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Research interests

Basic research - Pathophysiology of immune-mediated diseases:

- **Epigenetics:** My research group investigates the influence of transcriptional and epigenetic modifications on development and stability of various immune cells under inflammatory conditions.
- **Autoimmunity:** We investigate factors that drive the development of pathogenic T cells, to identify and validate new treatment targets, and to study critical transcription factors, important for the balance of effector versus regulatory T cells. Within the frame of international collaborations, we explore the association of infectious diseases, environmental and genetic factors with the manifestation of autoimmune diseases.
- **Structural Immunity:** We study structural immunity by focusing on the role of fibroblast - immune cell interactions as drivers of synovial tissue inflammation.
- **Precision medicine:** My research group aims to identify and validate biomarker for treatment response to enable a personalized treatment strategy. We are further interested in the JAK-STAT signaling pathway and investigate the differences between pan and selective JAK-STAT inhibition.

Clinical research (personalized medicine): my research group investigates serological, cellular, and histological data from biobanked material in combination with epidemiological data derived from clinical cohorts for classification, diagnosis, prediction of disease progression and treatment response in patients with rheumatic diseases.

Clinical trials: we combine clinical and investigator-initiated trials with basic research tools to address translational research questions, including treatment response of novel therapeutic compounds and the cellular and humoral immune responses to COVID-19 vaccinations in patients under immunosuppressive therapy.

Current positions

Director, basic and translational science unit Medical University of Vienna, Division of Rheumatology, Vienna, Austria | since 2024

Principal Investigator, Ludwig Boltzmann Institute for Arthritis and Rehabilitation, Vienna, Austria | since 2021

Associate Professor, Medical University of Vienna, Vienna, Austria | since 2018

Consultant for Rheumatology, Medical University of Vienna, Vienna, Austria | since 2018

Principal Investigator, Division of Rheumatology, Medical University of Vienna, Vienna, Austria | since 2015

Consultant for Internal Medicine, Medical University of Vienna, Vienna, Austria | since 2015

Guest Researcher, National Institute of Arthritis and Musculoskeletal and Skin Disease (NIAMS), National Institute of Health (NIH), Bethesda, MD, USA | since 2018

Previous positions

Postdoctoral Researcher, John O'Shea's lab, head of the National Institute of Arthritis and Musculoskeletal and Skin Disease (NIAMS), National Institute of Health (NIH), Bethesda, MD, USA. NIH, Research fellowship | 2011-2014

Resident in Internal Medicine, Medical University of Vienna, Vienna, Austria | 2005-2011

Education & Certifications

“Ruf” for a full W3 professorship at the Christian-Albrecht-Universität zu Kiel, Germany | 2024

First-ranked candidate for full professorship and head of the Department of Rheumatology & Immunology, Medical University of Graz, Austria | 2020

Board certification for Rheumatology, Medical University of Vienna, Vienna, Austria | 2018

Research Habilitation (*Venia docendi*) in Internal Medicine, Medical University of Vienna, Vienna, Austria | 2016

Board certification for Internal Medicine, Medical University of Vienna, Vienna | 2015

Graduation from medical school (N201) | Medical University of Vienna, Vienna, Austria | 2005

Doctoral thesis “Regulatory T cells under steady state and autoimmune conditions” | University of Vienna, Division of Rheumatology, Prof. C. Scheineker, MD (**grade 1.0**), Vienna, Austria | 2004

Medical school, University of Vienna (N201), Vienna, Austria | 1997-2004

Scientific Management and Organization

- > 40 invited presentations at national & international **conferences** in the field of **Rheumatology** (ACR, EULAR, EWRR, CCR, ÖGR) and **Immunology** (ECI, ACI, IIG, Keystone symposia)
- Scientific member, co-chair and **organizer of** the 41st European Workshop of Rheumatology Research (**EWRR 2021**)

- Regular and active participations in **European funded project meetings**: Autocure (FP6), Masterswitch (FP7), BTCure (IMI) and RTCure (IMI), Horizon Europe “Squeeze” (work package leader at coordinating center; period 2022-2027), Horizon Europe “DarkMatter” (work package leader; period 2023-2029)

Teaching (selected)

Teaching for Medical Students at the Medical University of Vienna, Vienna, Austria
Lecturer for the Master Program “Molecular Precision Medicine” and the PhD Program in Immunology at the Medical University of Vienna; since 2015

Mentoring

Postdocs:

Teresa Preglej (ongoing) | <https://www.linkedin.com/in/teresa-preglej-aa6021199/>

