

## Publications - Benedikt Grothe, Professor of Neurobiology

June 2017

Peer-reviewed publications: 99

Review articles, book chapters etc.: 26

Additional original publications from the Grothe-Lab (without BG as author): 61

In preparation or submitted:

1. Petrik D, Myoga MH, Grade S, Pusch M, **Grothe B**, Götz M: ENaC Regulates Proliferation of Adult Neural Stem Cells in Flow-Dependent Manner. *Submitted*
2. Brosel S, **Grothe B\***, Kunz L\*: An auditory brainstem nucleus as a model system for neuronal metabolic demands. *Submitted May 2017 EJN*
3. Beiderbeck B, Müller N, Myoga MH, Friauf F\*, **Grothe B\***, Pecka M\*: Precise inhibition in the 1 auditory brainstem fine-tunes and facilitates action potential firing. *In preparation*
4. Lingner A, Pecka M, Leibold C, **Grothe B**: Auditory short-term adaptation facilitates spatial segregation. *Submitted*
5. Gleis H, **Grothe B\***, Pecka M\*: Rapid signal dependent adaptation in binaural level difference processing. *In preparation*

Peer-reviewed papers:

1. Sinclair JL, Fischl MJ, Alexandrova O, **Grothe B**, Leibold C, Kopp-Scheinpflug C (2017) Sound-evoked activity influences myelination of brainstem axons in the trapezoid body. *J Neurosci (in press)*
2. Stange-Marten A, Sinclair JL, Fischl MJ, Kopp-Scheinpflug C, Pecka M, **Grothe B** (2017) Structural and functional adaptations for fast and precise inhibition: constant synaptic delays and accelerated action potential conduction velocity related to sound localization of low frequency sounds. *Proc Natl Acad Sci USA*, 114(24): E4851–E4858 doi:10.1073/pnas.1702290114
3. Ueberfuhr MA, Braun A, Wiegrebe L, **Grothe B**, Drexel M (2017) Modulation of auditory percepts by transcutaneous electrical stimulation. *Hear Res*. 350:235-243. doi: 10.1016/j.heares.2017.03.008
4. Biechl D, Tietje K, Ryu S, **Grothe B**, Gerlach G, Wullimann MF (2017) Identification of accessory olfactory system and medial amygdala in the zebrafish. *Nature Sci Rep Sci Rep* 7:44295. DOI: 10.1038/srep44295
5. Fischl JM, Burger RM, Schmidt-Pauly M, Alexandrova O, Sinclair JL, **Grothe B**, Forsythe ID, Kopp-Scheinpflug C (2016) Physiology and Anatomy of Neurons in the Medial Superior Olive (MSO) of the Mouse. *J Neurophysiol* 116(6):2676-2688 DOI: 10.1152/jn.00523.2016
6. Lingner A, **Grothe B**, Wiegrebe L, Ewert SD (2016) Binaural Glimpses at the Cocktail Party? *J Assoc Res Otolaryngol* 17(5):461-73 DOI: 10.1007/s10162-016-0575-7
7. Biechl D, Dorigo A, Koester RW, **Grothe B**, Wullimann MF (2016) Sonic hedgehog expressing eurydendroid cells and PH3 positive proliferative subpial cells in the larval zebrafish cerebellum support existence of an external granular layer in teleosts. *Frontiers in Neuroanatomy* 10:49 doi: 10.3389/fnana.2016.00049
8. Ford MC, Alexandrova O, Cossell L, Stange-Marten A, Sinclair J, Kopp-Scheinpflug C, Pecka M, Attwell D, **Grothe B** (2015) Tuning of Ranvier node and internode properties in myelinated axons to adjust action potential timing. *Nature Commun* doi: 10.1038/ncomms9073
9. Kulesza RJ, **Grothe B** (2015) Yes, there is a Medial Nucleus of the Trapezoid Body in Humans, *Front Neuroanat* 9: 35. doi: 10.3389/fnana.2015.00035
10. Leibold C, **Grothe B** (2015) Sound localization with microsecond precision in mammals: what is it we do not understand? *E-Neuroforum* 50 March 2015
11. Danek AH, Öllinger M, Fraps T, **Grothe B**, Flanagin VL (2015) An fMRI investigation of expectation violation in magic tricks. *Front Psychology* doi: 10.3389/fpsyg.2015.00084
12. Radtke-Schuller S, Seeler S, **Grothe B** (2015) Restricted loss of olivocochlear but not vestibular efferent neurons in the senescent gerbil (*Meriones unguiculatus*). *Front Aging Neurosci* 7:4, doi: 10.3389/fnagi.2015.00004
13. Danek AH, Fraps T, von Müller A, **Grothe B**, Öllinger M (2014) It's a kind of magic – what self-reports can reveal about the phenomenology of insight problem solving. *Front Psychol* 6:84 doi: 10.3389/fpsyg.2014.01408
14. Kugler K, Wiegrebe L, **Grothe B**, Kössl M, Gürkov R, Krause E, Drexel M (2014) Low-frequency sound affects active micromechanics in the human inner ear. *R Soc opensci* 1:140166
15. **Grothe B**, Pecka M (2014), The natural history of sound localization in mammals – a story of neuronal inhibition. *Front Neural Circuits* 8:116 doi: 10.3389/fncir.2014.00116
16. Yassin L, Radtke-Schuller S, Asraf H, **Grothe B**, Hershinkel M, Forsythe ID, Kopp-Scheinpflug C (2014): Nitric oxide signalling modulates synaptic inhibition in the superiorparaolivary nucleus (SPN) via cGMP-dependent suppression of KCC2. *Front Neural Circuits* 8:65 doi: 10.3389/fncir.2014.00065

