

*Curriculum vitae***Dr. Peter Soba**

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**Given name(s):** Peter Andreas  
**Academic title:** Dr. rer. nat.  
**Date of birth:** 22 March 1974  
**Sex:** male

**Affiliation:** Neuronal Patterning and Connectivity  
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**Current position:** Independent Research Group Leader  
Head of Research Group “Neuronal Patterning and Connectivity”

**Children:** 1 (4 years)

**Paternity leave:** —

**Professional experience**

02/2011 - present Independent Research Group leader, Center for Molecular Neurobiology, ZMNH, University Medical Center Hamburg-Eppendorf

10/2005 – 01/2011 Postdoctoral fellow at the Howard Hughes Medical Institute, University of California, San Francisco, UCSF (Prof. Dr. Yuh-Nung Jan)

10/2004 – 09/2005 Postdoctoral fellow at the Center for Molecular Biology (ZMBH), University of Heidelberg (Prof. Dr. Dr. h.c. Konrad Beyreuther)

**Academic education**

07/1998 – 06/1999 Diploma work at the University of Heidelberg (Prof. Dr. J. Blümel): “Silica-immobilized Nickel-Posphane-Complexes and Cyclotrimerization of Phenylacetylene” (grade: 1.0).

04/1996 – 06/1998 Studies of Chemistry (Diploma), University of Heidelberg

10/1993 – 03/1996 Studies of Chemistry (Diploma), University of Konstanz.

**Academic degrees**

08/1999 – 09/2004 Ph.D. thesis at the Center for Molecular Biology (ZMBH), University of Heidelberg, (with Prof Dr. Dr. h.c. K. Beyreuther): “Studies of the cell biological function of the Amyloid Precursor Protein (APP) family in *Drosophila melanogaster* and mammals” (grade: 1.0, *magna cum laude*).

**Academic honors**

2005 Fritz-Thyssen-Foundation fellowship

**Commissions of trust and faculty duties**

2012 Commission duty (faculty recruitment)  
Since 2011 Budgeting of research group, employee recruitment  
Since 2011 Research group representative at ZMNH faculty meetings (rotating duty)  
Since 2016 Biosafety and work safety officer (Research groups)

**Reviewer duties**

Journals: Science, eLife, Current Biology, Current Opinion in Structural Biology, Scientific Reports, Frontiers in Neuroscience, Molecular Pain, Developmental Biology, European Journal of Neuroscience, BioTechniques, PlosONE, The Canadian Entomologist

Grant agencies: French National Research Agency (ANR), MINERVA foundation, Heinrich Hertz foundation

**Organization of conferences/seminars**

2014 Co-organizer Blankenese Conference 2014 on “Brain Complexity: From Synaptic Dynamics to Connectomics”

Since 2016 Ph.D. student seminar series at ZMNH (initiator and organizer)

2014-2016 Research in progress seminar series at ZMNH (initiator and organizer)

**Public outreach**

Since 2015 participation in the “Night of Science”, University Medical Center public outreach event

2017 invited talk on neurodevelopment and disease at teachers’ association conference, Hamburg

**Memberships**

Since 2017 German Neuroscience Society (NWG)  
Federation of European Neuroscience Societies (FENS)  
Deutscher Hochschulverband (DHV)

