

Markus Nussbaumer

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Employment history

- 2014-2018 Technical assistant, Core Facility Physiology & Behavior, PD Dr. Carsten Wotjak and
Social Behavior & Metabolism Lab, Dept. Stress Neurobiology and Neurogenetics,
Prof.Dr. Alon Chen
Max-Planck Institute of Psychiatry, Munich, Germany
- 2003-2014 Technical assistant, Research group Behavioral Neuroendocrinology, PD Dr. Rainer
Landgraf
Max-Planck Institute of Psychiatry, Munich, Germany
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Education and professional training

- 2018 Advanced training course in accordance with FELASA guidelines “care and use of
laboratory animals”, FELASA type B
- 2001-2003 Professional training, diploma as state-approved biological technical assistant, Jörg-
Zürn vocational college, Überlingen, Lake Constance
- 1986-2000 Elementary & secondary school in Munich, University-entrance diploma, advanced
courses in Biology & English
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Experimental techniques, 2003-present

Behavioral phenotyping of mice and rats:

anxiety and depression-like behavior, social defeat, learning and memory, social behavior, maternal separation, development of novel behavioral paradigms, sleep deprivation, home cage behavior observation, chronic mild stress, restraint stress and HPA axis stress reactivity, ultrasound vocalization

Software-based analysis of behavior of mice and rats:

observation and manual scoring for all aforementioned behavioral tests, automated analysis with ANY-Maze software (where applicable)

Surgical and invasive techniques and tissue sampling of mice and rats:

- central application of substances and sampling (stereotactic surgery, intracerebral guide cannulas, osmotic pumps, virus injections, microinjections, microdialysis)
- peripheral application of substances (IP, SC, IM, IV, PO applications, jugular vein catheters (rat))
- suturing techniques
- whole animal perfusion and fixation
- tissue preparation of organs and brain
- inhalation and injection anesthesia, induction, monitoring, post-surgery care

Breeding colony management of different mouse strains (CD1, C57BL/6), selectively bred and genetically modified mice:

- mating, weaning, ear marking, tail biopsies and breeding database administration
- responsible for all mouse breeding colonies for the Landgraf group (2003-2014)
- responsible for transgenic mouse colonies for Department Chen (2014-2018)

Blood sampling techniques (Rat/Mouse):

- tail vein/artery
- retrobulbar
- facial vein
- cardiac puncture (also in connection with perfusion)

Video recording and lighting techniques, image acquisition for behavioral phenotyping:

Different camera types and related hardware and software, lighting methods and technical background, technical concepts of image acquisition and camera networks

Molecular lab techniques:

DNA extraction, isolation and quantitative measurement, measurement of osmolality, preparation of solutions and samples for measurements and applications, handling of blood samples, general lab management

Additional relevant skills

Programming in Python (Arduino controllers) for behavioral testing

Office software (Word, Excel, Powerpoint, Access)

Video, audio and image editing software for behavioral testing

Endnote reference management software

Awards

2017 - Best Poster Award, 13th World Congress of Biological Psychiatry, Copenhagen, Denmark

Nussbaumer M, Asara J, Teplytska L, Murphy M, Chen A, Turck C, Filiou MD. In vivo mitochondrial targeting exerts anxiolytic effects.

2017 - Best Poster Award, 1st Panhellenic Conference of the Institute of Stress Biology and Medicine, Athens, Greece

Filiou MD, **Nussbaumer M**, Asara J, Teplytska L, Murphy M, Chen A, Turck CW. Towards mitochondria-based therapeutics for anxiety disorders.

2017 - 3rd Best Poster Award, 30th AGNP Symposium, Munich, Germany

Nussbaumer M, Asara J, Teplytska L, Murphy M, Chen A, Turck C, Filiou MD. MitoQ administration exerts anxiolytic effects *in vivo*.

2017 - Award for excellent professional performance from the Max Planck Institute of Psychiatry

awarded for work on establishment of complex behavioral and metabolic paradigms and monitoring systems for assessing complex social rodent behavior (Prof. Dr. Alon Chen)

2016 - Award for excellent professional performance from the Max Planck Institute of Psychiatry

awarded for coordination of animal house relocation and organization of scientific core unit physiology and behavior (PD Dr. Carsten Wotjak)

Languages

English (excellent)

Greek (good)

French (intermediate)

German (native)

Publications in peer-reviewed scientific journals:

1. Genewsky A, Albrecht N, Bura SA, Kaplick PM, Heinz DE, **Nussbaumer M**, Engel M, Grünecker B, Kaltwasser SF, Riebe CJ, Bedenk BT, Czisch M, Wotjak CT. How much fear is in anxiety? eLife (submitted)

Published in BioRxiv on 6.8.2018 doi: <https://doi.org/10.1101/385823>

2. Forkosh O*, Karamihalev S*, Roeh S, Engel M, Alon U, Anpilov S, **Nussbaumer M**, Flachskamm C, Kaplick P, Shemesh Y, Chen A. Identity domains in complex behavior: Toward a biology of personality. Nat Neurosci. (under review)

