

Curriculum Vitae: Assoc.-Prof. Priv. Doz. Mag. Dr. Ruth HERBST

Medical University Vienna, Center for Pathophysiology, Infectiology and Immunology, Institute of Specific Prophylaxis and Tropical Medicine

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ORCID: 0000-0002-7764-5363

Place of Birth: Weiz, Austria

Nationality: Austria

Acad. Degree: Mag. Dr. (PhD)

Current Position: Associate Professor

Main Research Interest

My long term research interest focuses on investigating molecular mechanisms that govern signaling processes within cells but also between cells. In particular, I have been characterizing how receptor tyrosine kinases induce intracellular signaling cascades thereby regulating crucial cellular processes including cell proliferation, differentiation and function. As postdoctoral fellow and subsequently as independent group leader, together with my laboratory, I made important contributions to the function of the receptor tyrosine kinase MuSK and to the characterization of downstream signaling events. MuSK is a key molecule in the assembly and function of the neuromuscular junction, and also a target of auto-antibodies leading to the development of the autoimmune disease myasthenia gravis. More recently, I have also become interested in protein trafficking and the interplay between signaling and protein endocytosis. In this respect, we have identified the novel guanidine nucleotide exchange factor Rin-like which functions during T activation and in T helper cell differentiation.

Keywords: Receptor tyrosine kinase, Protein Trafficking, Neuromuscular diseases, T cells, Signal transduction

Education and Scientific Career

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| 1986-1990 | Studies of Biology/Genetics at the University of Vienna, Austria |
| 1990-1991 | Master thesis (Diplom) at the Institute of Genetics and Microbiology, University of Vienna |
| 1991-1996 | PhD thesis at the Institute of Molecular Biology (IMP), Vienna and Department of Molecular Medicine, University of Sheffield, UK |
| Nov 5 th , 1996 | Dr. rer. nat. (PhD) awarded |
| 1996-2001 | Postdoctoral fellow at the Skirball Institute of Biomolecular Medicine, NYU School of Medicine, New York, USA
<i>Research on the formation of the neuromuscular junction performed in the laboratory of S. J. Burden</i> |
| 2002-2016 | Principal Investigator, Center for Brain Research, Medical University of Vienna |
| 2010 | Habilitation in Neurobiology, Medical University of Vienna |
| 2006-2007 | part-time employment due to birth of daughter |
| Since 2016 | Principal Investigator, Center for Pathophysiology, Infectiology and Immunology, Medical University of Vienna |

Research Studies Abroad

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| 1992-1996 | Department of Molecular Medicine, University of Sheffield, UK. |
| 1996-2001 | Skirball Institute of Biomolecular Medicine, NYU School of Medicine, New York, USA. |

Academic Positions

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| 2008-2016 | „Head of Section for Synapse Formation“, Center for Brain Research, Medical University of Vienna |
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2014-2015 Assistant Professor, Center for Pathophysiology, Infectiology and Immunology, Medical University of Vienna
2016- Associate Professor, Center for Pathophysiology, Infectiology and Immunology, Medical University of Vienna
2020- “Head of Transport & Signal Transduction of Surface Receptors”, Institute of Specific Prophylaxis and Tropical Medicine, Center for Pathophysiology, Infectiology and Immunology, Medical University of Vienna

Supervision of Undergraduate and Graduate Students

Since 2002 Supervision of 27 Diploma / Master theses (24 finished; 3 ongoing) and 7 PhD theses (5 finished/ 2 ongoing)

Teaching Activities (selected)

Participation in courses of the Neuroscience PhD Program and organisation of lectures within the medical curriculum of the Medical University.

Teaching in the Master’s programme „*Molecular Biology*“ of the University of Vienna.

Since 2021 Deputy Curriculum Director of the Master programme „*Molecular Precision Medicine*“

Since 2021 Module Coordinator in the Master programme „*Molecular Precision Medicine*“

Institutional Responsibilities

Since 2004 Member of Diploma and PhD committees

2012-2016 Member of staff association “Betriebrat für wissenschaftliches Personal”

Since 2014 Member of the Habilitation committee for biomedical research

2020-2021 Member of the Curriculum commission “*Molecular Precision Medicine*”

Commission of Trust

- Ad hoc Referee for scientific journals and funding agencies
- Memberships: Society of Neuroscience, Austrian Neuroscience Association, Austrian Association of Molecular Life Sciences and Biotechnology, European Society of Muscle Research
- Since 2019: Member of fellowship committee for the DOC program of the Austrian Academy of Sciences
- Since 2018: Auditor of the “*Austrian Neuroscience Association*”
- Since 2021: President of the association “Frauennetzwerk Medizin” (WNWmed)
- Since 2022: Member of AFM-Telethon’s Scientific Council

Funded Research Projects

Since 2002, 10 internationally peer-reviewed research grants (OeNB and FWF) and 1 fellowship award (APART, OeAW) with a total funding of approx. 2.6 Mill €. Currently one research grant is running.