17. Yuan C-W, Khouri L, **Grothe B**, Leibold C (2014) Neuronal Adaptation Translates Stimulus Gaps Into A Population Code. *PLoS ONE* 9(4): e95705.
18. Myoga MH, Lehnert S, Leibold C, Felmy F, **Grothe B** (2014) Glycinergic Inhibition Controls Coincidence Detection in the Auditory Brainstem. *Nature Commun*, 5:3790 DOI: 10.1038/ncomms4790
19. Lehnert S, Ford MC, Alexandrova O, Hellmundt F, Felmy F, **Grothe B**, Leibold C (2014) Action Potential Generation in an Anatomically Constrained Model of Medial Superior Olive Axons. *J Neurosci* 34(15):5370–5384
20. Thurley K, Henke J, Hermann J, Ludwig B, Tatarau C, Wätzig A, Herz AVM, **Grothe B**, Leibold C (2014) Mongolian gerbils learn to navigate in complex virtual spaces. *Behav Brain Res* 266:161-168
21. Dietz M, Marquardt , Stange A, Pecka M, **Grothe B**, David McAlpine (2014) Emphasis of spatial cues 1 in the temporal fine-structure during the rising segments of amplitude modulated sounds II: Single neuron recordings. *J Neurophysiol* 111:1973-1985, DOI: 10.1152/jn.00681.2013
22. Danek AH, Fraps T, von Müller A, **Grothe B**, Öllinger M (2013) Working Wonders? Investigating Insight with Magic Tricks. *Cognition* 130(2):174-185, doi:10.1016/j.cognition.2013.11.003
23. Stange A, Myoga MH, Lingner A, Ford MC, Alexandrova O, Felmy F, Pecka M, Siveke I, **Grothe B** (2013) Adaptation in sound localization: from GABAB receptor-mediated synaptic modulation to perception. *Nature Neurosci* 16:1840-1847, DOI:10.1038/NN.3548
24. Trattner B, Berner S, **Grothe B**, Kunz L (2013) Depolarisation-induced suppression of a glycinergic synapse in the superior olivary complex by endocannabinoids. *J Neurochem* 127(1):78-90 doi: 10.1111/jnc.12369
25. Trattner B, Gravot CM, **Grothe B**, Kunz L (2013) Metabolic Maturation of Auditory Neurones in the Superior Olivary Complex. *PLoS ONE* 8(6):e67351
26. Lingner A, Kugler K, **Grothe B**, Wiegrebe L (2013) Amplitude-modulation detection of Gerbils in reverberant sound fields. *Hear Res* 302:207-112
27. Danek AH, Fraps T, von Müller A, **Grothe B**, Öllinger M (2012) Aha! experiences leave a mark: Facilitated recall of insight solutions. *Psychol Res* 77:659–669
28. Fischl MJ, Combs TD, Klug A, **Grothe B**, Burger RM (2012) Modulation of synaptic input by GABA<sub>B</sub> receptors improves coincidence detection for computation of sound location. *J Physiol* 590:3027-3066
29. Lingner A, Wiegrebe L, **Grothe B** (2012) Sound localization in noise by gerbils and humans. *JARO* 13:237-248
30. Couchman K, **Grothe B**, Felmy F (2012) Functional localization of neurotransmitter receptors and synaptic inputs to mature neurons of the medial superior olive. *J Neurophysiol* 107:1186-1198
31. Ammer J, Benedikt **Grothe B**, Felmy F (2012) Late postnatal development of cellular and synaptic properties promotes fast signalling in the dorsal nucleus of the lateral lemniscus. *J Neurophysiol* 107:1172-1185
32. Siveke I, Leibold C, Schiller E, **Grothe B** (2012) Adaptation of binaural processing in the adult brainstem induced by ambient noise. *J Neurosci* 32:462-473
33. Walcher J, Hassfurth B, **Grothe B**, Koch U (2011) Comparative post-hearing development of inhibitory inputs to the lateral superior olive in gerbils and mice. *J Neurophysiol* 106:1443-1453
34. Khouri L, Lesica NA, **Grothe B** (2011) Impaired Auditory Temporal Selectivity in the Inferior Colliculus of Aged Mongolian Gerbils. *J Neurosci* 31:9958-9970
35. Wullimann MF, Mueller T, Distel M, Babaryka A, **Grothe B**, Köster RW (2011) The long adventurous journey of rhombic lip cells in jawed vertebrates: a comparative developmental analysis. *Front Neuroanat* DOI: 10.3389/fnana.2011.00027
36. **Grothe B**, Koch U (2011) Dynamics of binaural processing in the mammalian sound localization pathway - the role of GABA<sub>B</sub> receptors. *Hearing Research* 279:43-50
37. Kaiser A, Alexandrova O, **Grothe B** (2011) Urocortin-expressing olivocochlear neurons exhibit tonotopic and developmental changes in the auditory brainstem and in the innervation of the cochlea. *J Comp Neurol* 519:2758-78
38. Lüling H., Siveke I, **Grothe B**, Leibold C (2011) Frequency-Invariant Representation of Interaural Time Differences in Mammals. *PLoS Comp Biol* 10.1371/journal.pcbi.1002013
39. Porres C, Meyer E, **Grothe B**, Felmy F (2011) NMDA currents modulate the synaptic input-output functions of neurons in the dorsal nucleus of the lateral lemniscus in Mongolian gerbils. *J Neurosci* 31: 4511– 4523
40. Couchman K, **Grothe B**, Felmy F (2010) Medial superior olivary neurons receive surprisingly few excitatory and inhibitory inputs with balanced strength and short-term dynamic. *J Neurosci* 30: 17111-17121
41. Hofer SB, Mrcsic-Flogel TD, Horvath D, **Grothe B**, Lesica NA (2010) Optimization of population decoding with distance metrics. *Neural Netw* 23: 728-732
42. Lesica NA, Lingner A, **Grothe B** (2010) Population coding of interaural time differences in gerbils and barn owls. *J Neurosci* 30: 11696-11702

