

Biosketch

Univ.-Prof.ⁱⁿ Dr.ⁱⁿ techn. Ruth Birner-Grünberger

Position in CoE: Key Researcher

Personal Details

Place of birth	Graz, Austria
Nationality	Austrian
Children	–
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Profile	ResearcherID: E-8623-2010
List of publications	ORCID: 0000-0003-3950-0312
Academic age	20 years since PhD



Academic Career and Positions Held

I studied **Technical Chemistry** in Graz (1991-1998). For my **Master's thesis**, I went to the **RMIT** (Royal Melbourne Institute on Technology) in Australia to work on bacterial membrane lipids and proteins (1996–1997). I then returned to **TU Graz** for my **PhD** (supervised by Günter Daum), focusing on yeast mitochondrial lipids (1998–2002). Afterwards, I stayed at **TU Graz** as a **PostDoc** in the group of Albin Hermetter in a large consortium project called GOLD (genomics of lipid-associated disorders) led by Rudolf Zechner (2002–2007). It was during that time that I obtained my first own grants and developed activity-based proteomics of lipases. After my **habilitation** in biochemistry in **2007**, I started my **own group** at the **Medical University of Graz**, where I set up and led a core facility for proteomics. In **2011**, I was appointed **Associate Professor** at the **Institute of Pathology at Medical University of Graz**. Since 2013, I have headed the *Omics Center Graz*. I have been a guest professor at institutions around the globe, namely ETH Zurich (2016), UC-Berkeley (2017) and the University of Witwatersrand in Johannesburg (2018). I further have had many functions in research societies: president of the Austrian Proteomics and Metabolomics Association (*APMA*, 2015–2019, vice president 2019–2021), member of the General Council of the Human Proteome Organization (*HUPO*, since 2017) and board member of the Deutsche Gesellschaft für Fettwissenschaft (*DGF*, since 2019). In July **2019**, I was appointed **Full Professor** at the **Institute of Chemical Technologies and Analytics of TU Wien**, where I head the research division of Instrumental Analytics and Imaging.

Scientific Achievements and Scientific Contribution to the CoE

Scientific Achievements. I have made major contributions in lipid metabolism including functional elucidation of mitochondrial phosphatidylethanolamine synthesis and intracellular lipid transport, **discovery** of **Adipose Triglyceride Lipase** (ATGL), a key enzyme in intracellular lipid mobilization, and novel phosphosites of its regulators CGI-58 and PLIN5. Currently, I investigate the role of **lipolysis** in cancer and lipid-related diseases. I have developed and applied activity-based and affinity probes based on click chemistry for enzyme discovery and profiling (of lipases, serine hydrolases, cysteine proteases and oxidoreductases). Currently I elucidate **pollen proteases** implicated in the development of **allergic rhinitis**. My team has extensive experience in proteomics, metabolomics and lipidomics and has developed several methods (e.g., activity-based proteomics, one carbon metabolomics, combined redox metabolomics and proteomics), which they apply routinely.

Scientific Contribution to the CoE. My team and I will provide our expertise in enzyme discovery, proteomics, metabolomics and lipidomics and state-of-the-art mass spectrometry *infrastructure* (2 Bruker tims-TOF pro mass spectrometers).

