

CURRICULUM VITAE

DR. NOA LIPSTEIN THOMS

PERSONAL INFORMATION

Birth date 21.11.1981 in Herzliya, Israel
Family status Married with one daughter (2010)
Work address Leibniz-Forschungsinstitut für Molekulare
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FIELDS OF INTEREST

Synaptic diversity - Synaptic transmission – Synaptic plasticity
Calcium and lipid signaling - Disorders of the synapse
Mouse genetics - Electrophysiology – Biochemistry - Proteomics

EDUCATION AND POSITIONS

10/2020 – **Junior Group Leader** Leibniz-Forschungsinstitut für Molekulare
Pharmakologie (FMP), Department of Molecular Physiology and Cell
Biology, Berlin, Germany, and NeuroCure Excellence Cluster, Berlin,
Germany
01/2019 – 09/2020 **Project Group Leader** Max Planck Institute of Experimental Medicine,
Department of Molecular Neurobiology, Göttingen, Germany (Dr. Nils Brose)
06/2013 – 12/2018 **Postdoctoral fellow**
Max Planck Institute of Experimental Medicine, Department of Molecular
Neurobiology, Göttingen, Germany (Dr. Nils Brose).
09/2006 – 06/2013 **Dissertation**
Tel Aviv University, Department of Neurobiology, Tel Aviv, Israel (Dr. Uri
Ashery), Max Planck Institute of Experimental Medicine, Department of
Molecular Neurobiology, Göttingen, Germany (Dr. Nils Brose).
10/2004 – 08/2006 **Excellence short-track program to PhD**
Tel Aviv University, Department of Neurobiology and Zoology, Tel Aviv,
Israel (Dr. Uri Ashery and Dr. Amir Ayali). Score: 97.42 (/100)
10/2001 – 10/2004 **Undergraduate studies (B.Sc.)**
The combined Life and Medical Sciences program, Tel Aviv University, Tel
Aviv, Israel. Score: 95.00 (/100), Summa cum Laude

RESEARCH EXPERIENCE

07/2012 – 10/2020 Max Planck Institute of Biophysical Chemistry, Department of Membrane
Biophysics, Göttingen, Germany.
Prof. Erwin Neher
Dr. Holger Taschenberger
Electrophysiology at the calyx of Held synapse

- 09/2006 – 09/2020 Max Planck Institute of Experimental Medicine, Department of Molecular Neurobiology, Göttingen, Germany, and Tel Aviv University, Department of Neurobiology, Tel Aviv, Israel
Dr. Nils Brose
Dr. Uri Ashery
Mouse genetics, molecular biology and biochemistry, whole-cell voltage clamp electrophysiology in neuronal cultures and in neuronal slices, proteomic methodologies.
- 04/2005 – 08/2006 Faculty of Life Sciences, Department of Neurobiology, Tel Aviv University, Tel Aviv, Israel.
Dr. Uri Ashery
Molecular biology and electrophysiology in Chromaffin cells.

AWARDS AND FELLOWSHIPS

- 2020 **Startup funds** to establish a Junior Research Group, by the Leibniz-Forschungsinstitut für Molekulare Pharmakologie (FMP) and the NeuroCure Cluster of Excellence, Berlin
- 2018 **Christiane Nüsslein-Volhard Stipend** for excellent women in science
- 06/2015 **Otto-Hahn award** for excellence during the doctoral studies
Max-Planck society
- 06/2007 – 06/2010 **Feodor Lynen Minerva Fellowship**
- 01/2006 **Minerva Short-Term Research Grant**
- 09/2004 – 09/2005 **Scholarship**, Excellence short-track PhD program
George S. Wise Faculty of Life Sciences, Tel-Aviv University, Tel Aviv, Israel
- 07/2004 **Scholarship** in honor of the Thalheimer family for academic achievements as an undergraduate student
Wolf Foundation
- 2002 – 2005 **Dean's Scholarship**, and cited on the Dean's List for academic achievements during all three years of undergraduate studies
Sackler Faculty of Medicine, Tel-Aviv University, Tel Aviv, Israel
- 2002 – 2005 Cited on the **Dean's List** for academic achievements during all three years of undergraduate studies
George S. Wise Faculty of Life Sciences, Tel Aviv University, Tel Aviv, Israel
- 2002 **Scholarship** for an extended research project
George S. Wise Faculty of Life Sciences in Tel Aviv University, Tel Aviv, Israel

GRANTS

- 06/2021 – 05/2024 **Collaborative Research Centre 1286: Quantitative Synaptology** (250 k€)

