

Magdalena Schacherl, Ph.D.

Curriculum vitae

Education

- 2007-2011 Ph.D. of Science in Chemistry and Molecular Sciences
Department of Chemistry and Biochemistry, University of Bern, Switzerland
Thesis: "Hydrolases in action - structural studies on archaeal enzymes" with Prof. Ulrich Baumann
- 2001-2006 Diploma in Biochemistry, Immunology and Biophysics
Free University Berlin, Germany
Thesis: "Selection of bacteriophage coat protein pIII variants and their use in a Tat-dependent phage display system" (in German language) with Prof. Wolfgang Höhne, Charité - Universitätsmedizin Berlin, Germany

Research Experience

- 2019-present Group leader in Structural Enzymology, Charité - Universitätsmedizin Berlin, Institute for Medical Physics and Biophysics, Berlin, Germany
- 2018-present Postdoctoral work, Charité - Universitätsmedizin Berlin, Institute for Medical Physics and Biophysics, Berlin, Germany
Cryo-electron microscopy on ribosomes in the group of Prof. Christian Spahn
- 2017-2018 Postdoctoral work, Research Center Caesar, Bonn, Germany
Cryo-electron microscopy on hormone receptors and large proteolytic complexes in the Max-Planck Research Group of Prof. Elmar Behrmann
- 2011-2016 Postdoctoral work, Institute of Biochemistry, University of Cologne, Germany
X-ray crystallographic and biochemical studies on proteolytic enzymes involved in cellular signaling and implicated in cancer diseases; and in host-pathogen interactions of the human pathogen *Clostridium difficile* in the group of Prof. Ulrich Baumann
- 2007-2010 Ph.D. work, Department of Chemistry and Biochemistry, University of Bern, Switzerland
X-ray crystallographic and biochemical studies on archaeal enzymes in the group of Prof. Ulrich Baumann
- 2006 Diploma work, Charité Universitätsmedizin Berlin, Germany
Creation of a Tat-dependent phage display system using random mutagenesis of the bacteriophage pIII protein with Prof. Wolfgang Höhne

Professional Experience

- 2005-2007 Assistant in the Life Sciences team, Business Development Board of the German Federal State Brandenburg (ZukunftsAgentur Brandenburg), Assessment of funding proposals of small and medium-sized enterprises, organization of events for the promotion of the Brandenburg region

Professional training

- 2018 POL teacher training, Dieter Scheffner Fachzentrum (DSFZ), Charité Universitätsmedizin Berlin
- 2016 "Teaching Teaching, Understanding Understanding" workshop on motivation in teaching settings, Center for Higher Education, University of Cologne
- 2016 "Supervising theses" workshop on supervising scientific theses and supporting of students in thesis writing, Center for Higher Education, University of Cologne
- 2015-2016 Cornelia Harte Mentoring "CHM pro" of the University of Cologne - one-year curriculum, career development for female scientists on the way to a professorship
- 2014 "Leadership development for advisors" with CJ Fitzsimons, participation in the seminar for principal investigators in the "International Graduate School Development, Health and Disease", Department of Biology, University of Cologne

Committee work

- 2013-2015 Member of the reaccreditation commission (B.Sc./M.Sc. programs in Chemistry), Department of Chemistry, University of Cologne
- 2012-2017 Member of the department board, Department of Chemistry, University of Cologne

Publications

Peer-reviewed articles

- [1] Heyder NA, Kleinau G, Speck D, Schmidt A, Paisdzior S, Szczepek M, Bauer B, Koch A, Gallandi M, Kwiatkowski D, Bürger Jörg, Mielke T, Beck-Sickinger A, Hildebrand PW, Spahn CMT, Hilger D, **Schacherl M**, Biebermann H, Hilal T, Kühnen P, Kobilka BK, Scheerer, P (2021) Structures of active melanocortin-4 receptor–Gs-protein complexes with NDP- α -MSH and setmelanotide. *Cell Research* (accepted 12 Aug 2021)
- [2] Rundlet EJ, Holm M, **Schacherl M**, Natchiar SK, Altman RB, Spahn CMT, Myasnikov AG, Blanchard SC (2021) Structural basis of early translocation events on the ribosome. *Nature* (595) 741–745.
- [3] Fragel S, Montada A, Heermann R, Baumann U, **Schacherl M**, Schnetz K (2019) Characterization of the pleiotropic LysR-type transcription regulator LeuO of *Escherichia coli*. *Nucleic Acid Res.* 47(14):7363-79.
- [4] Pichlo C, Juetten L, Wojtalla F, **Schacherl M**, Diaz D, Baumann U (2019) Molecular determinants of the mechanism and substrate specificity of *Clostridium difficile* proline-proline endopeptidase-1. *J Biol Chem.* 294(30):11525-11535.
- [5] Pichlo C, Tölzer C, Chojnacki K, Öcal S, Uthoff M, Ruegenberg S, HermannsT, **Schacherl M**, Denzel MS, Hofmann K, Niefind K, Baumann U (2018) Improved protein-crystal identification by using 2,2,2-trichloroethanol as a fluorescence enhancer. *Acta Cryst.* F74, 307-314.
- [6] **Schacherl M**[§], Gompert M, Pardon E, Lamkemeyer T, Steyaert J, Baumann U (2017) Crystallographic and biochemical characterization of the dimeric architecture of site-2

protease. *Biochimica et Biophysica Acta Biomembranes* 1859 (10), 1859-71. [§] *corresponding author*