**Conference talks**

- 2019** EMBO Conference “Cell biology of the neuron: Polarity, plasticity and regeneration” (selected abstract talk): “Maintenance of Cell Type-specific Connectivity and Circuit Function Requires Tao Kinase”
- 2018** Behavioral Neurogenetics of *Drosophila* Larva, Edinburgh (selected abstract talk): “Maintenance of circuit integrity and function during larval development”
- EMBO Workshop “Molecular and developmental biology of *Drosophila*” selected participant (talk)
- GBM Molecular Biology study group meeting, “Dynamics of the Nervous System in Health and Disease ” (selected abstract talk): “Microtubule dynamics are regulated by conserved Tao kinase activity to control dendrite development”
- 2017** EMBO Conference “Cell biology of the neuron: Polarity, plasticity and regeneration” (selected abstract talk): “Maintenance of scaled dendritic and synaptic growth during juvenile development requires Tao kinase function”
- 2016** Janelia Research Campus conference “Behavioral Neurogenetics of *Drosophila* Larva” (invited talk): „Integration of mechanosensory modalities and neuropeptide mediated signaling facilitates nociceptive behavior”
- 2014** Blankenese conference, Hamburg (invited talk): „The receptor tyrosine kinase Ret: A novel regulator of dendrite morphogenesis and sensory neuron function”
- 2013** UKE-Symposium in honor of Prof. Melitta Schachner (invited talk): “Exploring the molecular control of sensory circuit development in *Drosophila*”
- 2011** Cold Spring Harbor conference “Neurobiology of *Drosophila*” (selected abstract talk): „Ret regulates dendrite patterning and adhesion“
- 2007** *Drosophila* Conference, Philadelphia (selected abstract talk): “Dscam is required for self-avoidance and proper dendritic field organization of dendritic arborization neurons”

**Invited talks**

- 2019** University of Würzburg (Prof. C. Wegener): “No pain, no gain: Somatosensory encoding of noxious stimuli in *Drosophila*”
- University of Copenhagen (shortlist talk for Associate Professor position for Neurophysiology): “Maintain your network: Connectivity and Circuit Function during Growth”
- 2018** Ludwig Maximilian University of Munich (shortlist talk for W2 Professor position for “Synaptic Plasticity and Regeneration of the CNS”, *secundo loco*): “Of flies and men: Maintenance of nervous system connectivity and function during growth”

FENS Forum Satellite Symposium, Berlin, Resolving the brain circuitry: a story of tools, experiments and models: "Engineered optogenetic anion channels for in vivo analysis of neuronal circuits"

University of Leipzig (Prof. R. Kittel): "Establishing and maintaining circuit function during developmental growth"

University of Bremen (shortlist talk for W2 Professor position for Synthetic Biology): "Molecular control of neuronal development, maintenance and function"

- 2017** Institute of Science and Technology (IST), Vienna (Dr. H. Janovjak): "Development and function of a nociceptive circuit"
- European Neuroscience Institute, Göttingen (Dr. M. Silies): "Modality specific encoding of nociceptive behavior in *Drosophila*"
- 2016** University of Magdeburg/LIN (Prof. D. Dieterich): "Exploring the molecular control of nociceptive circuit development in *Drosophila*"
- Free University Berlin (Prof. R. Hiesinger): "Modality specific encoding of nociceptive behavior in *Drosophila*"
- LIMES, Universität Bonn (Dr. G. Tavosanis): "Novel functions for the Ret receptor in dendrite development"
- 2015** Francis Crick Institute, London (Dr. I. Salecker): "Exploring the molecular control of nociceptive circuit development"
- 2014** MRC Clinical Sciences Centre, Imperial College, London (Dr. I. Miguel-Aliaga): "Exploring the molecular control of sensory circuit development in *Drosophila*"
- University of Zürich (Prof. M. Müller): "Exploring the molecular control of sensory circuit development in *Drosophila*"
- 2013** University of Münster (Prof. C. Klämbt): "From dendrite development to circuits & behavior"
- 2012** University of Heidelberg (Prof. H. Bading): "Organization of sensory dendritic fields by cell surface receptors"
- 2010** Center for Molecular Neurobiology in Hamburg (ZMNH), Group Leader position interview and talk
- 2009** European Molecular Biology Laboratory (EMBL), Heidelberg, Group Leader position interview and talk
- University of Freiburg, BioSS, Freiburg, Group Leader position interview and talk