Lisa Göschl (ongoing)

Anela Tosevska (ongoing) | <https://at.linkedin.com/in/anela-tosevska-505609150>

Lena Müller (2020-2023) | current position: head of the mass cytometry unit at MUW

PhD students:

Marie Brinkmann (ongoing) | <https://www.linkedin.com/in/marie-brinkmann-04a7851b0/>

Laura Hermann (ongoing)

Mirjam Dellinger (ongoing) | <https://www.linkedin.com/in/mirjam-dellinger-8146ab200/>

Bianca Luckerbauer (ongoing) | <https://www.linkedin.com/in/bianca-luckerbauer-83890b1b5/>

Daniel Mrak (ongoing) | <https://www.linkedin.com/in/daniel-mrak-a42841284/>

Kastriot Kastrati (ongoing)

Maximilian Kugler (2019-2023) | <https://www.linkedin.com/in/maximilian-kugler-346812114/>

M.Sc. students:

Mirjam Dellinger (2020-2021) | <https://www.linkedin.com/in/mirjam-dellinger-8146ab200/>

Marie Brinkmann (2021-2022) | <https://www.linkedin.com/in/marie-brinkmann-04a7851b0/>

B.Sc. student:

Lina Breit (2020-2021) | <https://www.linkedin.com/in/lina-breit-19b964245/>

Diploma student:

Lisa Göschl (2010-2011)

Fellowships & Awards earned by lab members:

Marietta Blau fellowship | 2024

Career development Award (MUW) | 2024

Travel Award (OeGR) | 2024

Publication Award 2023 | OeGR

Poster Award 2022, 2023 | OeGR

Poster Award 2023 | EWRR

Master’s Thesis Award 2022, 2023 | OeGR

ÖGR Lilly innovation award | 2018, 2019 & 2021

ÖGR Science award | 2017

ÖGR Publication award | 2016

Reviewer, Editor & institutional responsibilities (selected)

Reviewer for the following journals:

Arthritis and Rheumatology

Annals of Rheumatic Diseases

Rheumatology

Arthritis Research and Therapy

Lancet Rheumatology

Nature Medicine

Ongoing since 2008

Nature Communications

Clinical Experimental Rheumatology

Journal of Immunology

European Journal of Immunology

International Immunology

Frontiers in Immunology

Working group member of the gender & equality working group of the ÖGAI, since 2023

Steering committee member of the Austrian Society of Allergology and Immunology (ÖGAI), since 2022

Section Editor for the journal “Wiener Klinische Wochenschrift” since 2021

Scientific Advisory Board member of the University of Chiba, Japan, since 2020

Grant Reviewer for the following organizations:

UK Research Institute (UKRI)

Deutsche Forschungsgesellschaft (DFG)

French National Research Agency (ANR)

Austrian National Bank

Medical Scientific Fund of the Mayor of Vienna

Ongoing since 2014

Memberships to the following organizations:

Austrian Society of Rheumatology | since 2005

Austrian Society of Allergology and Immunology | since 2021

Austrian Society of Internal Medicine | since 2014

Awards & Fellowships

Lilly Innovation Awards (senior author):

2021 “Development of a High-Throughput

Drug Screening Platform from T-cell –

FLS interactions in RA”

2019 “NFIL3 - A treatment target in

Rheumatoid Arthritis”

2018 “HDACS: new treatment targets for

Rheumatoid Arthritis”

ÖGR Science Award “T cells and synovial fibroblasts: partners in crime” (supervisor),

2017

VFWF Habilitation Award, 2017

ÖGR Publication Award, 2016

Inflammation Europe Aspire Research

Award “Epigenetic reprogramming of rheumatoid fibroblast-like synoviocytes (RA-FLS) with JAKinibs”, 2016

ÖGR-Roche Young Scientist Award, 2014

MSD-sponsored Scientific Award for Young Scientists, 2013

FWF | Erwin-Schrödinger Postdoctoral

Fellowship, 2011

ÖGR Poster Award, 2008

Research Funding

> **2.5 million €** of funding independently raised for my laboratory since 2017 was obtained in 12 internationally peer-reviewed research grants:

- **Horizon-Europe** project “MDA-RA”, 2024.
- **FWF Doc.Fund PhD** program, (Coordinator: Maria Sibilica) “Securing Host Immunity – Elimination versus Destruction - SHIELD”), principal investigator, approx. **300.000 €**, 2024-2028
- **Horizon-Europe** project “Dark matter” (101136582), principal investigator, **550.000 €**, 2023.
- **Horizon-Europe** project “Squeeze”, principal investigator, 2022
- **SFB (FWF):** HDACs as regulators of T-cell-mediated immunity in Health and Disease (subproject F7004), principal investigator, **407.526 €**, 2023 - 2027
- **Boehringer Research Collaboration**, principal investigator, **15.000 €**, 2022
- **Galapagos Research Foundation** grant “Time-resolved transcriptomic and epigenetic cell profiling of RA patients treated with Filgotinib”, principal investigator, **250.000 €**, 2023
- **GSK Innovate Medicine Initiative Grant** “Automated high-content microscopy: a new tool to discover personalized treatment strategies for inflammatory diseases”, principal investigator **180.000 €**, 2022
- **FWF stand-alone grant** “Molecular control of regulatory T cells by the Transcription Factor NFIL3”, principal investigator **402.000 €**, 2021 - 2026
- **SFB (FWF):** HDACs as regulators of T-cell-mediated immunity in Health and Disease (subproject F7004), principal investigator, **378.000 €**, 2018 - 2023
- **Jubiläumsfond der Österreichischen Nationalbank** (Development of new treatment strategies for patients with Rheumatoid Arthritis), principal investigator, **140.000 €**, 2017 - 2021
- **Medical science fond** of the city of Vienna (Type 1 regulatory T cells in patients with Rheumatoid Arthritis), principal investigator, **15.000€**, 2017

Selected clinical trials with major contribution

I contributed in > 10 Phase II / III and investigator-initiated clinical trials as principle and sub investigator such as PREDICTRA (2015-2018), RHBX (2016-2019), LUPIL-2 (2016-2019), PMR-Spare (2017-2020), TarIFNira (2018-2020), CC-10004-PSA-014 (2018-2020), CC-10004-PSA-013 (2018-2020).

Leadership experience

- Research lab head (Bonelli Laboratory; <https://innere-med-3.meduniwien.ac.at/en/unsere-abteilungen/rheumatologie/research/group-of-michael-bonelli>) since 2015. Supervision of PostDocs, PhD students, master students, bachelor students, and diploma students. Supervision of 5 research technicians and one computational biologist

- Principal and sub-investigator of multiple phase II / III clinical trials and investigator-initiated trials
- Co-lead of the clinical trial unit since 2016 including supervision and mentoring of study coordinators and study nurses
- Co-lead and coordination of Biobank, PBMC and tissue bank encompassing over 100.000 samples
- Senior physician with supervision of medical doctors in training since 2015
- Management of the outpatient clinic and clinical ward at the Division of Rheumatology
- Project management of national (e.g. SFB, FWF stand-alone project) and international (IMI2 [RTcure, BTCure], Horizon Europe [Squeeze]; [DarkMatter]) research projects

Publication summary

I have so far published over 64 scientific manuscripts with a cumulative citation index of 5315 and an H-index of 34 according to Google Scholar.

Selection of 10 recent peer-reviewed publications (2020-2024):

Kugler M, Dellinger M, Kartnig F, Müller L, Preglej T, Heinz LX, Simader E, Göschl L, Puchner SE, Weiss S, Shaw LE, Farlik M, Weninger W, Superti-Furga G, Smolen JS, Steiner G, Aletaha D, Kiener HP, Lewis MJ, Pitzalis C, Tosevska A, Karonitsch T, **Bonelli M.** (2023); Cytokine-directed cellular cross-talk imprints synovial pathotypes in rheumatoid arthritis. Ann Rheum Dis. 2023 Sep;82(9):1142-1152. doi: 10.1136/ard-2022-223396. **(IF: 27.4)**

Preglej T, Brinkmann M, Steiner G, Aletaha D, Göschl L, **Bonelli M.** (2023) Advanced immunophenotyping: A powerful tool for immune profiling, drug screening, and a personalized treatment approach. Front Immunol. 2023 Mar 24;14:1096096. doi: 10.3389/fimmu.2023.1096096. **(IF: 7.3)**

Mrak D, Kartnig F, Sieghart D, Simader E, Radner H, Mandl P, Göschl L, Hofer P, Deimel T, Gessl I, Kain R, Winkler S, Smolen JS, Perkmann T, Haslacher H, Aletaha D, Heinz LX, **Bonelli M.** (2023). Accelerated waning of immune responses to a third COVID-19 vaccination in patients with immune-mediated inflammatory diseases. J Autoimmun. 2023 Feb;135:102981. doi: 10.1016/j.jaut.2022.102981. **(IF: 12.8)**