LOCAL AND INTERNATIONAL COLLABORATIONS

- Since 2022 **UNC13A in ALS/FTD.**
Dr. Aaron Gilter, Stanford University
Dr. Pietro Fratta, University College London
- Since 2019 **Synaptic composition and plasticity of sensory synapses.**
Dr. Frank Schmitz, University Clinic Saarland
Dr. Tobias Moser, University Clinic Göttingen
- Since 2017 **SynGo consortium for expert annotation of synaptic proteins.** Active member of this international group encompassing world leaders in the synapse community, aimed at accurately transducing synaptic science to the global scientific community (see Koopmans et al., 2019)
- Since 2015 **Academy-clinic collaboration for the discovery and characterization of novel synaptopathies.** Including over 40 clinicians and geneticists worldwide for the identification and characterization of rare and novel synaptopathies.
Dr. Anita Rauch, University Clinic Zurich
Dr. Judith J. Jans, University Clinic Utrecht (see Lipstein et al., 2017).
- Since 2008 **Structural proteomics.** Recruiting proteomic methodologies for the studies of synaptic proteins (see Lipstein et al., 2017, Herbst et al., 2014, Lipstein et al., 2012).
Dr. Olaf Jahn, Max Planck Institute of Experimental Medicine
Dr. Andrea Sinz, Halle University
- Since 2007 **Munc13 Biology.** To elucidate mechanisms of presynaptic function and plasticity in diverse experimental systems (See Lipstein et al., 2013, Lipstein et al., 2017, Koopmans et al., 2019 Yizhar et al., 2007).
Dr. Erwin Neher, Max Planck Institute of Biophysical Chemistry
Dr. Takeshi Sakaba, Doshisha University, Kyoto, Japan
Dr. Christian Rosenmund, Charité University Medicine Berlin^[1]_{SEP}
Dr. Jeremy Dittman, Weill Cornell Medical College
Dr. Pascal Kaeser, Harvard Medical School
Dr. Mattijias Verhage, University Medical Center Amsterdam
Dr. Uri Ashery, Tel Aviv University

PRESENTATIONS AT INTERNATIONAL CONFERENCES (SELECTED)

- 10/2021 **The Synaptic Dimension of Brain Disorders.** Baeza, Spain.
Invited speaker
- 09/2021 **100th annual meeting of the German Physiological Society.** Frankfurt am Main, Germany. Invited speaker
- 02/2020 **Annual Biophysical Society meeting.** San Diego, CA, USA.
Invited speaker
- 10/2019 **Giant Synapse meeting.** Chicago, IL, USA.
Invited speaker.
- 06/2018 **Gordon Conference 'Cell Biology of the Neuron'.**
Waterville valley, MA, USA.
Invited speaker (Short talk)
- 12/2017 **6th European Synapse Meeting.** Milano, Italy.
Invited speaker.
- 11/2017 **Society for Neuroscience meeting 2017.** Washington, USA.
Invited speaker (Nanosymposium talk)

ADDITIONAL ACADEMIC ACTIVITIES

Since 2018	Reviewer for academic journals (eLife, Nature, Cell Reports)
03/2019	13th Göttingen meeting of the German Neuroscience Society. Göttingen, Germany. Symposium organizer
2018	'Sign Up!' mentoring program to promote excellent female postdocs of the Max-Planck-Society for leadership in science. Participant
07/2018	FENS Forum Berlin 2018. Organizer of a social event
2015 – 2016	The Dorothea Schlözer Mentoring Program of the Göttingen University: mentoring program at the Göttingen Research Campus to accompany young female researchers through their scientific development. Participant

STUDENT SUPERVISION

CURRENT

Sofia Elizarova – Postdoctoral fellow – since 05/2021 – Molecular plasticity of the presynaptic proteome

Sun Siqi – PhD thesis – since 8/2021– Elucidating the Nanoarchitecture of the Presynaptic proteome

Mareike Lohse – PhD thesis – since 10/2021 – The vGlut1 Proxiome – an analysis of molecular complexes of the synaptic vesicle cycle

Jonas Sommer – B.Sc thesis – Since 03/2022 – N-terminal interactions of disease-causing Munc13-1 variants

PAST

Alexander Wirth – BSc thesis – 09/2009 – 12/2009 – Immunocyto- and immunohistochemical analysis of Munc13- splice isoforms

Anne-Sophie Ernst – BSc thesis – 09/2011 – 12/2011 – Characterization of expression pattern and protein-protein interactions of a calmodulin-insensitive Munc13-1 variant

Xiaomin Zhang – PhD thesis (co-supervisor) – 10/2013 – 12/2014 – Knock-in mouse generation and characterization

Noam Nitzan – MSc thesis – 10/2015 – 03/2016 – Electrophysiological investigation of the calcium-dependent regulation of Munc13-1 by calmodulin and its involvement in short- and long-term plasticity

Maria Clara Soto Bernardini – PhD thesis (co-supervisor) – 02/2016 – 02/2017 – Knock-in mouse generation and characterization

