

## Publications of ZMNH Scientists and their collaborators 2018 - 2020

### Content

Institute of Developmental Neurophysiology (Head: Prof. Dr. Ileana Hanganu-Opatz).....	2
Institute of Medical Systems Biology (Director: Prof. Dr. Stefan Bonn).....	2
Institute of Neuroimmunology and Multiple Sclerosis (Director: Prof. Dr. Manuel Friese) .....	4
Institute of Synaptic Physiology (Director: Prof. Dr. Thomas Oertner).....	13
Institute of Structural Neurobiology (Director: Prof. Dr. Dr. h. c. Michael Frotscher).....	14
Institute of Molecular Neurogenetics (Director: Prof. Dr. Matthias Kneussel).....	15
Institute of Molecular and Cellular Cognition (Director: Prof. Dr. Dietmar Kuhl).....	17
RG Synaptic Wiring and Information Processing (Head: Dr. J. Simon Wiegert).....	18
RG Neuronal Protein Transport (Head: Dr. Marina Mikhaylova) .....	19
RG Neuronal and Cellular Signal Transduction (Head: Prof. Dr. Meliha Karsak).....	20
RG Behavioral Biology (Head: Dr. Fabio Morellini) .....	20
RG Neuronal Development (Head: Dr. Froylan Calderon de Anda) .....	21
RG Neuronal Patterning and Connectivity (Head: Dr. Peter Šoba) .....	22
RG Neuronal Translational Control (Head: Dr. Kent Duncan) .....	23
Emeritus Group Biosynthesis of Neural Structures (Head: Prof. Dr. Dr. h. c. Melitta Schachner) .....	23
Leibniz Group Dendritic Organelles and Synaptic Function (Head: Dr. Michael R. Kreutz) .....	26
Core Facility Electron Microscopy and Morphology (Head: Dr. Michaela Schweizer).....	27
Core Facility Transgenic Mouse Facility (Head: Priv.-Doz. Dr. Irm Hermans-Borgmeyer) .....	29
Core Facility Bioanalytics (Head: Priv.-Doz. Dr. Sabine Hoffmeister-Ullerich) .....	30

## Institute of Developmental Neurophysiology (Head: Prof. Dr. Ileana Hanganu-Opatz)

(Since 01/2020 at ZMNH)

Bitzenhofer SH, Pöplau JA, Hanganu-Opatz I (2020) Gamma activity accelerates during prefrontal development. *ELIFE* 9:e56795.

Chini M, Hanganu-Opatz IL (2020) Prefrontal cortex development in health and disease: lessons from rodents and humans. *Trends Neurosci* doi: 10.1016/j.tins.2020.10.017. Online ahead of print.

Chini M, Pöplau JA, Lindemann C, Carol-Perdiguer L, Hnida M, Oberländer V, Xu X, Ahlbeck J, Bitzenhofer SH, Mulert C, Hanganu-Opatz IL (2020) Resolving and rescuing developmental miswiring in a mouse model of cognitive impairment. *Neuron* 105:60-74. e7.

Kostka JK, Gretenkord S, Spehr M, Hanganu-Opatz IL (2020) Bursting mitral cells time the oscillatory coupling between olfactory bulb and entorhinal networks in neonatal mice. *J Physiol* 598: 5753-5769.

Tsitoura C, Malinowski S, Mohrhardt J, Degen R, DiBenedictis BT, Gao Y, Watznauer K, Gerhold K, Nagel M, Weber M, Rothermel M, Hanganu-Opatz IL, Ben-Shaul Y, Davison I, Spehr M (2020) Synchronous infra-slow oscillations organize ensembles of accessory olfactory bulb projection neurons into distinct microcircuits. *J Neurosci* 40:4203-4218.

Xu X, Hanganu-Opatz IL, Bieler M (2020) Cross-talk of low-level sensory and high-level cognitive processing: development, mechanisms, and relevance for cross-modal abilities of the brain. *Front Neurobot* 14:7.

## Institute of Medical Systems Biology (Director: Prof. Dr. Stefan Bonn)

Khadjeh S, Hindmarsh V, Weber F, Cyganek L, Vidal RO, Torkieh S, Streckfuss-Bömeke K, Lbik D, Tiburcy M, Mohamed BA, Bonn S, Toischer K, Hasenfuss G (2020) CRISPLD1: a novel conserved target in the transition to human heart failure. *Basic Res Cardiol* 115:27.