**List of Publications****a) 5 most important reviewed publications**

1. Tenedini FM, Saéz González M, Hu C, Pedersen L, Petruzzi MM, Wang D, Richter M, Petersen M, Spotowicz E, Schweizer M, Sigrist S, Calderon de Anda F, **Soba P** (2019). Maintenance of cell type-specific connectivity and circuit function requires Tao kinase. **Nat Comm** *accepted*. **Significance:** *How circuit specificity and function are maintained during organismal growth has not been elucidated. We showed that connectivity between primary nociceptors and their downstream neurons scales with animal size and that the conserved Ste20-like kinase Tao acts as a negative regulator of synaptic growth required for maintenance of circuit specificity and connectivity (IF: 11.878).*
2. Hoyer N, Zielke P, Hu C, Petersen M, Sauter K, Scharrenberg R, Peng Y, Kim CC, Han C, Parrish JZ, **Soba P** (2018). Ret and substrate-derived TGF $\beta$  maverick regulate space-filling dendrite growth in *Drosophila* sensory neurons. **Cell Rep** 24: 2261-2272. doi: 10.1016/j.celrep.2018.07.092. <https://www.cell.com/cell-reports/fulltext/> **Significance:** *We identified the substrate-derived TGF $\beta$  ligand mav/GDF15, which is promoting space-filling dendrite growth via the neuronal receptor tyrosine kinase Ret. Our work is providing novel mechanistic insight into how dendrite-substrate interactions are shaping dendritic fields to establish complete receptive field coverage (citations: 1 (Google Scholar), IF: 8.032).*
3. Hu C\*, Petersen M\*, Hoyer N\*, Spitzweck B, Tenedini F, Wang D, Gruschka A, Burchardt LS, Szpotowicz E, Schweizer M, Guntur AR, Yang CH, **Soba P** (2017). Sensory integration and neuromodulatory feedback facilitate *Drosophila* mechanonociceptive behavior. **Nat Neurosci** 20(8):1085-95. (\*equal contribution). doi: 10.1038/nn.4580. <https://www.nature.com/articles/nn.4580.pdf> **Significance:** *We uncovered the circuit and neuromodulatory mechanism underlying mechanonociceptive behavior in *Drosophila*. Our work showed that nociceptive thermal and mechanical stimuli are differentially encoded by the network. Moreover, we discovered that the NPY-homolog sNPF plays a critical role in facilitating mechano-nociceptive responses, providing novel mechanistic insight into neuropeptide action and circuit function in vivo (citations: 28 (Google Scholar), IF: 19.912).*
4. **Soba P\***, Han C, Zheng Y, Perea D, Miguel-Aliaga I, Jan LY, Jan YN\*. (2015) The Ret receptor regulates sensory neuron dendrite growth and integrin mediated adhesion. **Elife** 4:e05491. (\*co-corresponding author). doi: 10.7554/eLife.05491. <https://elifesciences.org/download/> **Significance:** *This work provided the first evidence that Ret, a conserved receptor tyrosine kinase and a major player in neuronal development and disease, is involved in dendrite development. We gained mechanistic insight in the regulation of dendrite patterning and adhesion via Ret/integrin interaction and signaling through rac1, a function that is likely conserved in mammals (citations: 25 (Google Scholar), IF: 7.616).*
5. **Soba P\***, Zhu S\*, Emoto K, Younger S, Yang SJ, Yu HH, Lee T, Jan LY, Jan YN (2007) *Drosophila* sensory neurons require Dscam for dendritic self-avoidance and proper dendritic field organization. **Neuron** 54:403-16. (\*equal contribution). doi: 10.1016/j.neuron.2007.03.029. [http://www.cell.com/neuron/pdf/S0896-6273\(07\)00288-7.pdf](http://www.cell.com/neuron/pdf/S0896-6273(07)00288-7.pdf) **Significance:** *One of three landmark papers showing that Down's syndrome cell adhesion molecule (Dscam) is required for recognition and repulsion of isoneuronal dendrites, which ensures non-overlapping dendritic territories (self-avoidance). These findings provided the first molecular and mechanistic evidence for dendritic self-avoidance, which was later shown to be conserved in mammals (citations: 211 (Google Scholar), IF: 14.318).*

