CURRICULUM VITAE

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PERSONAL

Date and place of birth	August 13, 1978; Knittelfeld
Nationality	Austria

EDUCATION

09/2003 - 04/2006	PhD, Biophysics Graz University of Technology, Austria
10/1996 - 06/2003	MSc, Technical Chemistry / Biochemistry Graz University of Technology, Austria

RESEARCH

08/2011 – now	Postdoctoral Fellow, Institute of Applied Physics, Vienna University of Technology, Vienna
08/2008 – 08/2010	Postdoctoral Fellow, Department of Molecular Biophysics and Biochemistry, Yale University, CT, USA
05/2006 – 07/2011	Postdoctoral Fellow, Institute of Biophysics and Nanosystems Research, Austrian Academy of Sciences, Graz
09/2003 – 04/2006	PhD Thesis: "Hemolytic and antimicrobial activity of LL-37 is based on diverse modes of membrane perturbation". Institute of Biophysics and Nanosystems Research, Austrian Academy of Sciences, Graz
04/2002 – 02/2003	Diploma Thesis: "Lipid-mediated activation of inflammatory transcription factors in vascular smooth muscle cells". Institute of Biochemistry, Graz University of Technology

PUBLICATIONS

Sevcsik E., Brameshuber M., Fölser M., Weghuber J., Honigmann A., Schütz G.J. (2015). GPI-anchored proteins do not reside in ordered domains in the live cell plasma membrane. *Nature Commun.* 6, 6969

Braun A.R., Sevcsik E., Chin P., Rhoades E., Tristram-Nagle S., Sachs J.N. (2012). α-Synuclein induces both positive mean curvature and negative Gaussian curvature in membranes**.** *J. Am. Chem. Soc.* 134, 2613-2620

Sevcsik E., Trexler A., Dunn J., Rhoades E. (2011). Evidence for allostery in a disordered protein: oxidative modifications to α-synuclein act distally to regulate membrane binding. *J. Am. Chem. Soc.* 133, 7152-7158

Strobach S., Kunert R., Stadlmann J., Messner P., Sevcsik E., Lhota G., Katinger H.,Vorauer-Uhl K. (2009). Topological transformation of liposomes by a membrane-affecting domain of recombinant human erythropoietin, *J. Liposome Res.* 20, 24-30

Sevcsik E., Pabst G., Richter W., Danner S., Amenitsch H., Lohner K. (2008). Interaction of LL-37 with model membrane systems of different complexity – Influence of the lipid matrix, *Biophys. J* 94, 4688-4699

Sevcsik E., Pabst G., Jilek A., Lohner K. (2007). How lipids influence the mode of action of membrane-active peptides, *Biochim. Biophys. Acta* 1768, 2586-2595

Reisinger H., Sevcsik E., Vorauer-Uhl K., Lohner K., Katinger H., Kunert R. (2007). Serum-free transfection of CHO-cells with tailor-made unilamellar vesicles, *Cytotechnology* 54, 157-168

Pozo Navas B., Lohner K., Deutsch G., Sevcsik E., Riske K.A., Dimova R., Garidel P., Pabst G. (2005). Composition dependence of vesicle morphology and mixing properties in a bacterial model membrane system, *Biochim. Biophys. Acta* 1716, 40-48

Konovalov O., O'Flaherty S.M., Saint-Martin E., Deutsch G., Sevcsik E., Lohner K. (2005). The bending rigidity of phospholipid monolayers in the presence of an antimicrobial frog peptide studied by X-ray grazing incidence diffraction, *Physica B* 357, 185-189

Loidl A., Sevcsik E., Riesenhuber G., Deigner H.P., Hermetter A. (2003). Oxidized phospholipids in minimally modified low density lipoprotein induce apoptotic signaling via activation of acid sphingomyelinase in arterial smooth muscle cells, *J. Biol. Chem.* 278, 32921-32928

BOOK CONTRIBUTIONS

Lohner K., Sevcsik E., Pabst G. (2007). Liposome based membrane mimetic systems: Implications for lipid-peptide interactions, in *Advances in Planar Lipid Bilayers* Vol. 6, (Ed. A. Leitmannova Liu), Elsevier, New York, 103-137

SELECTED ORAL PRESENTATIONS

Sevcsik E. Lipid rafts – From model membranes to live cells. ITN SNAL Invited talk at Summer School on Biomaterials, Cell Membranes and Lipid Bilayers, Roccalumera, Italy (2015)