Krebs CF, Reimers D, Zhao Y, Paust HJ, Bartsch P, Nuñez S, Roseblatt MV, Hellmig M, Kilian C, Borchers A, Enk LUB, Zinke M, Becker M, Schmid J, Klinge S, Wong MN, Puelles VG, Schmidt C, Bertram T, Stumpf N, Hoxha E, Meyer-Schwesinger C, Lindenmeyer MT, Cohen CD, Rink M, Kurts C, Franzenburg S, Koch-Nolte F, Turner JE, Riedel JH, Huber S, Gagliani N, Huber TB, Wiech T, Rohde H, Bono MR, Bonn S, Panzer U, Mittrücker HW (2020) Pathogen-induced tissue-resident memory TH17 (TRM17) cells amplify autoimmune kidney disease. *Sci Immunol* 5:eaba4163.

Marouf M, Machart P, Bansal V, Kilian C, Magruder DS, Krebs CF, Bonn S (2020) Realistic in silico generation and augmentation of single-cell RNA-seq data using generative adversarial networks. *Nat Commun* 11:166.

Matschke J, Lütgehetmann M, Hagel C, Sperhake JP, Schröder AS, Edler C, Mushumba H, Fitzek A, Allweiss L, Dandri M, Dottermusch M, Heinemann A, Pfefferle S, Schwabenland M, Sumner Magruder D, Bonn S, Prinz M, Gerloff C, Püschel K, Krasemann S, Aepfelbacher M, Glatzel M (2020) Neuropathology of patients with COVID-19 in Germany: a post-mortem case series. *Lancet Neurol* 19:919-929.

Menden K, Marouf M, Oller S, Dalmia A, Magruder DS, Kloiber K, Heutink P, Bonn S (2020) Deep learning-based cell composition analysis from tissue expression profiles. *Sci Adv* 6:eaba2619.

Rahman RU, Liebhoff AM, Bansal V, Fiosins M, Rajput A, Sattar A, Magruder DS, Madan S, Sun T, Gautam A, Heins S, Liwinski T, Bethune J, Trenkwalder C, Fluck J, Mollenhauer B, Bonn S (2020) SEAweb: the small RNA Expression Atlas web application. *Nucleic Acids Res* 48(D1): D204 – D219.

Ripamonti S, Shomroni O, Rhee JS, Chowdhury K, Jahn O, Hellmann KP, Bonn S, Brose N, Tirard M (2020) SUMOylation controls the neurodevelopmental function of the transcription factor Zbtb20. *J*

Neurochem 154:647-661.

Samir M, Vidal RO, Abdallah F, Capece V, Seehusen F, Geffers R, Hussein A, Ali AAH, Bonn S, Pessler F (2020) Organ-specific small non-coding RNA responses in domestic (Sudani) ducks experimentally infected with highly pathogenic avian influenza virus (H5N1). *RNA Biol* 17:112-124.

Wakhloo D, Scharkowski F, Curto Y, Butt UJ, Bansal V, Steixner-Kumar AA, Wüstefeld L, Rajput A, Arinrad S, Zillmann MR, Seelbach A, Hassouna I, Schneider K, Ibrahim AQ, Werner HB, Martens H, Miskowiak K, Wojcik SM, Bonn S, Nacher J, Nave KA, Ehrenreich H (2020) Functional hypoxia drives neuroplasticity and neurogenesis via brain erythropoietin. *Nat Commun* 11:1313.

Wartmann H, Heins S, Kloiber K, Bonn S (2020) Bias invariant RNA-seq metadata annotation. *bioRxiv* 2020.11.26.399568.

Zimmermann M, Klaus M, Wong MN, Thebille AK, Gernhold L, Kuppe C, Halder M, Kranz J, Wanner N, Braun F, Wulf S, Wiech T, Panzer U, Krebs CF, Hoxha E, Kramann R, Huber TB, Bonn S, Puelles VG (2020) Deep learning-based molecular morphometrics for kidney biopsies. *bioRxiv* 2020.08.23.263392.

Fiosina J, Fiosins M, Bonn S (2019) Explainable deep learning for augmentation of small RNA expression profiles. *J Comput Biol* 27:234-247.