**b) Other reviewed journal publications**

6. Schattling B, Engler JB, Volkmann C, Rothhammer N, Woo MS, Petersen M, Winkler I, Kaufmann M, Rosenkranz SC, Fejtova A, Thomas U, Bose A, Bauer S, Träger S, Miller KK, Brück W, Duncan KE, Salinas G, **Soba P**, Gundelfinger ED, Merkler D, Friese MA (2019). Bassoon proteinopathy drives neurodegeneration in multiple sclerosis. **Nat Neurosci** 22(6):887-896. (*citations: 1 (Google Scholar), IF: 19.912*).
7. Zhu S, Chen R, **Soba P**, Jan YN (2019) JNK signaling coordinates with ecdysone signaling to promote dendrite pruning of *Drosophila* sensory neurons. **Development** 146(8). dev163592. doi: 10.1242/dev.163592. (*IF: 5.413*)
8. Hoyer N, Petersen M, Tenedini FM, **Soba P** (2018). Assaying Mechanonociceptive Behavior in *Drosophila* Larvae. **Bio-protocol** 8(4): e2736.
9. Petersen M, Tenedini FM, Hoyer N, Kutschera F, **Soba P** (2018). Assaying Thermo Nociceptive Behavior in *Drosophila* Larvae. **Bio-protocol** 8(4): e2737.
10. Ziegler AB, Thiele C, Tenedini F, Richard M, Leyendecker P, **Soba P**, Tavosanis G (2017) Cell autonomous control of neuronal dendrite expansion via the fatty acid synthesis regulator SREBP **Cell Rep** 21(12):3346-3353. (*citations: 7 (Google Scholar), IF: 8.032*).
11. Wietek J, Rodriguez-Rozada S, Tutas J, Tenedini F, Grimm C, Oertner TG, **Soba P**, Hegemann P, Wiegert JS (2017) Anion-conducting channelrhodopsins with tuned spectra and modified kinetics engineered for optogenetic manipulation of behavior. **Sci Rep** 7:14957. (*citations: 13 (Google Scholar), IF: 4.122*).
12. Perea D, Guiu J, Hudry B, Konstantinidou C, Milona A, Hadjieconomou D, Carroll T, Hoyer N, Natarajan D, Kallijärvi J, Walker JA, **Soba P**, Thapar N, Cordero J, Burns AJ, Jensen KB, Miguel-Aliaga I (2017) A new role for the Ret receptor tyrosine kinase in intestinal epithelia **EMBO J** 36:3029-3045. (*citations: 5 (Google Scholar), IF: 10.557*).
13. Almeida-Carvalho MJ, Berh D, Braun A, Chen YC, Eichler K, Eschbach C, Fritsch PMJ, Gerber B, Hoyer N, Jiang X, Kleber J, Klämbt C, König C, Louis M, Michels B, Miroschnikow A, Mirth C, Miura D, Niewalda T, Otto N, Paisios E, Pankratz MJ, Petersen M, Ramsperger N, Randel N, Risse B, Saumweber T, Schlegel P, Schleyer M, **Soba P**, Sprecher SG, Tanimura T, Thum AS, Tushima N, Truman JW, Yarali A, Zlatic M (2017). The Ollimpiad: Concordance of behavioural faculties of stage 1 and stage 3 *Drosophila* larvae. **J Exp Biol**, 220: 2452-2475. (*citations: 11 (Google Scholar), IF: 3.179*)
14. Meltzer S, Yadav S, Lee J, **Soba P**, Younger SH, Jin P, Zhang W, Parrish J, Jan LY, and Jan YN (2016). Epidermis-Derived Semaphorin Promotes Dendrite Self-Avoidance by Regulating Dendrite-Substrate Adhesion in *Drosophila* Sensory Neurons. **Neuron** 89(4):741-55. (*citations: 25 (Google Scholar), IF: 14.318*)
15. Stahl R, Schilling S, **Soba P**, Rupp C, Hartmann T, Wagner K, Merdes G, Eggert S, Kins S. (2014) Shedding of APP limits its synaptogenic activity and cell adhesion properties. **Front Cell Neurosci**. 8:410. (*citations: 34 (Google Scholar), IF: 4.300*)
16. Jiang N, **Soba P**, Parker E, Kim CC, Parrish JZ (2014) The microRNA bantam regulates a developmental transition in epithelial cells that restricts sensory dendrite growth. **Development** 141:2657-2668. (*citations: 32 (Google Scholar), IF: 5.413*)

