment**. The scientific excellence of MedUni Vienna and CeMM is demonstrated by a continuous stream of publications in high impact journals, numerous ERC grantees among faculty and outstanding international PhD and PostDoc programs.

Academic Career and Positions Held

After my studies of veterinary medicine at the **University of Veterinary Medicine in Vienna (1997–2003)**, I did my **doctoral work** in immunology and virology supported by a Boehringer Ingelheim Fund scholarship with Hans Hengartner and Nobel Laureate Rolf Zinkernagel at the Institute of Experimental Immunology, University and **ETH Zurich**, Zurich Switzerland **(2003–2006)**. This was followed by postdoctoral work with Daniel Pinschewer in Zurich and at the **University of Geneva**. Subsequently, I worked as a **postdoctoral fellow** in systems biology supported by a Fellowship for Advanced Researchers by Swiss National Science Foundation and an EMBO Long-Term fellowship with Alan Aderem at the **Institute for Systems Biology in Seattle**, US **(2008–2011)** before accepting a position as **principal investigator** at the **CeMM** Research Center for Molecular Medicine of the Austrian Academy of Sciences in Vienna, Austria. In January **2022**, I assumed a **full professorship** as Professor of Molecular Immunology and institute head at the **Medical University of Vienna**, Vienna Austria (see above).

In my career, I obtained funding of >12 million €. This includes an **ERC Starting Grant**, grants from the Austrian Science Fund (FWF) and the Vienna Science and Technology Fund (WWTF) as well as research funding by Austrian authorities. Since 2011, I supervised 12 postdoctoral fellows, 9 PhD students, 7 Master's

students, 5 interns, 5 research assistants, 2 animal caretakers and 5 pupils. Several of them assumed permanent positions in academia or industry in Austria or abroad. I have been active in community services by serving in different working groups and commissions (e.g., institutional Biosafety Deputy Officer, National Commission for Genetic Engineering, COVID-19 Future Operations Working Group Public Health, national pandemic top advisory board GECKO) and since 2012, I have organised five scientific meetings. I have been active in **scientific outreach** as exemplified by regular science workshops in highschools and as co-initiator of the national school webstream series "Breaking the Wave". During the pandemic, I gave **>90 scientific talks** about our SARS-CoV-2 work to diverse academic and lay audiences and ca. 900 media interviews including regular TV appearances in national and international channels. I received **several awards**, which include the Golden Honour Medal for Special Merits, University of Veterinary Medicine Vienna, the Löffler-Frosch-Prize of the Society of Virology, the Georges-Köhler Prize of the German Society for Immunology, the Milstein Young Investigator Award of the Intl. Cytokine & Interferon Society, the Austrian Infection Research Prize, Austrian Society for Infectious Diseases & Tropical Medicine and, in 2019, the nomination for "Austrian of the Year in the Category Research". I am also **co-founder** of several companies, including the Nasdaq-listed immunotherapy company **Hookipa Pharma**. Career breaks include civil service (1996-1997) and paternity leaves (1–2/2019, 10–11/2020)

Main Research Areas and Most Important Research Achievement

I co-authored **81 publications** (16 last-authored studies; 4418 citations, h-index 35, Google Scholar September 29th 2022) in top journals including Nature, Nature Immunology, Nature Biotechnology, Immunity, Science Translational Medicine, Science Immunology and Nature Reviews Immunology.

A main focus of our research addresses the inherently complex interplay of **immunology and metabolism** on a cellular, tissue and systemic level. We embrace the **pathophysiological context** and pursue **multi-organ approaches** using well-defined animal models of disease relevance and **cutting-edge technologies** including next-generation sequencing protocols, metabolite tracing, complementary spatial techniques and non-invasive imaging (reviewed in Lercher et al. Immunity 2020). Previously, we elucidated novel molecular mechanisms of the immunometabolic disease cachexia and mapped cytokine-induced reprogramming of liver metabolism (e.g., Baazim et al. Nature Immunology 2019, Lercher et al. Immunity 2019, Baazim et al. Nature Reviews Immunology 2021). We continue to address fundamental questions of systemic immunometabolism and are particularly interested in energy substrate utilization across organs and the impact of metabolites and the microbiome on sickness behaviour. Our holistic and pathophysiology-driven approaches integrates seemingly distant areas from biological processes, pathways, cell types, organs and/or molecular disease entities to unravel hitherto unknown fundamental processes of homeostasis and disease.

Our second main focus research is centered on advanced **pathogen surveillance** in the context of the **SARS-CoV-2 virus** pandemic and other pathogens. Until July 2022, my group contributed >50% of all virus whole genome sequences from Austria to the database GISAID and made important contributions to the fields of **genomic epidemiology** (Popa et al. Science Translational Medicine 2020) and immunology (Agerer et al. Science Immunology 2021). Importantly, we also established a scientific collaborative framework for a weekly **wastewater-based national surveillance** program for SARS-CoV-2, covering >90 municipal catchments, serving >55% of the population. We developed novel **bioinformatic** methodology to deduce variant abundance from complex wastewater samples and cross-validated wastewater-derived data with >300.000 epidemiological cases (Amman et al. Nature Biotechnology 2022). Our work continues to directly contribute to the national pandemic management and public health efforts.