Mrak, D., Sieghart, D., Simader, E., Tobudic, S., Radner, H., Mandl, P., Göschl, L., Koblischke, M., Hommer, N., Wagner, A., Mayer, M., Schubert, L., Hartl, L., Kozbial, K., Hofer, P., Kartnig, F., Hummel, T., Kerschbaumer, A., Deimel, T., Puchner, A., **Bonelli, M.** (2022). Heterologous vector versus homologous mRNA COVID-19 booster vaccination in non-seroconverted immunosuppressed patients: a randomized controlled trial. Nature communications, 13(1), 5362. <https://doi.org/10.1038/s41467-022-33036-y> **(IF: 16.6)**

Kartnig, F., Mrak, D., Simader, E., Tobudic, S., Radner, H., Mandl, P., Göschl, L., Hommer, N., Mayer, M., Hofer, P., Hummel, T., Deimel, T., Geßl, I., Puchner, A., Kerschbaumer, A., Thalhammer, R., Handisurya, A., Kain, R., Winkler, S., Smolen, J. S., **Bonelli, M.** (2022). Safety and immunogenicity of a third COVID-19 vaccination in patients with immune-mediated inflammatory diseases compared with healthy controls. *Ann Rheum Dis.* [annrheumdis-2022-222682](https://doi.org/10.1136/ard-2022-222682). Advance online publication. <https://doi.org/10.1136/ard-2022-222682> (IF: 27.4)

Mrak, D., Simader, E., Sieghart, D., Mandl, P., Radner, H., Perkmann, T., Haslacher, H., Mayer, M., Koblichke, M., Hofer, P., Göschl, L., Kartnig, F., Deimel, T., Kerschbaumer, A., Hummel, T., Kornek, B., Thalhammer, R., Stiasny, K., Winkler, S., Smolen, J. S., **Bonelli, M.** (2022). Immunogenicity and safety of a fourth COVID-19 vaccination in rituximab-treated patients: an open-label extension study. *Ann Rheum Dis.* 81(12), 1750–1756. <https://doi.org/10.1136/ard-2022-222579> (IF: 27.4)

Mrak, D., Tobudic, S., Koblichke, M., Graninger, M., Radner, H., Sieghart, D., Hofer, P., Perkmann, T., Haslacher, H., Thalhammer, R., Winkler, S., Blüml, S., Stiasny, K., Aberle, J. H., Smolen, J. S., Heinz, L. X., Aletaha, D., & **Bonelli, M.** (2021). SARS-CoV-2 vaccination in rituximab-treated patients: B cells promote humoral immune responses in the presence of T-cell-mediated immunity. *Ann Rheum Dis.* 80(10), 1345–1350. <https://doi.org/10.1136/annrheumdis-2021-220781> (IF: 27.4)

Bonelli M., Radner H, Kerschbaumer A, Mrak D, Durechova M, Stieger J, Husic R, Mandl P, Smolen JS, Dejaco C, Aletaha D. (2022) Tocilizumab in patients with new onset polymyalgia rheumatica (PMR-SPARE): a phase 2/3 randomised controlled trial. *Ann Rheum Dis.* doi: 10.1136/annrheumdis-2021-221126 (IF: 27.4)

Bonelli, M. Mrak, D., Perkmann, T., Haslacher, H., & Aletaha, D. (2021) SARS-CoV-2 vaccination in rituximab-treated patients: evidence for impaired humoral but inducible cellular immune response. *Ann Rheum Dis.* 80(10), 1355–1356. <https://doi.org/10.1136/annrheumdis-2021-220408> (IF: 27.4)

Göschl, L., Preglej, T., Boucheron, N., Saferding, V., Müller, L., Platzer, A., Hirahara, K., Shih, H. Y., Backlund, J., Matthias, P., Niederreiter, B., Hladik, A., Kugler, M., Gualdoni, G. A., Scheinecker, C., Knapp, S., Seiser, C., Holmdahl, R., Tillmann, K., Plasenzotti, R., Podesser, B., Aletaha, D., Smolen, J. S., Karonitsch, T., Steiner, G., Ellmeier, W., **Bonelli, M.** (2020) Histone deacetylase 1 (HDAC1): A key player of T cell-mediated arthritis. *J Autoimmun.* Mar;108:102379. doi: 10.1016/j.jaut.2019.102379 (IF: 12.8)