17. Han C, Wang, D, **Soba P**, Zhu S, Jan LY, Jan YN (2012) Integrins are Essential for Repulsion-mediated Dendritic Spreading of Drosophila Sensory Neurons by Restricting Dendrites in a Two-dimensional Space. **Neuron** 73:64-78. (citations: 99 (Google Scholar), IF: 14.318)
18. Rusu P, Jansen A, **Soba P**, Kirsch J, Lower A, Merdes G, Kuan YH, Jung A, Beyreuther K, Kjaerulff O and Kins S (2007) Axonal accumulation of synaptic markers in APP transgenic Drosophila depends on the NPTY motif and is paralleled by defects in synaptic plasticity. **Eur J Neurosci** 25:1079-1086. (citations: 39 (Google Scholar), IF: 2.832)
19. Kuan YH, Gruebl T, **Soba P**, Eggert S, Nestic I, Back S, Kirsch J, Beyreuther K and Kins S (2006) PAT1a modulates intracellular transport and processing of amyloid precursor protein (APP), APLP1, and APLP2. **J Biol Chem** 281:40114-40123. (citations: 42 (Google Scholar), IF: 4.010)
20. Kwak YD, Brannen CL, Qu T, Kim HM, Dong X, **Soba P**, Majumdar A, Kaplan A, Beyreuther K and Sugaya K (2006) Amyloid precursor protein regulates differentiation of human neural stem cells. **Stem Cells Dev** 15:381-389. (citations: 115 (Google Scholar), IF: 3.315)
21. **Soba P\***, Eggert S., Wagner K., Zentgraf H, Siehl K, Kreger S, Loewer A, Langer A, Merdes G, Paro R, Masters CL, Muller U, Kins S, Beyreuther K (2005) Homo- and heterodimerization of APP family members promotes intercellular adhesion. **EMBO J** 24:3624-34. (\*corresponding author). (citations: 320 (Google Scholar), IF: 10.557).
22. Merdes G, **Soba P**, Loewer A, Bilic MV, Beyreuther K, Paro R (2004) Interference of human and Drosophila APP and APP-like proteins with PNS development in Drosophila. **EMBO J** 23:4082-95. (citations: 87 (Google Scholar), IF: 10.557)
23. Eggert S, Paliga K, **Soba P**, Evin G, Masters CL, Weidemann A and Beyreuther K (2004) The proteolytic processing of the amyloid precursor protein gene family members APLP-1 and APLP-2 involves alpha-, beta-, gamma-, and epsilon-like cleavages: modulation of APLP-1 processing by n-glycosylation. **J Biol Chem** 279:18146-18156. (citations: 225 (Google Scholar), IF: 4.010)
24. Loewer A, **Soba P**, Beyreuther K, Paro R, Merdes G (2004) Cell-type-specific processing of the amyloid precursor protein by Presenilin during Drosophila development. **EMBO Rep** 5:405-11. (citations: 25 (Google Scholar), IF: 8.749)
25. Reinhard S, **Soba P**, Rominger F, Blümel J (2003) New silica-immobilized Nickel Catalysts for Cyclotrimerizations of Acetylenes. **Adv Synth Catal** 345:589-602. (citations: 34 (Web of Science) IF: 5.123)

#### **c) Book Chapters:**

26. **Soba P** (2016), Dendritic self-avoidance, in Dendrites: development and disease (Emoto K, Wong R, Huang E, Hoogenraad C, ed).

#### **d) other currently submitted or revised publications:**

27. Hu C, Kanellopoulos A, Konietzny A, Richter M, Tenedini F, Scharrenberg R, Petersen M, Hoyer N, Cheng L, Poon C, Harvey K, Windhorst S, Parish JZ, Mikhaylova M, Bagni C, Calderon de Anda FC, **Soba P**. Tao kinase coordinates dendritic arborization and microtubule dynamics with animal growth. *Submitted*