43. Hassfurth B, **Grothe B**, Koch U (2010) The mammalian ITD detection circuit is differentially controlled by GABA<sub>B</sub> receptors during development. *J Neurosci* 30:9715-9727
44. **Grothe B**, Pecka M, McAlpine D (2010) Mechanisms of sound localization in mammals. *Physiol Rev* 90: 983-1012
45. Schebesch G, Lingner A, Firzlaff U, Wiegrebe L, **Grothe B** (2010) Perception and neural representation of size-variant human vowels in the Mongolian gerbil (*Meriones unguiculatus*). *Hear Res* 261: 1-8
46. Pecka M, Siveke I, **Grothe B**, Lesica NA (2010) Enhancement of ITD coding within the initial stages of the auditory pathway. *J Neurophysiol* 102: 38-46
47. Hassfurth B, Magnusson AK, **Grothe B**, Koch U (2009) Sensory deprivation regulates the development of the hyperpolarization-activated current in auditory brainstem neurons. *Eur J Neurosci* 30: 1227-1238
48. Rautenberg PL, **Grothe B**, Felmy F (2009) Quantification of the three dimensional morphology of coincidence detector neurons in the medial superior olive of gerbils during late postnatal development. *J Comp Neurol* 517: 385-396
49. Meffin H., **Grothe B** (2009) Selective Filtering by Spurious Localization Cues in the Mammalian Auditory Brainstem. *J Acoust Soc Am* 126: 2437-2454
50. Ford MC, **Grothe B**, Klug A (2009) Fenestration of the calyx of Held during development occurs sequentially along the tonotopic axis and is influenced by afferent activity. *J Comp Neurol* 514: 92-106
51. Hermann J, **Grothe B**, Klug A (2009) Modeling short-term synaptic plasticity at the calyx of Held using in vivo like stimulation patterns. *J Neurophysiol* 101: 20-30
52. Park TJ, Brand A, Koch U, Ikebuchi M, **Grothe B** (2008) Dynamic changes in level influence spatial coding in the lateral superior olive. *Hear Res* 238:58-67, DOI:10.1016/j.heares.2007.10.009
53. Werthath F, Alexandrova O, **Grothe B**, Koch U (2008) Experience dependent refinement of the inhibitory axons projecting to the medial superior olive. *Developmental Neurobiology* 68: 1454-1462
54. Krebs B, Lesica NA, **Grothe B** (2008) [The representation of amplitude modulations in the mammalian auditory midbrain.](#) *J Neurophysiol* 100:1602-1609
55. Magnusson AK, Park TJ, Pecka M, **Grothe B\***, Koch U (2008) Retrograde GABA signaling adjusts sound localization by balancing excitation and inhibition in the brainstem. *Neuron* 59:125–137<sup>1,2</sup>
56. Pecka M, Brand A, Behrend O, **Grothe B** (2008) Interaural time difference processing in the mammalian medial superior olive: the role of glycinergic inhibition. *J Neurosci* 28: 6914-6925
57. Lesica NA, **Grothe B** (2008) Dynamic spectrotemporal feature selectivity in the auditory midbrain. *J Neurosci* 28: 5412-5421
58. Lesica NA, **Grothe B** (2008) Efficient temporal processing of naturalistic sounds. *PLoS ONE*. 3 (2):e1655
59. Siveke I, Ewert SD, **Grothe B**, Wiegrebe L (2008) Psychophysical and physiological evidence for fast binaural processing. *J Neurosci*. 28: 2043-2052
60. Maier JK, Kinderman T, **Grothe B**, Klump G (2008) Effects of omni-directional noise exposure during hearing onset and age on auditory spatial resolution in the Mongolian gerbil (*Meriones unguiculatus*) - a behavioral approach. *Brain Res* 1220: 47-57
61. Siveke I, Leibold C, **Grothe B** (2007) [Spectral Composition of Concurrent Noise Affects Neuronal Sensitivity to Interaural Time Differences of Tones in the Dorsal Nucleus of the Lateral Lemniscus.](#) *J Neurophysiol* 98: 2705-2715
62. Berninger B, Costa MR, Koch U, Schroeder T, Sutor B, **Grothe B**, Götz M (2007) Functional properties of neurons derived from in-vitro reprogrammed postnatal astroglia. *J Neurosci* 27: 8654-8664
63. Hermann J, Pecka M, Gersdorff H von, **Grothe B**, Klug A (2007) Synaptic transmission at the calyx of Held under in vivo like activity levels. *J Neurophysiol* 98: 807-820
64. Pecka M, Zahn TP, Saunier-Rebori B, Siveke I, Felmy F, Wiegrebe L, Klug A, Pollak GD, **Grothe B** (2007) [Inhibiting the inhibition: a neuronal network for sound localization in reverberant environments.](#) *J Neurosci* 27: 1782-1790
65. Siveke I, Pecka M, Seidl AH, Baudoux S, **Grothe B** (2006) Binaural Response Properties of Low Frequency Neurons in the Gerbil Dorsal Nucleus of the Lateral Lemniscus. *J Neurophysiol* 96: 1425-1440
66. Magnusson AK, Kapfer C, **Grothe B**, Koch U (2005) Maturation of Glycinergic Inhibition in the Gerbil Medial Superior Olive after Hearing Onset. *J Physiol* 568: 497-512
67. Seidl AH, **Grothe B** (2005) Development of sound localization mechanisms in mammals is shaped by early acoustic experience. *J Neurophysiol* 94: 1028-1036
68. Koch U, Braun M, Kapfer C, **Grothe B** (2004) Distribution of HCN1 and HCN2 in rat auditory brainstem nuclei. *Eur J Neurosci* 20: 79-91