Kaczmarczyk L, Bansal V, Rajput A, Rahman RU, Krzyżak W, Degen J, Poll S, Fuhrmann M, Bonn S, Jackson WS (2019) Tagger-A Swiss army knife for multiomics to dissect cell type-specific mechanisms of gene expression in mice. *PLoS Biol* 17:e3000374.

Keihani S, Kluever V, Mandad S, Bansal V, Rahman R, Fritsch E, Gomes LC, Gärtner A, Kügler S, Urlaub H, Wren JD, Bonn S, Rizzoli SO, Fornasiero EF (2019) The long noncoding RNA neuroLNC regulates presynaptic activity by interacting with the neurodegeneration-associated protein TDP-43. *Sci Adv* 18;5(12):eaay2670.

Mitjans M, Seidel J, Begemann M, Bockhop F, Moya-Higueras J, Bansal V, Wesolowski J, Seelbach A, Ibanez MI, Kovacevic F, Duvar O, Fananas L, Wolf HU, Ortet G, Zwanzger P, Klein V, Lange I, Tanzer A, Dudeck M, Penke L, van Elst LT, Bittner RA, Schmidmeier R, Freese R, Muller-Isberner R, Wiltfang J, Liesener T, Bonn S, Poustka L, Muller JL, Arias B, Ehrenreich H (2019) Violent aggression predicted by multiple pre-adult environmental hits. *Mol Psychiatr* 24:1549-1564.

Wanner N, Vornweg J, Combes A, Wilson S, Plappert J, Rafflenbeul G, Puelles VG, Rahman RU, Liwinski T, Lindner S, Grahammer F, Kretz O, Wlodek ME, Romano T, Moritz KM, Boerries M, Busch H, Bonn S, Little MH, Bechtel-Walz W, Huber TB (2019) DNA Methyltransferase 1 controls nephron progenitor cell renewal and differentiation. *J Am Soc Nephrol* 30:63-78

Bansal V, Mitjans M, Burik CAP, Linnér RK, Okbay A, Begemann M, Bonn S, Ripke S, de Vlaming R, Nivard MG, Ehrenreich H, Koellinger D (2018) Genome-wide association study results for educational attainment aid in identifying genetic heterogeneity of schizophrenia. *Nat Commun* 9:3078.

Bonn S, Machart P, Marouf M, Magruder DS, Bansal V, Kilian C, Krebs CF (2018) Realistic in silico generation and augmentation of single cell RNA-seq data using Generative Adversarial Neural Networks. *bioRxiv*, 390153

Evert BO, Nalavade R, Jungverdorben J, Matthes F, Weber S, Rajput A, Bonn S, Brüstle O, Peitz M, Krauß S (2018) Upregulation of miR-370 and miR-543 is associated with reduced expression of heat shock protein40 in spinocerebellar ataxia type 3. *PLoS One* 13:e0201794

Fledrich R, Abdelaal T, Rasch L, Bansal V, Schütza V, Brügger B, Lüchtenborg C, Prukop T, Stenzel J, Rahman RU, Hermes D, Ewers D, Möbius W, Ruhwedel T, Katona I, Weis J, Klein D, Martini R, Brück W, Müller WC, Bonn S, Bechmann I, Nave KA, Stassart RM, Sereda MW (2018) Targeting myelin lipid metabolism as a potential therapeutic strategy in a model of CMT1A neuropathy. *Nat Commun* 9:3025.

Fornasiero EF, Mandad S, Wildhagen H, Alevra M, Rammner B, Keihani S, Opazo F, Urban I, Ischebeck

T, Sakib MS, Fard MK, Kirli K, Centeno TP, Vidal RO, Rahman RU, Benito E, Fischer A, Dennerlein S, Rehling P, Feussner I, Bonn S, Simons M, Urlaub H, Rizzoli SO (2018) Precisely measured protein lifetimes in the mouse brain reveal differences across tissues and subcellular fractions. *Nat Commun* 9:4230.

Kubick N, Brösamle D, Mickael ME (2018) Molecular evolution and functional divergence of the IgLON family. *Evol Bioinform Online* 14:1176934318775081. eCollection 2018.

Llorens F, Thune K, Marti E, Kanata E, Dafou D, Diaz-Lucena D, Vivancos A, Shomroni O, Zafar S, Schmitz M, Michel U, Fernandez-Borges N, Andreoletti O, Del Rio JA, Diez J, Fischer A, Bonn S, Sklaviadis T, Torres JM, Ferrer I, Zerr I (2018) Regional and subtype-dependent miRNA signatures in sporadic Creutzfeldt-Jakob disease are accompanied by alterations in miRNA silencing machinery and biogenesis. *PLoS Pathog* 14:e1006802.