Published in BioRxiv on 20.8.2018 doi: <https://doi.org/10.1101/395111>

3. Turck CW, Webhofer C, **Nussbaumer M**, Teplytska L, Chen A, Maccarrone G, Filiou MD. Stable isotope metabolic labeling suggests differential turnover of the DPYSL protein family. *Proteomics Clin Appl*. 2016 10:1269-1272.
 4. **Nussbaumer M**, Asara JM, Teplytska L, Murphy MP, Logan A, Turck CW, Filiou MD. Selective mitochondrial targeting exerts anxiolytic effects in vivo. *Neuropsychopharmacology*. 2016 41:1751-1758.
 5. Filiou MD, Asara JM, **Nussbaumer M**, Teplytska L, Landgraf R, Turck CW. Behavioral extremes of trait anxiety in mice are characterized by distinct metabolic profiles. *J Psychiatr Res*. 2014 58:115-122.
 6. Filiou MD, Zhang Y, Teplytska L, Reckow S, Gormanns P, Maccarrone G, Frank E, Kessler MS, Hamsch B, **Nussbaumer M**, Bunck M, Ludwig T, Yassouridis A, Holsboer F, Landgraf R, Turck CW. Proteomics and metabolomics analysis of a trait anxiety mouse model reveals divergent mitochondrial pathways. *Biol Psychiatry*. 2011 70:1074-1082.
 7. Touma C, Bunck M, Glasl L, **Nussbaumer M**, Palme R, Stein H, Wolferstätter M, Zeh R, Zimbelmann M, Holsboer F, Landgraf R. Mice selected for high versus low stress reactivity: a new animal model for affective disorders. *Psychoneuroendocrinology*. 2008 33:839-862.
 8. Landgraf R, Kessler MS, Bunck M, Murgatroyd C, Spengler D, Zimbelmann M, **Nussbaumer M**, Czibere L, Turck CW, Singewald N, Rujescu D, Frank E. Candidate genes of anxiety-related behavior in HAB/LAB rats and mice: focus on vasopressin and glyoxalase-I. *Neurosci Biobehav Rev*. 2007;31(1):89-102.
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Conference abstracts

1. Filiou MD, Engel M, Eggert C, Ressler A, Misiewicz Z, Stoffel R, **Nussbaumer M**, Paul ED, Chen A. Chronic stress alters mitochondrial function in the amygdala. 11th FENS Forum, 7-11 July 2018, Berlin, Germany (Poster)
2. Filiou MD, Engel M, **Nussbaumer M**, Eggert C, Ressler A, Misiewicz Z, Stoffel R, Paul ED, Chen A. Mitochondria, stress and the amygdala. Brain Mind Symposia, Stress in Health and Disease, 14-15 March 2018, Lausanne, Switzerland (Poster)

3. **Nussbaumer M**, Asara J, Teplytska L, Murphy M, Chen A, Turck C, Filiou MD. MitoQ administration exerts anxiolytic effects *in vivo*. 30th AGNP Symposium, 4-6 October 2017, Munich, Germany **3rd BEST POSTER AWARD**

Published in *Pharmacopsychiatry* 2017 50: A22 (Poster)

4. Filiou MD, **Nussbaumer M**, Engel M, Asara J, Teplytska L, Murpgy M, Paul E, Turck C, Chen A. Mitochondria as pharmacological targets for stress-related pathologies. EBPS Biennial Meeting, 31 August - 3 September 2017, Heraklion, Greece (Poster)

5. **Nussbaumer M**, Asara J, Teplytska L, Murphy M, Chen A, Turck C, Filiou MD. In vivo mitochondrial targeting exerts anxiolytic effects. 13th World Congress of Biological Psychiatry, 18-22 June 2017, Copenhagen, Denmark (Poster) **BEST POSTER AWARD**

6. Filiou MD, Engel M, Paul ED, **Nussbaumer M**, Teplytska L, Murphy M, Asara JM, Maccarrone G, Turck CW, Chen A. The bioenergetic dimension of stress: focus on synaptic mitochondria. The 1st Munich Winter Conference on Stress, 19-21 March 2017, Garmisch-Patenkirchen, Germany (Poster)

7. Filiou MD, **Nussbaumer N**, Asara J, Teplytska L, Murphy M, Chen A, Turck CW. Towards mitochondria-based therapeutics for anxiety disorders. 1st Panhellenic Conference of the Institute of Stress Biology and Medicine, 20-22 January 2017, Athens, Greece (Poster) **BEST POSTER AWARD**

8. **Nussbaumer M**, Asara JM, Teplytska L, Murphy MP, Chen A, Turck C, Filiou MD. Selective mitochondrial targeting exerts anxiolytic effects. 67th EEBMB Meeting, 25-27 November 2016, Ioannina, Greece (Poster)

9. **Nussbaumer M**, Maccarrone G, Teplytska L, Murphy MP, Asara JM, Landgraf R, Turck CW, Filiou MD. A hypothesis-free, systemic approach to identify pharmacological targets for anxiety disorders. 6th Conference on Systems Biology of Mammalian Cells, 6-8 April 2016, Munich, Germany (Poster)