\* UK and BG share senior authorship

<sup>1</sup> Preview by Xu-Friedman MA and Regehr WG (2008) Retrograde Tuning of Tuning. *Neuron* 59: 3-8

<sup>2</sup> "Research Highlight", *Nature* 454: 371, 2008

69. Park TJ, Klug A, Holinstat MA, **Grothe B** (2004) Interaural Level Difference Processing in the Lateral Superior Olive and the Inferior Colliculus. *J Neurophysiol* 91: 286-301
70. Koch U, **Grothe B** (2003) [Hyperpolarization-activated current \(I<sub>h</sub>\) in the inferior colliculus: distribution and contribution to temporal processing](#). *J Neurophysiol* 90: 3679-3687
71. **Grothe B** (2003) New roles for synaptic inhibition in sound localization. *Nature Rev Neurosci* 4: 540-550
72. McAlpine D, **Grothe B** (2003) Sound Localisation and Delay Lines - Do Mammals fit the Model? *TINS* 26: 347-350
73. Brand A, Behrend O, Marquardt T, McAlpine D, **Grothe B** (2002) Precise inhibition is essential for micro-second interaural time difference coding. *Nature* 417: 543-547<sup>3,4,5</sup>
74. Kapfer C, Seidl AH, Schweizer H, **Grothe B** (2002) Experience-dependent refinement of inhibitory inputs to auditory coincidence-detector neurons. *Nature Neurosci* 5: 247-253<sup>6</sup>
75. Behrend O, Brand A, Kapfer C, **Grothe B** (2002) Auditory response properties in the superior paraolivary nucleus of the gerbil. *J Neurophysiol* 87: 2915-2928
76. **Grothe B**, Covey E, Casseday JH (2001) Medial superior olive in the big brown bat: neuronal response to pure tones, amplitude modulations, and pulse trains. *J Neurophysiol* 86: 2219-2230
77. Brand A, Urban A, **Grothe B** (2000) Duration tuning in the mouse auditory midbrain. *J Neurophysiol* 84: 1790-1799
78. **Grothe B**, Neuweiler G (2000) The function of the medial superior olive in small mammals: temporal receptive fields in auditory analysis. *J Comp Physiol A* 186: 413-423
79. Koch U, **Grothe B** (2000) Interdependence of spatial and temporal coding in the auditory midbrain. *J Neurophysiol* 83: 2300-2314
80. Klug A, Khan A, Burger RM, Bower EE, Yang L, **Grothe B**, Halvorsen MB, Park TJ (2000) Latency as a function of intensity in auditory neurons: influences of central processing. *Hear Res* 148: 107-123
81. **Grothe B** (2000) The evolution of temporal processing in the medial superior olive, an auditory brain-stem structure. *Prog Neurobiol* 61: 581-610
82. **Grothe B**, Klump GM (2000) Temporal processing in sensory systems. *Curr Opin Neurobiol* 10: 467-473
83. **Grothe B**, Park TJ (2000) Structure and function of the bat superior olivary complex. *Microsc Res Techn* 51: 382-402
84. **Grothe B**, Park TJ (1998) Sensitivity to interaural time differences in the medial superior olive of a small mammal, the Mexican free-tailed bat. *J Neurosci* 18: 6608-6622
85. Koch U, **Grothe B** (1998) GABAergic and glycinergic inhibition sharpens tuning for frequency modulations in the inferior colliculus of the big brown bat. *J Neurophysiol* 80: 71-82
86. Park TJ, Klug A, Oswald JP, **Grothe B** (1998) A novel circuit in the bat's auditory midbrain recruits neurons into sound localization processing. *Naturwissenschaften* 85: 176-179
87. Casseday JH, Covey E, and **Grothe B** (1997) Neural selectivity and tuning for sinusoidal frequency modulations in the inferior colliculus of the big brown bat, *Eptesicus fuscus*. *J Neurophysiol* 77: 1595-1605
88. **Grothe B**, Park TJ, Schuller G (1997) Medial superior olive in the free-tailed bat: response to pure tones and amplitude-modulated tones. *J Neurophysiol* 77: 1553-1565
89. Koch U, **Grothe B** (1997) Azimuthal position affects analysis of complex sounds in the mammalian auditory system. *Naturwissenschaften* 84: 160-162
90. **Grothe B**, Covey E, Casseday JH (1996) Spatial tuning of neurons in the inferior colliculus of the big brown bat: effects of sound level, stimulus type and multiple sound sources. *J Comp Physiol A* 179: 89-102
91. Park TJ, **Grothe B** (1996) From pattern recognition to sound localization: A by-product of growing larger during evolution. *Naturwissenschaften* 83: 30-32
92. Park TJ, **Grothe B**, Pollak GD, Schuller G, Koch U (1996) Neural delays shape selectivity to interaural intensity differences in the LSO. *J Neurosci* 16: 6554-6566
93. **Grothe B**, Park TJ (1995) Time can be traded for intensity in the lower auditory system. *Naturwissenschaften* 82:521-523
94. **Grothe B** (1994) Interaction of excitation and inhibition in processing of pure tone and amplitude-modulated stimuli in the medial superior olive of the mustached bat. *J Neurophysiol* 71(2):706-721
95. **Grothe B**, Sanes DH (1994) Synaptic inhibition influences the temporal coding properties of medial superior olivary neurons: an *in vitro* study. *J Neurosci* 14(3):1701-1709

<sup>3</sup>-"news and views" by Pollak GD (2002) Model hearing. *Nature* 417: 543