Mandad S, Rahman RU, Centeno TP, Vidal RO, Wildhagen H, Rammner B, Keihani S, Opazo F, Urban I, Ischebeck T, Kirli K, Benito E, Fischer A, Yousefi RY, Dennerlein S, Rehling P, Feussner I, Urlaub H, Bonn S, Rizzoli SO, Fornasiero EF (2018) The codon sequences predict protein lifetimes and other parameters of the protein life cycle in the mouse brain. *Sci Rep* 8:16913.

Narayanan R, Pham L, Kerimoglu C, Watanabe T, Castro Hernandez R, Sokpor G, Ulmke PA, Kiszka KA, Tonchev AB, Rosenbusch J, Seong RH, Teichmann U, Frahm J, Fischer A, Bonn S, Stoykova A, Staiger JF, Tuoc T (2018) Chromatin remodeling BAF155 subunit regulates the genesis of basal progenitors in developing cortex. *iScience* 4:109-126.

Piston D, Bansal V, Alvarez-Erviti L, Gargano D, Yao Z, Szabadkai G, Odell M, Puno MR, Bjorkblom B, Maple-Groden J, Breuer P, Kaut O, Larsen JP, Bonn S, Moller SG, Wullner U, Schapira AHV, Gegg ME (2018) DJ-1 is a redox sensitive adapter protein for high molecular weight complexes involved in regulation of catecholamine homeostasis (vol 26, pg 4028, 2017). *Hum Mol Genet* 27:576-576.

Rahman RU, Gautam A, Bethune J, Sattar A, Fiosins M, Magruder DS, Capece V, Shomroni O, Bonn (2018) Oasis 2: improved online analysis of small RNA-seq data. *BMC Bioinformatics* 19:54.

Xie K, Ryan DP, Pearson BL, Henzel KS, Neff F, Vidal RO, Hennion M, Lehmann I, Schleif M, Schröder S, Adler T, Rathkolb B, Rozman J, Schütz AL, Prehn C, Mickael ME, Weiergräber M, Adamski J, Busch DH, Ehninger G, Matynia A, Jackson WS, Wolf E, Fuchs H, Gailus-Durner V, Bonn S, Hrabě de Angelis M, Ehninger D (2018) Epigenetic alterations in longevity regulators, reduced life span, and exacerbated aging-related pathology in old father offspring mice. *Proc Natl Acad Sci USA* 115:E2348-E2357.

## [Institute of Neuroimmunology and Multiple Sclerosis \(Director: Prof. Dr. Manuel Friese\)](#)

Alexander T, Badoglio M, Henes J, Heesen C, Arnold R, Radbruch A, Snowden JA, Hiepe F (2020) Autologe hämatopoetische Stammzelltransplantation bei Autoimmunerkrankungen: Aktuelle Indikationen und Wirkungsweise, ein Review der EBMT Autoimmune Diseases Working Party (ADWP). *Z Rheumatol*. 79:419-428.

Aslan K, Turco V, Blobner J, Sonner JK, Liuzzi AR, Gonzalo Núñez N, De Feo D, Kickingereder P, Fischer M, Green E, Sadik A, Friedrich M, Sanghvi K, Kilian M, Cichon F, Wolf L, Jähne K, von Landenberg A, Bunse L, Sahn F, Schrimpf D, Meyer J, Alexander A, Brugnara G, Röth R, Pfeleiderer K, Niesler B, von Deimling A, Opitz C, Breckwoldt MO, Heiland S, Bendszus M, Wick W, Becher B, Platten M (2020) Heterogeneity of response to immune checkpoint blockade in hypermutated experimental gliomas. *Nat Commun* 11:931.

Benecke M, Kasper J, Heesen C, Schäffler N, Reissmann DR (2020) Patient autonomy in dentistry: demonstrating the role for shared decision making. *BMC Med Inform Decis Mak* 20:318.