Sevcsik E., Brameshuber M., Fölser M., Weghuber J., Honigmann A., Schütz G.J. GPI-anchored proteins do not reside in ordered regions in the live cell plasma membrane, Biophysical Society 59th Annual Meeting, Baltimore, USA (2015)

Sevcsik E., Brameshuber M., Fölser M., Weghuber J., Honigmann A., Schütz G.J. Determination of the reach of membrane proteins: is there a space for rafts? Biomembrane Days, Berlin (2014)

Sevcsik E., Sunzenauer S., Brameshuber M., Schütz G.J. Protein micropatterning as a tool to decipher plasma membrane organization, Invited Talk at Max-Planck-Institute for Biophysical Chemistry, Göttingen, Germany (2013)

Sevcsik E., Sunzenauer S., Brameshuber M., Schütz G.J. Protein micropatterning in live cells: a tool for creating membrane domains with raft-like properties, Biophysical Society 57th Annual Meeting, Philadelphia, USA (2013)

Sevcsik E., Sunzenauer S., Schütz G.J. Using protein micropatterning to probe lipid-mediated protein interactions in the plasma membrane of live cells, ÖGMBT Annual Meeting, Graz, Austria (2012)

Sevcsik E., Rhoades E. Effects of oxidative stress on aggregation and membrane interaction of alpha-synuclein characterized by single molecule fluorescence, Biophysical Society 53rd Annual Meeting, Boston, USA (2009)

GRANTS AND AWARDS

CPOW Travel Award, Biophysical Society (2014)
IDP Subgroup Postdoctoral Research Award, Biophysical Society (2010)
Max Kade Foundation Postdoctoral Fellowship, Austrian Academy of Sciences (2009-2010)
Poster Award, Gordon Research Conference on Antimicrobial Peptides (2007)
Student Travel Grant, 3rd International and 28th European Peptide Symposium (2004)
Academic Excellence Scholarship, Science Faculty, Graz University of Technology (2002)

TEACHING

Introduction to Biophysics VO, Post-Graduate Program of Medical Physics, Medical University of Vienna (2012-2015)

Mikroskopie an Biomolekülen PR, TU Wien (2015)

TECHNICAL EXPERIENCE

Physical: TIR fluorescence microscopy, single molecule fluorescence techniques (PALM, STORM, sm-tracking, sm-Förster resonance energy transfer, fluorescence correlation spectroscopy), ESI mass spectrometry, X-ray diffraction, differential scanning calorimetry, electron spin resonance spectroscopy, dynamic light scattering, circular dichroism spectroscopy

Biochemical/Molecular biological: protein micropatterning, cloning, PCR, protein expression and purification, mammalian cell culture, model membranes, lipid analysis

RESEARCH EXPERIENCE AND CURRENT RESEARCH FOCUS

After doing my PhD work in the field of membrane biophysics and antimicrobial peptides, I decided to do postdoctoral research in the Rhoades lab at Yale University. This position allowed me to acquire experience on single molecule fluorescence techniques while at the same time continuing to work on protein-membrane interactions, the topic of my PhD thesis. After that, I joined the Schütz lab to extend my research to live cell single-molecule studies. My prime research interests have now become the use of single molecule super-resolution fluorescence microscopy techniques in combination with micro- and nanostructured surfaces to unravel the connection between plasma membrane organization, dynamics and functionality.

In a recent publication I could use this combination of these techniques to substantially contribute to resolving a long-standing problem in cell biology: The plasma membrane displays a tremendous complexity of proteins and lipids necessary for cell function but it is unclear how proteins sense and influence their lipid environment. Nanoscopic lipid "raft" phases were proposed to mediate protein functionality but have thus far not been directly observed. I used live cell micropatterning combined with single molecule microscopy techniques to put current models to the test: I rearranged lipid-anchored proteins in the plasma membrane and measured the effect on their membrane nanoenvironment. I found that the captured proteins merely acted as obstacles and did not influence their membrane environment over distances past their actual physical size. These findings rule out the presence of "raft" phases associated with lipid-anchored proteins.

Part of my present work is still devoted to the development, improvement and application of micro- and nanostructured surfaces for the use in live cell experiment. Such surfaces allow for interfering with the spatial organization of proteins in live cells, making them singularly effective tools to manipulate and probe membrane-associated cellular processes. I am using these surfaces to extract information about the fundamental elements of plasma membrane organization and function, with a specific interest in the role of lipids and the actin cytoskeleton in plasma membrane organization in general and plasma membrane organization during T cell activation in particular.