<sup>4</sup> commented on in by Jones R (2002) *Nature Rev Neurosci* 3: 492-493

<sup>5</sup> cover-story by Fitzgerald R (2002) *Physics Today* 55: 13-16

<sup>6</sup>-"news and views" by Sanes DH (2002) Right place at the right time. *Nature Neurosci* 5: 187-188

96. **Grothe B**, Schweizer H, Pollak GD, Schuller G, Rosemann C (1994) Anatomy and projection patterns of the superior olivary complex in the Mexican free-tailed bat, *Tadarida brasiliensis mexicana*. *J Comp Neurol* 343: 630-646
97. **Grothe B**, Sanes DH (1993) Bilateral inhibition by glycinergic afferents in the medial superior olive. *J Neurophysiol* 69: 1192-1196
98. **Grothe B**, Vater M, Casseday JH, Covey E (1992) Monaural interaction of excitation and inhibition in the medial superior olive of the mustached bat: an adaptation for biosonar. *Proc Nat Acad Sci USA* 89: 5108-5112
99. Vater M, Habbicht H, Kössl M, **Grothe B** (1992) The functional role of GABA and glycine in monaural and binaural processing in the inferior colliculus of horseshoe bats. *J Comp Physiol A* 171: 541-553

### Book Chapters and other Publications:

1. Leibold C, Grothe B (2015) Sound localization with microsecond precision in mammals: what is it we do not understand? *e-Neuroforum*, DOI 10.1007/s13295-015-0001-3
2. Wullmann MF, **Grothe B** (2013) The Central Nervous Organization of the Lateral Line System. In: Coombs S, Bleckmann H, Fay RR, Popper AN (eds): *The Lateral Line System. Springer Handbook of Auditory Research*. Springer, New York, ISBN 978-1-4614-8850-7, pp. 195-251, DOI 10.1007/978-1-4614-8851-4
3. **Grothe B** (2012) "Neuro" als Erfolgsschlag - Doch was wissen wir tatsächlich über die Auswirkungen digitaler Medien auf unser Gehirn? Interview, Deutscher Hochschulbund. *Forschung & Lehre* 12/12: 884-885
4. **Grothe B** (2012) Why systemic neurosciences? *Public Service Review: European Science and Technology*
5. **Grothe B** (2012). Understanding the brain - Setting the standard for PhD research in the neurosciences in Germany. *Public Service Review: European Science and Technology* 16, [http://www.publicservice.co.uk/article.asp?publication=European%20Science%20and%20Technology&id=593&content\\_name=Health&article=21183](http://www.publicservice.co.uk/article.asp?publication=European%20Science%20and%20Technology&id=593&content_name=Health&article=21183)
6. Borst A, **Grothe B** (2011) Die Welt entsteht im Kopf - Das Gehirn und sein Sinne. In: Bonhoeffer T, Gruss P (eds) *Zukunft Gehirn*. Verlag C.H.Beck oHG, München, ISBN-978-3-406-61642 6, pp. 37-58
7. Siemers BM, Wiegrebe L, **Grothe B** (2011) Editorial: Ecology and neuroethology of bat echolocation: a tribute to Gerhard Neuweiler. *J Comp Physiol A* 197:399-402
8. Klug A, **Grothe B** (2010) Ethological stimuli. In: Rees A, Palmer AR (eds) *Oxford Handbook of Auditory Science: The Auditory Brain*. Oxford University Press, ISBN 978-0-19-923328-1, pp. 171-190
9. **Grothe B**, Schnitzler H-U (2010) Nachruf auf Gerhard Neuweiler 18.5.1935 – 15.8.2008. *Mitteilungen der Deutschen Zoologischen Gesellschaft*
10. **Grothe B** (2009) Nimmt uns die Neurobiologie den freien Willen? Eine kritische Betrachtung der Aussagekraft moderner neurowissenschaftlicher Methoden. In Vossenkuhl W et al. (eds) *Ecce Homo! Menschenbild - Menschenbilder*. Kohlhammer, Stuttgart, ISBN 978-3-17-020368-6, pp. 238-255
11. Behrend O, **Grothe B** (2007) Auditory processing in the bat medial superior olive. In Dallos P, Oertel D (eds) *The Senses: A Comprehensive Reference, Volume 3, Audition*. Academic Press, Oxford, ISBN-13 978-0126394825, pp. 701-718
12. **Grothe B** (2007) Der freie Wille ist noch nicht abgeschafft. *Das Parlament* 57(1):9
13. **Grothe B** (2006) Nimmt uns die moderne Neurowissenschaft den freien Willen? In: Hillenkamp T (ed) *Schriftenreihe Deutsche Strafverteidiger e.V.: Neue Hirnforschung – Neues Strafrecht?* Nomos, Baden-Baden, ISBN 978-3-8329-2077-7, pp 35-49.
14. Meffin H, **Grothe B** (2006) The modulation of spike rate in the dorsal nucleus of the lateral lemniscus by a virtually moving sound. *CNS*, Paper #109
15. Dulac C, **Grothe B** (2004) Sensory systems (Editorial). *Curr Opin Neurobiol* 14(4):403-406
16. Palmer A, **Grothe B** (2004) Interaural Time Difference Processing. In Merzenich MM, Syka J (eds) *Plasticity and Signal Representation in the Auditory System*. Kluwer Academic/Plenum Publishers, ISBN 978-0-387-23154-9, pp 1-13
17. **Grothe B**, Fritsch B, Köppl C, Casseday JH, Carr CE (2004) The evolution of central pathways and their neural processing patterns. In: Manley GA, Popper AN, Fay RR (eds): *Evolution of the Vertebrate Auditory System. Springer Handbook of Auditory Research*. Springer, New York, ISBN 0-387-21089, pp. 289-359
18. **Grothe B** (2002) Die Rolle neuronaler Hemmung bei der auditorischen Zeitverarbeitung im Sub-Millisekundenbereich. In: *Jahrbuch der Max-Planck-Gesellschaft* 2001, ISBN-13: 978-3525861325, pp 284-288