- [7] Pichlo C, Montada AAM, **Schacherl M**[§], Baumann U (2016) Production, crystallization and structure determination of *C. difficile* PPEP-1 via microseeding and zinc-SAD. *J.Vis. Exp.* (118), e55022. [§] *corresponding author*
- [8] Knyphausen P, de Boor S, Kuhlmann N, Scislowski L, Extra A, Baldus L, **Schacherl M**, Baumann U, Neundorf I, Lammers M (2016) Insights into lysine-deacetylation of natively folded substrate proteins by sirtuins. *J Biol Chem* 291(28), 14677-94.
- [9] Kuhlmann N, Wroblowski S, Knyphausen P, de Boor S, Brenig J, Zienert AY, Meyer-Teschendorf K, Praefcke GJ, Nolte H, Kruger M, **Schacherl M**, Baumann U, James LC, Chin JW, Lammers M (2016) Structural and mechanistic insights into the regulation of the fundamental Rho-regulator RhoGDI α by lysine acetylation. *J Biol Chem* 291(11), 5484-5499.
- [10] **Schacherl M**, Montada AAM, Brunstein E, Baumann U (2015) First crystal structure of the peptidase domain of an archaeal member of the U32 peptidase family. *Acta Cryst. D71*, 2505-12.
- [11] **Schacherl M**[§], Pichlo C, Neundorf I, Baumann U[§] (2015) Structural basis of proline-proline peptide bond specificity of the metalloprotease Zmp1 implicated in motility of *Clostridium difficile*. *Structure* 23(9), 1632-1642. [§] *corresponding author*; [CrossTalk Interview Cell Press](#)
- [12] Vostrukhina M, Popov A, Brunstein E, Lanz MA, Baumgartner R, Bieniossek C, **Schacherl M**, Baumann U (2015) The structure of *Aquifex aeolicus* FtsH in the ADP-bound state reveals a C2-symmetric hexamer. *Acta Cryst. D71*, 1307-1318.
- [13] **Schacherl M**, Waltersperger S, Baumann U (2013) Structural characterization of the ribonuclease H-like type ASKHA superfamily kinase MK0840 from *Methanopyrus kandleri*. *Acta Cryst. D69*, 2440-2450.
- [14] Graef C*, **Schacherl M***, Waltersperger S, Baumann U (2012) Crystal structures of archaeometzincin reveal a moldable substrate-binding site. *PLoS ONE* 7(8): e43863. **co-author*

Invited review (preview)

- [1] **Schacherl M**[§], Baumann U[§] (2016) Feeding Anthrax: The Crystal Structure of *Bacillus anthracis* InhA Protease. *Structure* 24(1), 1-2. [§] *corresponding author*

Invited talks

- [1] "Targeting the motility of *Clostridium difficile*" (2016); Seminar of the CRC1093 Supramolecular Chemistry on Proteins, University Duisburg-Essen, Germany
- [2] "Structural studies on an integral membrane protease with the help of llama nanobodies" (2016); Biochemistry Center of the University Heidelberg, Germany

Talks and poster presentations on conferences

- [1] "PPEP-1 - a secreted metalloprotease involved in the regulation of *Clostridium difficile* motility" (2016), Pichlo C, Neundorf I, Baumann U und Schacherl M; poster presentation at the Gordon Research Conference "Microbial Toxins & Pathogenicity", Waterville Valley, NH, USA

- [2] "Structural basis of proline-proline peptide bond specificity of the secreted protease PPEP-1 implicated in motility of *Clostridium difficile*" (2016); Talk at the 24th annual meeting of the German Crystallographic Society (DGK), Stuttgart, Germany
- [3] "Structural basis of proline-proline bond specificity of a secreted protease implicated in motility of *Clostridium difficile* " (2015); Talk at the 27th Winter School on Proteases and Their Inhibitors in Tiers, South Tyrol, Italy
- [4] "Camelid nanobody-driven stabilization of an archaeal site-2 protease - a systematic study leading toward the full-length crystal structure" (2014), Schacherl, M and Baumann U; Talk and poster presentation at the Gordon Research Seminar & Conference „Protein Processing, Trafficking & Secretion“, New London, NH, USA
- [5] "Biochemical and structural characterisation of U32 peptidases" (2014), Montada AAM, Schacherl M, Baumann U; Poster presentation at the 65th Mosbacher Kolloquium „Cellular Protein Quality Control in Health, Aging and Disease“, Mosbach/Baden, Germany
- [6] "Structure-function relationships in proprotein convertase S1P" (2014), Pichlo C, Schacherl M, Baumann U; Poster presentation at the 65th Mosbacher Kolloquium „Cellular Protein Quality Control in Health, Aging and Disease“, Mosbach/Baden, Germany
- [7] "RIP - Structural studies on enzymes involved in regulated intramembrane proteolysis" (2013), Schacherl, M und Baumann U; Poster presentation at the division meeting of the Department of Biology, University of Cologne, Prüm, Germany
- [8] "Unusual structural features of archaemetzincins" (2010), Schacherl M, Gräf C, Baumann U; Poster presentation at the "Sommerfest der Chemie", University of Cologne, Germany

Peer review activities

Ad-hoc reviewer in FEBS Letters, Journal of Microbiology and Experimentation, Current Proteomics

Membership in professional societies

German Crystallographic Society (DGK) - Member of the Working Group 1 (AK1)
"Biological Structures"

Deutsche Gesellschaft für Elektronenmikroskopie (DGE)

European Microscopy Society (EMS)

German Society for Biochemistry and Molecular Biology (GBM)

Federation of European Biochemical Societies (FEBS)

International Union of Biochemistry and Molecular Biology (IUBMB)

Languages

Fluent in Polish, German and English

Reading and writing knowledge of French, improving speaking abilities