Bittner S, Steffen F, Uphaus T, Muthuraman M, Fleischer V, Salmen A, Luessi F, Berthele A, Klotz L, Meuth SG, Bayas A, Paul F, Hartung HP, Linker R, Heesen C, Stangel M, Wildemann B, Then Bergh F, Tackenberg

B, Kuempfel T, Weber F, Zettl UK, Ziemann U, Tumani H, Groppa S, Mühlau M, Hemmer B, Wiendl H, Gold R, Zipp F; KKNMS consortium (2020) Clinical Implications of Serum Neurofilament in Newly Diagnosed MS Patients: A Longitudinal Multicentre Cohort Study. *Ebio Medicine* 56:102807.

Dalgas U, Hvid L, Kwakkel G, Motl R, de Groot V, Feys P, Op't Eijnde B, Coote S, Beckerman H, Pfeifer K, Streber R, Peters S, Riemann-Lorenz K, Rosenkranz S, Centonze D, Van Asch P, Bansi J, Sandroff B, Pilutti L, Ploughman M, Freeman J, Paul L, Dawes H, Romberg A, Kalron A, Stellmann J, Friese M, Heesen C (2020) Moving exercise research in multiple sclerosis forward (the MoXFo initiative): Developing consensus statements for research. *Mult Scler J* 26:1303-1308.

Engel S, Graetz C, Salmen A, Muthuraman M, Toenges G, Ambrosius B, Antonios Bayas 1, Berthele A, Heesen C, Klotz L, Kümpfel T, Linker RA, Meuth SG, Paul F, Stangel M, Tackenberg B, Bergh FT, Tumani H, Weber F, Wildemann B, Zettl UK, Antony G, Bittner S, Groppa S, Hemmer B, Wiendl H, Gold R, Zipp F, Lill CM, Luessi F, German Competence Network of Multiple Sclerosis (2020) Is APOE  $\epsilon 4$  associated with cognitive performance in early MS? *Neurol Neuroimmunol Neuroinflamm* 7:e728.

Er-Lukowiak M, Duan Y, Rassendren F, Ulmann L, Nicke A, Ufer F, Friese MA, Koch-Nolte F, Magnus T, Rissiek B (2020) A P2rx7 passenger mutation affects the vitality and function of T cells in congenic mice. *iScience* 23:101870.

Faergeman SL, Evans H, Attfield KE, Desel C, Kuttikkatte SB, Sommerlund M, Jensen LT, Frokiaer J, Friese MA, Matthews PM, Luchtenborg C, Brügger B, Oturai AB, Dendrou CA, Fugger L (2020) A novel neurodegenerative spectrum disorder in patients with MLKL deficiency. *Cell Death Dis* 11:303.

Faizy T, Thaler C, Broocks G, Flottmann F, Leischner H, Kniep H, Nawabi J, Schön G, Stellmann J, Kemmling A, Reddy R, Heit J, Fiehler J, Kumar D, Hanning U (2020) The myelin water fraction serves as a marker for age-related myelin alterations in the cerebral white matter – A multiparametric MRI aging study. *Front Neurosci-Switz* 14:136.

Gasperi C, Andlauer TFM, Keating A, Knier B, Klein A, Pernpeintner V, Lichtner P, Gold R, Zipp F, Then Bergh F, Stangel M, Tumani H, Wildemann B, Wiendl H, Bayas A, Kümpfel T, Zettl UK, Linker RA, Ziemann U, Knop M, Warnke C, Friese MA, Paul F, Tackenberg B, Berthele A, Hemmer B (2020) Genetic determinants of the humoral immune response in MS. *Neurol Neuroimmunol Neuroinflamm* 7:e827.

Gharakhanlou R, Wesselmann L, Rademacher A, Lampit A, Negaresh R, Kaviani M, Oberste M, Motl RW, Sandrof B M, Bansi J, Baker JS, Heesen C, Zimmer P, Javelle F (2020) Exercise training and cognitive performance in persons with multiple sclerosis: A systematic review and multilevel meta-analysis of clinical trials. *Mult Scler J* 1352458520917935.

Giovannetti AM, Barabasch A, Giordano A, Quintas R, Barello S, Graffigna G, Alfieri S, Schiffmann I, Mucche-Borowski C, Borreani C, Heesen C, Solari A; ManTra project (2020) Construction of a User-Led Resource for People Transitioning to Secondary Progressive Multiple Sclerosis: Results of an International Nominal Group Study. *Front Neurol* 11:798. eCollection 2020.

Giovannetti AM, Pietrolongo E, Borreani C, Giordano A, Schiffmann I, Barabasch A, Heesen C, Solari A; ManTra Project (2020) Conversion to secondary progressive multiple sclerosis: Multistakeholder experiences and needs in Italy. *PLoS One* 15:e0228587.