19. **Grothe B** (2001) How evolution has opened our ears. *Max Planck Research*, 4:24-31
20. **Grothe B** (2001) Stichwort "Großhirn" (2001) In: N. Pethes, J. Ruchatzs (eds), *Rowolts Enzyklopädie, Gedächtnis und Erinnerung – Ein interdisziplinäres Lexikon*. Rowohlt Verlag, Reinbeck bei Hamburg, ISBN-13: 978-3499556364
21. **Grothe B** (2001) Stichwort "Zentrales Nervensystem" In: N. Pethes, J. Ruchatzs (eds), *Rowolts Rnyklopädie, Gedächtnis und Erinnerung – Ein interdisziplinäres Lexikon*. Rowohlt Verlag, Reinbeck bei Hamburg, ISBN-13: 978-3499556364
22. **Grothe B** (2000) Wie funktioniert das Hören? In: *Zuhören – Lernen – Verstehen*. Huber L, Odersky E (eds). Westermann, Braunschweig, ISBN 3-14-162044-X, pp 39-57
23. **Grothe B** (1999) Die Rolle der Hemmung bei der neuronalen Filterung der Umhüllenden von Reizen. *Zeit Audiol Suppl* II, pp.1-6
24. **Grothe B** (1999) Temporal processing in the lower brainstem. In: *Sensory Analysis and Perception in Animals and Man*. Manley GA, Klump GM, Oeckinghaus. Wiley-VCH, Weinheim, ISBN 3-527-27587-8, pp 153-160
25. **Grothe B** (1999) Zur Evolution des Hörens – Wechselspiel von Neuentwicklung und Funktionswechsel. *Einsichten* 16(2):12-15
26. **Grothe B** (1997) Phylogeny of acoustic communication in mammals. *Phys Med Rehab* 7(5):251-256

### Original Publications from the Grothe-Group

(it is policy of the Lehrstuhl Neurobiology (Grothe) that advanced postdocs can publish without the group leader if he did not contribute directly to the manuscript; this explicitly includes papers that have been funded partially by grants from B. Grothe; relevant PI from the Grothe lab indicated by italics):

1. Flanagan VL, Schönrnich S, Schraner M, Hummel N, Wallmeier L, Wahlberg M, Stephan T, Wiegrebe L (2017) Human exploration of enclosed spaces through echolocation. *J Neurosci* 37: 1614-1627. doi: 10.1523/JNEUROSCI.1566-12.2016.
2. Jeanson L, Wiegrebe L, Gürkov R, Krause E, Drexl M (2017) Aftereffects of Intense Low-Frequency Sound on Spontaneous Otoacoustic Emissions: Effect of Frequency and Level. *J Assoc Res Otolaryngol* 18: 111-119. doi: 10.1007/s10162-016-0590-8.
3. Luo J, Lingner A, Firzlaff U, Wiegrebe L (2017) The Lombard effect emerges early in young bats: Implications for the development of audio-vocal integration. *J Exp Biol* 220: 1032-1037. doi: 10.1242/jeb.151050.
4. Ueberfuhr MA, Wiegrebe L, Krause E, Gürkov R, Drexl M (2017) Tinnitus in Normal-Hearing Participants after Exposure to Intense Low-Frequency Sound and in Ménière's Disease Patients. *Front Neural* 7: 239. doi: 10.3389/fneur.2016.00239. eCollection 2016.
5. Wullimann MF (2017) Should we redefine the lateral pallium? *J Comp Neurol* 525: 1509-1513. doi: 10.1002/cne.24127.
6. Biechl D, Tietje K, Gerlach G, Wullimann MF (2016) Crypt cells are involved in kin recognition in larval zebrafish. *Sci Rep* 6:24590. doi: 10.1038/srep24590.
7. Drexl M; Otto L; Wiegrebe L; Marquardt T; Gürkov R; Krause E (2016) Low-frequency sound exposure causes reversible long-term changes of cochlear transfer characteristics. *Hear Res* 332: 87-94. doi: 10.1016/j.heares.2015.12.010.
8. Drexl M; Krause E; Gürkov R; Wiegrebe L (2016) Responses of the Human Inner Ear to Low-Frequency Sound. *Adv Exp Med Biol* 894: 275-84. doi: 10.1007/978-3-319-25474-6\_29.
9. Genzel D; Firzlaff U; Wiegrebe L; MacNeilage P (2016) Dependence of auditory spatial updating on vestibular, proprioceptive, and efference copy signals. *J Neurophysiol* 116: 765-75. jn.00052.2016. doi: 10.1152/jn.00052.2016.
10. Kugler K; Greiter W; Luksch H; Firzlaff U; Wiegrebe L (2016) Echo-acoustic flow affects flight in bats. *J Exp Biol* 219: 1893-7. doi: 10.1242/jeb.139345
11. Linnenschmidt M; Wiegrebe L (2016) Sonar beam dynamics in leaf-nosed bats. *Sci Rep* 6: 29222. doi: 10.1038/srep29222.
12. Luo J, Wiegrebe L (2016) Biomechanical control of vocal plasticity in an echolocating bat. *J Exp Biol* 219: 878-86. doi: 10.1242/jeb.134957
13. Dörenberger S; Banchi R; Brose S; Seebacher C; Laimgruber S; Uhl R; Felmy F; Straka H; Kunz L (2015) Analysis of signal processing in vestibular circuits with a novel light-emitting diodes-based fluorescence microscope. *Eur J Neurosci* 41: 1332-44. doi: 10.1111/ejn.12907
14. Franzen DL; Gleiss SA; Berger C; Kümpfbeck FS; Ammer JJ; Felmy F (2015) Development and modulation of intrinsic membrane properties control the temporal precision of auditory brain stem neurons. *J Neurophysiol* 113: 524-36. doi: 10.1152/jn.00601.2015.
15. Genzel D; Hoffmann S; Prosch S; Firzlaff U; Wiegrebe L (2015) Biosonar navigation above water II: exploiting mirror images. *J Neurophysiol* 113: 1146-55. doi: 10.1152/jn.00264.2014
16. Hoffmann S; Genzel D; Prosch S; Baier L; Weser S; Wiegrebe L; Firzlaff U (2015) Biosonar navigation above water I: estimating flight height. *J Neurophysiol* 113: 1135-45. doi: 10.1152/jn.00263.2014. Epub 2014 Nov 19.
17. Kress S; Biechl D; Wullimann MF (2015) Combinatorial analysis of calcium-binding proteins in larval and adult zebrafish primary olfactory system identifies differential olfactory bulb glomerular projection fields. *Brain Struct Funct* 220: 1951-70. doi: 10.1007/s00429-014-0765-1
18. Kugler K; Wiegrebe L; Gürkov R; Krause E; Drexl M (2015) Concurrent Acoustic Activation of the Medial Olivocochlear System Modifies the After-Effects of Intense Low-Frequency Sound on the Human Inner Ear. *J Assoc Res Otolaryngol* 16: 713-25. doi: 10.1007/s10162-015-0538-4. Epub 2015 Aug 12.