10. **Nussbaumer N**, Teplytska L, Asara JM, Murphy MP, Landgraf R, Filiou MD. Mitochondrial targeting exerts anxiolytic effects *in vivo*. FFRM Regional FENS Meeting, 7-10 October 2015, Thessaloniki, Greece (Poster)

11. **Nussbaumer M**, Asara JM, Teplytska L, Murphy MP, Landgraf R, Turck CW, Filiou MD. Mitochondria as pharmacological targets for anxiolytic treatment. 29th AGNP Meeting, 23-26 September 2015, Munich, Germany

Published in *Pharmacopsychiatry* 2015 48:A83 (Poster)

12. **Nussbaumer M**, Teplytska L, Asara JM, Murphy MP, Landgraf R, Turck CW, Filiou MD. Multi-omics driven selective mitochondrial targeting for treating anxiety disorders. MEDMS III, 28 June - 2 July 2015, Athens, Greece (Poster)

13. Filiou MD, **Nussbaumer N**, Teplytska L, Murphy MP, Landgraf R, Turck CW. Proteomics-driven selective mitochondrial targeting for treating anxiety disorders. HUPO 13th World Congress, 5-8 October 2014, Madrid, Spain (Poster)

14. Filiou MD, **Nussbaumer N**, Teplytska L, Murphy MP, Landgraf R, Turck CW. Effects of selective mitochondrial targeting on anxiety-related behavior. 9th FENS Forum, 5-9 July 2014, Milan, Italy (Poster)

15. Filiou MD, Teplytska L, **Nussbaumer M**, Landgraf R, Otte D, Zimmer A, Maccarrone G, Turck CW. Biomarker discovery for psychiatric disorders: The systems biology perspective. 45th EBBS Meeting, 6-9 September 2013, Munich, Germany (Poster)

16. Filiou MD, Teplytska L, **Nussbaumer M**, Landgraf R, Zimmer A, Maccarrone G, Turck CW. Using system biology approaches for biomarker discovery in neuropsychiatric disorders. 35th meeting of the Hellenic Society of Biological Sciences, 23-25 May 2013, Nafplio, Greece (Poster)

17. Filiou MD, Webhofer C, **Nussbaumer M**, Landgraf R, Maccarrone G, Turck CW. A neutron can make the difference: The ¹⁵N stable isotope effect on metabolic pathways. Experimental Biology 2013, 20-24 April 2013, Boston, MA (Poster)

18. Filiou MD, Teplytska L, Reckow S, **Nussbaumer M**, Gormanns P, Otte DM, Zimmer A, Landgraf R, Maccarrone G, Turck CW. A quantitative proteomics and metabolomics platform for biomarker identification in psychiatric disorders: Focus on mitochondrial dysfunction. EuPA Meeting, 9-12 July 2012, Glasgow, UK (Poster)

19. Filiou MD, Teplytska L, Reckow S, Gormanns P, **Nussbaumer M**, Maccarrone G, Landgraf R, Turck CW. Proteomics, metabolomics and biochemical analyses reveal a key role of mitochondria in anxiety-related behavior. FEBS/EMBO Course, Mitochondria in life, death and disease, 9-13 May 2012, Heraklion, Greece (Poster)
20. Filiou MD, Teplytska L, Reckow S, Gormanns P, Zhang Y, Frank E, Kessler MS, Hambsch B, **Nussbaumer M**, Maccarrone G, Landgraf R, Turck CW. From anxiety to mitochondria: A proteomics-driven approach to biomarker discovery. Neuroscience 2011, 12-16 November 2011, Washington, DC (Poster)
21. Filiou MD, Teplytska L, Gormanns P, Reckow S, Zhang Y, Frank E, Kessler MS, **Nussbaumer M**, Maccarrone G, Landgraf R, Turck CW. Anxiety and mitochondria. Insights from the -omics world. 27th AGNP Symposium, 5-8 October 2011, Munich, Germany
Published in *Pharmacopsychiatry* 2011 44:289 (Oral Presentation)
22. Filiou MD, Teplytska L, Gormanns P, Reckow S, Zhang S, Frank E, Kessler M, Hambsch B, **Nussbaumer M**, Maccarrone G, Yassouridis A, Holsboer F, Landgraf R, Turck CW. Discovering mitochondrial biomarkers for anxiety disorders. 43rd EBBS Meeting, 9-12 September 2011, Seville, Spain (Poster)
23. Filiou MD, Zhang Y, Teplytska L, Reckow S, Gormanns P, Frank E, Kessler M, Hambsch B, **Nussbaumer M**, Yassouridis A, Maccarrone G, Tolstikov V, Landgraf R, Turck CW. Biomarker discovery by ¹⁵N metabolic labeling of a trait anxiety mouse model. 1st International Proteomics Conference in Crete, 7-9 October 2010, Heraklion, Greece (Poster)