Stephanie Weisser – PhD thesis (co-supervisor) – 11/2018 – 02/2019 – Synapse identity profiling using BioID methodologies

Sun Siqi - MSc thesis – 10/2019 – 7/2020 - Elucidating the nanoarchitecture of the presynaptic active zone using proximity biotinylation

Paula Meth - BSc thesis – 03/2020 – 09/2020 - Identification of the synaptic vesicle release site proteome by photoproximity labeling

Mareike Lohse – MSc thesis – 10/2020 – 03/2021 – The vGlut1 Proxiome – an analysis of molecular complexes of the synaptic vesicle cycle

Aisha Ghuman – PhD thesis – 02/2018 – 01/2022 – Characterization of synaptic transmission abnormalities in neurological disorders of the presynaptic terminal

TEACHING

- Frontiers in Neural Development** 2018 – 2020
 Practical Course – Developmental, Neural and Behavioral Biology Program
 Göttingen University Faculty of Biology
- Organelle Pathology** 2019 – 2020
 Seminar – Molecular Medicine MSc Program,
 Göttingen University Medical School

PUBLICATION LIST

1. Trubetskov, V., Pardinas, A.F., Qi, T., Panagiotaropoulou, G., Awasthi, S., Bigdeli, T.B., Bryois, J., Chen, C.Y., Dennison, C.A., Hall, L.S., et al. (2022). Mapping genomic loci implicates genes and synaptic biology in schizophrenia. **Nature**. 10.1038/s41586-022-04434.
2. **Lipstein, N.** (2022). Mechanism underlying a risk gene in neurodegeneration. **Nature** 603, 33-34, doi:10.1038/d41586-022-00383-1.
3. Banerjee A, Imig C, Balakrishnan K, Kershberg L, **Lipstein N**, Uronen RL, Wang J, Cai X, Benseler F, Rhee JS, Cooper BH, Liu C, Wojcik SM, Brose N, Kaeser PS (2022) Molecular and functional architecture of striatal dopamine release sites. **Neuron** 110: 248-265 e249, DOI 10.1016/j.neuron.2021.10.028.
4. **Lipstein, N.**, Chang, S., Lin, K.H., Lopez-Murcia, F.J., Neher, E., Taschenberger, H., and Brose, N. (2021). Munc13-1 is a Ca(2+)-phospholipid-dependent vesicle priming hub that shapes synaptic short-term plasticity and enables sustained neurotransmission. **Neuron**. <https://doi.org/10.1016/j.neuron.2021.09.054>
5. Piotrowski, C., Moretti, R., Ihling, C.H., Haedicke, A., Liepold, T., **Lipstein, N.**, Meiler, J., Jahn, O., and Sinz, A. (2020). Delineating the Molecular Basis of the Calmodulin/Munc13-2 Interaction by Cross-Linking/Mass Spectrometry-Evidence for a Novel CaM Binding Motif in bMunc13-2. **Cells** 9 (1): 136.
6. Koopmans F, van Nierop P, Andres-Alonso M, Byrnes A, Cijssouw T, Coba MP, Cornelisse LN, Farrell RJ, Goldschmidt HL, Howrigan DP, Hussain NK, Imig C, de Jong APH, Jung H, Kohansalnodehi M, Kramarz B, **Lipstein N**, Lovering RC, MacGillavry H, Mariano V, Mi H, Ninov M, Osumi-Sutherland D, Pielot R, Smalla KH, Tang H, Tashman K, Toonen RFG, Verpelli C, Reig-Viader R, Watanabe K, van Weering J, Achsel T, Ashrafi G, Asi N, Brown TC, De Camilli P, Feuermann M, Foulger RE, Gaudet P, Joglekar A, Kanellopoulos A, Malenka R, Nicoll RA, Pulido C, de Juan-Sanz J, Sheng M, Südhof TC, Tilgner HU, Bagni C, Bayés À, Biederer T, Brose N, Chua JJE, Dieterich DC, Gundelfinger ED, Hoogenraad C, Hugarir RL, Jahn R, Kaeser PS, Kim E, Kreutz MR, McPherson PS, Neale BM, O'Connor V, Posthuma D, Ryan TA, Sala C, Feng G, Hyman SE, Thomas PD, Smit AB, Verhage M (2019) SynGO: An Evidence-Based, Expert-Curated Knowledge Base for the Synapse. **Neuron** 103, 217-234.
7. Ritzau-Jost A, Jablonski L, Viotti J, **Lipstein N**, Eilers J, Hallermann S (2018) Apparent calcium dependence of vesicle recruitment. **J Physiol** 596, 4693-4707.
8. **Lipstein N**, Verhoeven-Duif NM, Michelassi FE, Calloway N, van Hasselt PM, Pienkowska K, van Haften G, van Haelst MM, van Empelen R, Cuppen I, van Teeseling HC, Evelein AM, Vorstman JA, Thoms S, Jahn O, Duran KJ, Monroe GR, Ryan TA, Taschenberger H, Dittman JS, Rhee JS, Visser G, Jans JJ, Brose N (2017b) Synaptic UNC13A protein variant causes increased neurotransmission and dyskinetic movement disorder. **J Clin Invest** 127, 1005-1018.
9. Frank JA, Yushchenko DA, Hodson DJ, **Lipstein N**, Nagpal J, Rutter GA, Rhee JS, Gottschalk A, Brose N, Schultz C, Trauner D (2016) Photoswitchable diacylglycerols enable optical control of protein kinase C. **Nat Chem Biol** 12, 755-762.
10. Okamoto Y, **Lipstein N**, Hua Y, Lin KH, Brose N, Sakaba T, Midorikawa M (2016) Distinct modes of endocytotic presynaptic membrane and protein uptake at the calyx of Held terminal of rats and mice. **Elife** 5, e14643.
11. Herbst S, **Lipstein N**, Jahn O, Sinz A (2014) Structural insights into calmodulin/Munc13 interaction. **Biol Chem** 395, 763-768.