19. Rodenas-Cuadrado P; Chen XS; Wiegrebe L; Firzlaff U; Vernes SC (2015) A novel approach identifies the first transcriptome networks in bats: a new genetic model for vocal communication. *BMC Genomics* 16: 836. doi: 10.1186/s12864-015-2068-1.
20. Wallmeier L; Kish D; Wiegrebe L; Flanagan VL (2015) Aural localization of silent objects by active human biosonar: neural representations of virtual echo-acoustic space. *Eur J Neurosci* 41: 533-45. doi: 10.1111/ejn.12843
21. Atiani S; David SV; Elgueda D; Locastro M; Radtke-Schuller S; Shamma SA; Fritz JB (2014) Emergent Selectivity for Task-Relevant Stimuli in Higher-Order Auditory Cortex. *Neuron* 82: 486-99. doi: 10.1016/j.neuron.2014.02.029.
22. Franzen DL, Gleiss SA, Berger C, Kämpfbeck FS, Ammer JJ, Felmy F (2014) Development and modulation of intrinsic membrane properties control the temporal precision of auditory brainstem neurons. *J Neurophysiol* doi: 10.1152/jn.00601.2014
23. Berger C, Meyer EM, Ammer JJ, Felmy F (2014) Large somatic synapses on neurons in the ventral lateral lemniscus work in pairs. *J Neurosci* 34: 3237-46. doi: 10.1523/JNEUROSCI.3664-13.2014.
24. Drexler M, Überfuhr M, Weddell TD, Lukashkin AN, Wiegrebe L, Krause E, Gürkov R (2014) Multiple indices of the 'bounce' phenomenon obtained from the same human ears. *J Assoc Res Otolaryngol* 15: 57-72. doi: 10.1007/s10162-013-0424-x
25. Herget U, Wolf A, Wullimann MF, Ryu S (2014) Molecular neuroanatomy and chemoarchitecture of the neurosecretory preoptic-hypothalamic area in zebrafish larvae. *J Comp Neurol* 522: 1542-1564. DOI: 10.1002/cne.23480 (Epub 2013 Oct 11)
26. Kress S, Biechl D, Wullimann MF (2014) Combinatorial analysis of calcium-binding proteins in larval and adult zebrafish primary olfactory system identifies differential olfactory bulb glomerular projection fields. *Brain Struct Funct* DOI 10.1007/s00429-014-0765-1
27. Wullimann MF (2014) Ancestry of basal ganglia circuits: new evidence in teleosts. *J Comp Neurol* 522: 2013-8. DOI: 10.1002/cne.23525
28. Genzel D, Wiegrebe L (2013) Size does not matter: size-invariant echo-acoustic object classification. *J Comp Physiol A* 199: 159-68
29. Heidegger S, Anz D, Stephan N, Bohn B, Herbst T, Fendler WP, Suhartha N, Sandholzer N, Kobold S, Hotz C, Eisenächer K, Radtke-Schuller S, Endres S, Bourquin C (2013) Virus-associated activation of innate immunity induces rapid disruption of Peyer's patches in mice. *Blood* 122: 2591-9. doi: 10.1182/blood-2013-01-479311
30. Heinrich M, Wiegrebe L (2013) Size constancy in bat biosonar? Perceptual interaction of object aperture and distance. *PLoS one* 8: e61577. doi: 10.1371/journal.pone.0061577
31. Hoffmann S, Warmbold A, Wiegrebe L, Firzlaff U (2013) Spatio-temporal contrast enhancement and feature extraction in the bat auditory midbrain and cortex. *J Neurophysiol* 110: 1257-68. 10.1152/jn.00226.2013
32. Schörnich S, Wallmeier L, Gessele N, Nagy A, Schraner M, Kish D, Wiegrebe L (2013) Psychophysics of human echolocation. *Adv Exp Med Biol* 787, 311-9. doi: 10.1007/978-1-4614-1590-9\_35
33. Wallmeier L, Geßele N, Wiegrebe L (2013) Echolocation versus echo suppression in humans. *Proc Biol Sci* 280: 20131428. doi: 10
34. Zsebok S, Kroll F, Heinrich M, Genzel D, Siemers BM, Wiegrebe L (2013) Trawling bats exploit an echo-acoustic ground effect. *Front Physiol* 4: 65. doi: 10.3389/fphys.2013.00065.1098/rspp.2013.1428
35. Ewert SD, Kaiser K, Kernschmidt L, Wiegrebe L (2012) Perceptual sensitivity to high-frequency interaural time differences created by rustling sounds. *J Assoc Res Otolaryngol* 13: 131-143
36. Genzel D, Geberl C, Wiegrebe L (2012) Coordination of bat sonar activity and flight for the exploration of three-dimensional objects. *J Exp Biol* 215:2226-35. doi: 10.1242/jeb.064535
37. Goerlitz HR, Genzel D, Wiegrebe L (2012) Bats' avoidance of real and virtual objects: implications for the sonar coding of object size. *Behav Processes* 89: 61-7
38. Kress S, Wullimann MF (2012) Correlated basal expression of immediate early gene *egr1* and tyrosine hydroxylase in zebrafish brain and downregulation in olfactory bulb after transitory olfactory deprivation. *J Chem Neuroanat* 46: 51-66
39. Schörnich S, Wiegrebe L, Nagy A (2012) Discovering your inner bat: echo-acoustic target ranging in humans. *J Assoc Res Otolaryngol* 13:673-82. doi: 10.1007/s10162-012-0338-z
40. Borina F, Firzlaff U, Wiegrebe L (2011) Neural coding of echo-envelope disparities in echolocating bats. *J Comp Physiol A* 197: 561-9
41. Heinrich M, Warmbold A, Hoffmann S, Firzlaff U, Wiegrebe L (2011) The sonar aperture and its neural representation in bats. *J Neurosci* 31: 15618-27
42. Wullimann MF (2011) Basal ganglia: insights into origins from lamprey brains. *Curr Biol* 21: R497-500
43. Yamamoto K, Ruuskanen JO, Wullimann MF, Vernier P (2011) Differential Expression of Dopaminergic Cell Markers in the Adult Zebrafish Forebrain. *J Comp Neurology* 519: 576-598
44. Goerlitz HR, Geberl C, Wiegrebe L (2010) Sonar detection of jittering real targets in free-flying bats. *J Acoust Soc Am* 128: 1467-1475
45. Volkman K, Chen Y-Y, Harris MP, Wullimann MF, Köster RW (2010) The zebrafish upper rhombic lip generates tegmental hindbrain nuclei by long-distance migration in an evolutionary conserved manner. *J Comp Neurol* 518: 2794-2817
46. Wolf M, Schuchmann M, Wiegrebe L (2010) Localization dominance and the effect of frequency in the Mongolian Gerbil, *Meriones unguiculatus*. *J Comp Physiol A* 196: 463-470
47. Yamamoto K, Ruuskanen JO, Wullimann MF, Vernier P (2010) Two Tyrosine Hydroxylases in Vertebrates -New Dopaminergic Territories Revealed in the Adult Zebrafish Brain. *Molecular & Cellular Neurosci* 43: 394-402
48. Distel M, Wullimann MF, Köster RW (2009) Optimized Gal4 genetics for permanent gene expression mapping in zebrafish. *Proc Natl Acad Sci USA* 11, 106: 13365-13370
49. Lilleaar C, Stigloher C, Tannhauser B, Wullimann MF, Bally-Cuif L (2009) Axonal projections originating from raphe serotonergic neurons in the developing and adult zebrafish, *Danio rerio*, using transgenics to visualize raphe-specific *pet1* expression. *J Comp Neurol* 512: 158-82
50. Mueller T, Wullimann MF (2009) An Evolutionary Interpretation of Teleost Forebrain Anatomy. *Brain Behav Evol* 74: 30-42
51. Wullimann MF (2009) Secondary neurogenesis and telencephalic organization in zebrafish and mice. *Integrative Zoology* 4: 123-133
52. Genzel D, Wiegrebe L (2008) Time-variant spectral peak and notch detection in echolocation-call sequences in bats. *J Exp Biol* 211(Pt 1): 9-14
53. Goerlitz HR, Hubner M, Wiegrebe L (2008) Comparing passive and active hearing: spectral analysis of transient sounds in bats. *J Exp Biol* 211(Pt 12): 1850-8