Contribution to CoE. Our specific scientific contributions to the CoE will be in two distinct areas:
i) We will provide our expertise in infectious diseases by employing defined models of viral infection to investigate the pathophysiological relevance of microbes for **inter-organ communication** and **immunometabolism**. We

will collaborate with CoE members to investigate how gut microbes communicate with each other in the small intestine, and how their activities impact the immune system of the host. This will be supported by our demonstrated expertise and the integrative application of established cutting-edge techniques.
ii) We will apply the experimental and computational expertise together with our extensive scientific and logistical network to mount an ambitious program of **next-gen wastewater-based pathogen surveillance**. Together with the vast scientific strengths existing within the CoE, we will develop novel approaches to surveil and dissect the microbial content of wastewater to make important contributions to national and **global public health**.

10 Most Important Publications (*relevant for the CoE)

1. *Baazim, H.; Antonio-Herrera, L.; **Bergthaler, A.** The Interplay of Immunology and Cachexia in Infection and Cancer. *Nat Rev Immunol* **2022**, *22* (5), 309–321. *https://doi.org/10.1038/s41577-021-00624-w*.
2. Agerer, B.; Koblischke, M.; Gudipati, V.; (36 co-authors); Huppa, J. B.; Aberle, J. H.; **Bergthaler, A.** SARS-CoV-2 Mutations in MHC-I-Restricted Epitopes Evade CD8 + T Cell Responses. *Sci. Immunol.* **2021**, *6* (57), eabg6461. *https://doi.org/10.1126/sciimmunol.abg6461*.
3. *Krausgruber, T.; Fortelny, N.; Fife-Gernedl, V.; Senekowitsch, M.; Schuster, L. C.; Lercher, A.; Nemc, A.; Schmidl, C.; Rendeiro, A. F.; **Bergthaler, A.**; Bock, C. Structural Cells Are Key Regulators of Organ-Specific Immune Responses. *Nature* **2020**, *583* (7815), 296–302. *https://doi.org/10.1038/s41586-020-2424-4*.
4. *Baazim, H.; Schweiger, M.; Moschinger, M.; Xu, H.; Scherer, T.; Popa, A.; Gallage, S.; Ali, A.; Khamina, K.; Kosack, L.; Vilagos, B.; Smyth, M.; Lercher, A.; Friske, J.; Merkler, D.; Aderem, A.; Helbich, T. H.; Heikenwälder, M.; Lang, P. A.; Zechner, R.; **Bergthaler, A.** CD8+ T Cells Induce Cachexia during Chronic Viral Infection. *Nat Immunol* **2019**, *20* (6), 701–710. *https://doi.org/10.1038/s41590-019-0397-y*.
5. *Lercher, A.; Bhattacharya, A.; Popa, A. M.; (22 co-authors); Trauner, M.; Klavins, K.; **Bergthaler, A.** Type I Interferon Signaling Disrupts the Hepatic Urea Cycle and Alters Systemic Metabolism to Suppress T Cell Function. *Immunity* **2019**, *51* (6), 1074–1087.e9. *https://doi.org/10.1016/j.immuni.2019.10.014*.
6. *Lercher, A.; Baazim, H.; **Bergthaler, A.** Systemic Immunometabolism: Challenges and Opportunities. *Immunity* **2020**, *53* (3), 496–509. *https://doi.org/10.1016/j.immuni.2020.08.012*.
7. Popa, A.; Genger, J.-W.; Nicholson, M. D.; (33 co-authors); Bock, C.; **Bergthaler, A.** Genomic Epidemiology of Superspreading Events in Austria Reveals Mutational Dynamics and Transmission Properties of SARS-CoV-2. *Sci. Transl. Med.* **2020**, *12* (573), eabe2555. *https://doi.org/10.1126/scitranslmed.abe2555*.
8. Bhattacharya, A.; Hegazy, A. N.; (19 co-authors); Löhning, M.; **Bergthaler, A.** Superoxide Dismutase 1 Protects Hepatocytes from Type I Interferon-Driven Oxidative Damage. *Immunity* **2015**, *43* (5), 974–986. *https://doi.org/10.1016/j.immuni.2015.10.013*.
9. Schliehe, C.; Flynn, E. K.; (23 co-authors); Aderem, A.; **Bergthaler, A.** The Methyltransferase Setdb2 Mediates Virus-Induced Susceptibility to Bacterial Superinfection. *Nat Immunol* **2015**, *16* (1), 67–74. *https://doi.org/10.1038/ni.3046*.
10. Amman, F.; Markt, R.; Endler, L.; (28 authors); Kreuzinger, N.; Insam, H.; **Bergthaler, A.** Viral Variant-Resolved Wastewater Surveillance of SARS-CoV-2 at National Scale. *Nat Biotechnol* **2022**. *https://doi.org/10.1038/s41587-022-01387-y*.