12. Dolev I, Fogel H, Milshtein H, Berdichevsky Y, **Lipstein N**, Brose N, Gazit N, Slutsky I (2013) Spike bursts increase amyloid-beta 40/42 ratio by inducing a presenilin-1 conformational change. **Nat Neurosci** 16, 587-595.
13. **Lipstein N**, Sakaba T, Cooper BH, Lin KH, Strenzke N, Ashery U, Rhee JS, Taschenberger H, Neher E, Brose N (2013) Dynamic control of synaptic vesicle replenishment and short-term plasticity by Ca²⁺-calmodulin-Munc13-1 signaling. **Neuron** 79, 82-96.
14. **Lipstein N**, Schaks S, Dimova K, Kalkhof S, Ihling C, Kolbel K, Ashery U, Rhee J, Brose N, Sinz A, Jahn O (2012) Nonconserved Ca²⁺/calmodulin binding sites in Munc13s differentially control synaptic short-term plasticity. **Mol Cell Biol** 32, 4628-4641.
15. Orenbuch A, Shulman Y, **Lipstein N**, Bechar A, Lavy Y, Brumer E, Vasileva M, Kahn J, Barki-Harrington L, Kuner T, Gitler D (2012) Inhibition of exocytosis or endocytosis blocks activity-dependent redistribution of synapsin. **J Neurochem** 120, 248-258.
16. Cooper B, Hemmerlein M, Ammermuller J, Imig C, Reim K, **Lipstein N**, Kalla S, Kawabe H, Brose N, Brandstatter JH, Varoqueaux F (2012) Munc13-independent vesicle priming at mouse photoreceptor ribbon synapses. **J Neurosci** 32, 8040-8052.
17. Rodriguez-Castaneda F, Maestre-Martinez M, Coudeville N, Dimova K, Junge H, **Lipstein N**, Lee D, Becker S, Brose N, Jahn O, Carlomagno T, Griesinger C (2010) Modular architecture of Munc13/calmodulin complexes: dual regulation by Ca²⁺ and possible function in short-term synaptic plasticity. **EMBO J** 29, 680-691.
18. Cohen L, **Lipstein N**, Karbat I, Ilan N, Gilles N, Kahn R, Gordon D, Gurevitz M (2008) Miniaturization of scorpion beta-toxins uncovers a putative ancestral surface of interaction with voltage-gated sodium channels. **J Biol Chem** 283, 15169-15176.
19. Yizhar O, **Lipstein N**, Gladychева SE, Matti U, Ernst SA, Rettig J, Stuenkel EL, Ashery U (2007) Multiple functional domains are involved in tomosyn regulation of exocytosis. **J Neurochem** 103, 604-616.
20. Cohen L, **Lipstein N**, Gordon D (2006) Allosteric interactions between scorpion toxin receptor sites on voltage-gated Na channels imply a novel role for weakly active components in arthropod venom. **FASEB J** 20, 1933-1935.

REVIEWS

1. Cortes-Saladelafont E, **Lipstein N**, Garcia-Cazorla A (2018) Presynaptic disorders: a clinical and pathophysiological approach focused on the synaptic vesicle. **J Inherit Metab Dis** 41, 1131-1145.
2. **Lipstein N**, Goth M, Piotrowski C, Pagel K, Sinz A, Jahn O (2017a) Presynaptic Calmodulin targets: lessons from structural proteomics. **Expert Rev Proteomics** 14, 223-242.