54. Hoffmann S, Baier L, Borina F, Schuller G, Wiegrebe L, Firzlaff U (2008) Psychophysical and neurophysiological hearing thresholds in the bat *Phyllostomus discolor*. *J Comp Physiol A* 194(1): 39-47
55. Mueller T, Wullimann MF, Guo S (2008) Early teleostean basal ganglia development visualized by zebrafish *Dlx2a*, *Lhx6*, *Lhx7*, *Tbr2* (*eomesa*), and *GAD67* gene expression. *J Comp Neurol* 507: 1245-57
56. Schörmich S, Wiegrebe L (2008) Phase sensitivity in bat sonar revisited. *J Comp Physiol A* 194: 61-7
57. Wiegrebe L (2008) An autocorrelation model of bat sonar. *Biol Cybern* 98(6): 587-95
58. Firzlaff U, Schuchmann M, Grunwald JE, Schuller G, Wiegrebe L (2007) Object-oriented echo perception and cortical representation in echolocating bats. *PLoS Biol* 5(5): e100
59. Firzlaff U, Schörmich S, Hoffmann S, Schuller G, Wiegrebe L (2006) A neural correlate of stochastic echo imaging. *J Neurosci* 26(3): 785-91
60. Groger U, Wiegrebe L (2006) Classification of human breathing sounds by the common vampire bat, *Desmodus rotundus*. *BMC Biol* 4: 18
61. Grunwald JE, Schörmich S, Wiegrebe L (2004) Classification of natural textures in echolocation. *Proc Natl Acad Sci USA* 101(15): 5670-4