Since 2019 P31199-B27, FWF

Publications (Summary)

24 peer-reviewed articles, 1 contributed article, 5 invited reviews, 1 editorial, 1 article *in revision*

Impact factor: 215,443; total citations: >1000

Top Ten Publications

1. Gemza I, Barresi C, Proemer J, Hatami J, Lazaridis M, Herbst R., Internalization of muscle-specific kinase is increased by Agrin but independent of kinase-activity, Lrp4 and Dynamin. *Front Mol Neurosci.* 2022 Mar 15;15:780659. doi: 10.3389/fnmol.2022.780659. eCollection 2022.
2. Kim, JK, Caine, C, Awano, T, Herbst, R, Monani, UR (2017), Motor neuronal repletion of the NMJ organizer, Agrin, modulates the severity of the spinal muscular atrophy disease phenotype in model mice. *Human Molecular Genetics* 26. doi: 10.1093/hmg/ddx124.
3. Camurdanoglu BZ, Hrovat C, Dürnberger G, Madalinski M, Mechtler K, Herbst R. (2016), MuSK Kinase Activity is Modulated By A Serine Phosphorylation Site in The Kinase Loop. *Sci Rep.* 2016 Sep 26;6:33583. doi: 10.1038/srep33583.
4. Dürnberger G, Camurdanoglu BZ, Tomschik M, Schutzbier M, Roitinger E, Hudecz O, Mechtler K, Herbst R. (2014), Global Analysis of Muscle-specific Kinase Signaling by Quantitative Phosphoproteomics. *Mol Cell Proteomics.* 13(8):1993-2003. doi: 10.1074/mcp.M113.036087.
5. Hanada T, Weitzer S, Mair B, Bernreuther C, Wainger BJ, Ichida J, Hanada R, Orthofer M, Cronin SJ, Komnenovi V, Minis A, Sato F, Mimata H, Yoshimura A, Tamir I, Rainer J, Kofler R, Yaron A, Eggan KC, Woolf CJ, Glatzel M, Herbst R, Martinez J, Penninger JM, (2013), The RNA kinase CLP1 links tRNA metabolism to progressive motor neuron loss. *Nature* 495 (7442), 474-80. doi: 10.1038/nature11923.
6. Luiskandl S., Woller B, Schlauf M., Schmid JA, Herbst R. (2013), Endosomal trafficking of the receptor tyrosine kinase MuSK proceeds via clathrin-dependent pathways, Arf6 and actin. *FEBS J.* 280(14):3281-97. doi: 10.1111/febs.12309. doi: 10.1111/febs.12309
7. Woller B., Luiskandl S., Popovic M., Prieler B.E., Ikonge G., Mutzl M., Rehmann H., Herbst R. (2011), Rin-like, a novel regulator of endocytosis, acts as guanine nucleotide exchange factor for Rab5a and Rab22. *BBA Mol Cell Res.* 1813, 1198-1219. doi: 10.1016/j.bbamcr.2011.03.005
8. Ruggio, M., Herbst, R., Kim, N., Jevscek, M., Fak, J.J., Mann, M.A., Fischbach, G., Burden, S.J. and Darnell, RB. (2009), Rescuing Z⁺ agrin splicing in Nova null mice restores neuromuscular synapse formation and unmasks a physiologic defect in motor neuron firing. *PNAS* 106 (9), 3513-8. doi: 10.1073/pnas.0813112106.
9. Herbst, R., Avetisova, E. and Burden, S.J. (2002), Restoration of synapse formation in MuSK mutant mice expressing a MuSK/Trk chimeric receptor. *Development* 129, 5449-5460. doi: 10.1242/dev.00112.
10. Herbst, R. and Burden, S.J. (2000), The juxtamembrane region of MuSK has a critical role in agrin-mediated signaling. *EMBO J.* 19, 67-77. doi: 10.1093/emboj/19.1.67.

Selected additional achievements

Awarded Fellowships

1996-1998	Erwin-Schrödinger Postdoctoral Fellowship, FWF
2002-2004	Erwin-Schrödinger Return Fellowship, FWF
2004-2008	APART Habilitation Fellowship, Austrian Academy of Sciences

Invited lectures

09/2015: EMC Satellite Meeting on Muscle Synapse, Warsaw, PL
11/2019: Weatherall Institute of Molecular Medicine, Oxford University, UK

Editor of Special Issue “*Molecular Mechanisms Underlying Assembly and Maintenance of the Neuromuscular Junction*” published in *Frontiers in Molecular Neuroscience*” (<https://www.frontiersin.org/research-topics/9335/molecular-mechanisms-underlying-assembly-and-maintenance-of-the-neuromuscular-junction>)

Outreach Activities

Participation and lecture at “Wissensdurst”

Founding member of the women network WNWmed (Wissenschaftlerinnennetzwerk-Medizin) to promote women in science. Since 2021 President of WNWmed

Participation in the mentoring programme WNWmed-NOST to support foreign doctors in the validation process for their degree at the MedUni Vienna (Nostrifikation)