10 Most Important Publications (*relevant for the CoE)

1. *Darnhofer, B.; Tomin, T.; Liesinger, L.; Schittmayer, M.; Tomazic, P. V.; **Birner-Gruenberger, R.** Comparative Proteomics of Common Allergenic Tree Pollens of Birch, Alder, and Hazel. *Allergy* **2021**, *76* (6), 1743–1753. <https://doi.org/10.1111/all.14694>.
2. *Neuendorf, C. S.; Vignolle, G. A.; Derntl, C.; Tomin, T.; Novak, K.; Mach, R. L.; **Birner-Grünberger, R.**; Pflügl, S. A Quantitative Metabolic Analysis Reveals *Acetobacterium Woodii* as a Flexible and Robust Host for Formate-Based Bioproduction. *Metabolic Engineering* **2021**, *68*, 68–85. <https://doi.org/10.1016/j.ymben.2021.09.004>.
3. Honeder, S.; Tomin, T.; Nebel, L.; Gindlhuber, J.; Fritz-Wallace, K.; Schinagl, M.; Heininger, C.; Schittmayer, M.; Ghaffari-Tabrizi-Wizsy, N.; **Birner-Gruenberger, R.** Adipose Triglyceride Lipase Loss Promotes a Metabolic Switch in A549 Non-Small Cell Lung Cancer Cell Spheroids. *Molecular & Cellular Proteomics* **2021**, *20*, 100095. <https://doi.org/10.1016/j.mcpro.2021.100095>.
4. *Schittmayer, M.; Vujic, N.; Darnhofer, B.; Korbilius, M.; Honeder, S.; Kratky, D.; **Birner-Gruenberger, R.** Spatially Resolved Activity-Based Proteomic Profiles of the Murine Small Intestinal Lipases. *Molecular & Cellular Proteomics* **2020**, *19* (12), 2104–2115. <https://doi.org/10.1074/mcp.RA120.002171>.
5. *Wallace, P. W.; Haernvall, K.; Ribitsch, D.; Zitzenbacher, S.; Schittmayer, M.; Steinkellner, G.; Gruber, K.; Guebitz, G. M.; **Birner-Gruenberger, R.** PpEst Is a Novel PBAT Degrading Polyesterase Identified by Proteomic Screening of *Pseudomonas Pseudoalcaligenes*. *Appl Microbiol Biotechnol* **2017**, *101* (6), 2291–2303. <https://doi.org/10.1007/s00253-016-7992-8>.
6. *Sturmberger, L.; Wallace, P. W.; Glieder, A.; **Birner-Gruenberger, R.** Synergism of Proteomics and mRNA Sequencing for Enzyme Discovery. *Journal of Biotechnology* **2016**, *235*, 132–138. <https://doi.org/10.1016/j.jbiotec.2015.12.015>.
7. *Weiß, S.; Lebuhn, M.; Andrade, D.; Zankel, A.; Cardinale, M.; **Birner-Gruenberger, R.**; Somitsch, W.; Ueberbacher, B. J.; Guebitz, G. M. Activated Zeolite—Suitable Carriers for Microorganisms in Anaerobic Digestion Processes? *Appl Microbiol Biotechnol* **2013**, *97* (7), 3225–3238. <https://doi.org/10.1007/s00253-013-4691-6>.
8. ***Birner-Gruenberger, R.**; Susani-Etzerodt, H.; Waldhuber, M.; Riesenhuber, G.; Schmidinger, H.; Rechberger, G.; Kollroser, M.; Strauss, J. G.; Lass, A.; Zimmermann, R.; Haemmerle, G.; Zechner, R.; Hermetter, A. The Lipolytic Proteome of Mouse Adipose Tissue. *Molecular & Cellular Proteomics* **2005**, *4* (11), 1710–1717. <https://doi.org/10.1074/mcp.M500062-MCP200>.
9. Zimmermann, R.; Strauss, J. G.; Haemmerle, G.; Schoiswohl, G.; **Birner-Gruenberger, R.**; Riederer, M.; Lass, A.; Neuberger, G.; Eisenhaber, F.; Hermetter, A.; Zechner, R. Fat Mobilization in Adipose Tissue Is Promoted by Adipose Triglyceride Lipase. *Science* **2004**, *306* (5700), 1383–1386. <https://doi.org/10.1126/science.1100747>.
10. **Birner, R.**; Bürgermeister, M.; Schneiter, R.; Daum, G. Roles of Phosphatidylethanolamine and of Its Several Biosynthetic Pathways in *Saccharomyces Cerevisiae*. *MBoC* **2001**, *12* (4), 997–1007. <https://doi.org/10.1091/mbc.12.4.997>.