Gold SM, Köhler-Forsberg O, Moss-Morris R, Mehnert A, Miranda JJ, Bullinger M, Steptoe A, Whooley MA, Otte C (2020) Comorbid depression in medical diseases. *Nat Rev Dis Primers* 6:70.

Golde S, Heine J, Pöttgen J, Mantwill M, Lau S, Wingefeld K, Otte C, Penner IK, Engel AK, Heesen C, Stellmann JP, Dziobek I, Finke C, Gold SM (2020) Distinct Functional Connectivity Signatures of Impaired Social Cognition in Multiple Sclerosis. *Front Neurol* 11:507.

Golde S, Wingefeld K, Riepenhausen A, Schröter N, Fleischer J, Prüssner J, Grimm S, Fan Y, Hellmann-Regen J, Beck A, Gold SM, Otte C (2019) Healthy women with severe early life trauma show altered neural facilitation of emotion inhibition under acute stress. *Psychol Med* 50(12):2075-2084.

Has Silemek AC, Fischer L, Pöttgen J, Penner IK, Engel AK, Heesen C, Gold SM, Stellmann JP (2020) Functional and structural connectivity substrates of cognitive performance in relapsing remitting multiple sclerosis with mild disability. *Neuroimage Clin* 25: 102177.

Heesen C, Scalfari A, Galea I (2020) Prognostic information for people with MS: Impossible or inevitable: Impossible or inevitable? *Mult Scler* 26:771-773.

Heine J, Prüß H, Scheel M, Brandt AU, Gold SM, Bartsch T, Paul F, Finke C (2020) Transdiagnostic hippocampal damage patterns in neuroimmunological disorders. *Neuroimage-Clin* 28:102515.

Heitmann H, Haller B, Tiemann L, Mühlau M, Berthele A, Tölle T, Salmen A, Ambrosius B, Bayas A, Asseyer S, Hartung H, Heesen C, Stangel M, Wildemann B, Haars S, Groppa S, Luessi F, Kümpfel T, Nischwitz S, Meuth S, Klotz L, Linker R, Zettl U, Ziemann U, Tumani H, Tackenberg B, Zipp F, Wiendl H, Gold R, Hemmer B, Ploner M (2020) Longitudinal prevalence and determinants of pain in multiple sclerosis: results from the German National Multiple Sclerosis Cohort study. *Pain* 161:787-796.

Hermann J, Bender M, Schumacher D, Woo MS, Shaposhnykov A, Rosenkranz SC, Kuryshev V, Meier C, Guse AH, Friese MA, Freichel M, Tsvilovskyy V (2020) Contribution of NAADP to glutamate-evoked changes in Ca<sup>2+</sup> homeostasis in mouse hippocampal neurons. *Front Cell Dev Biol* 8:496.

Köhler-Forsberg O, Otte C, Gold SM, Dinesen Østergaard S (2020) Statins in the treatment of depression: Hype or hope? *Pharmacol Ther* 107625.

Kosch R, Schiffmann I, Daumer M, Lederer C, Scalfari A, Galea I, Scheiderbauer J, Rahn A, Heesen C (2020) Long-term prognostic counselling in people with multiple sclerosis using an online analytical processing tool. *Mult Scler*. 2020 Oct 26:1352458520964774. doi: 10.1177/1352458520964774. Online ahead of print.

Marques RF, Engler JB, Küchler K, Jones RA, Lingner T, Salinas G, Gillingwater TH, Friese MA, Duncan KE (2020) Motor neuron transcriptome reveals deregulation of SYNGR4 and PLEKHB1 in mutant TDP-43 amyotrophic lateral sclerosis models. *Hum Mol Genet* 29:2647-2661.

Meyer-Arndt L, Hetzer S, Asseyer S, Bellmann-Strobl J, Scheel M, Stellmann JP, Heesen C, Engel AK, Brandt AU, Haynes JD, Paul F, Gold SM, Weygandt M (2020) Blunted neural and psychological stress processing predicts future grey matter atrophy in multiple sclerosis. *Neurobiol Stress* 13:100244.

Montes-Cobos E, Huscher B, Engler JB, Woo MS, Binkle L, Bauer S, Kursawe N, Moles M, Friese MA, Ufer F (2020) Voltage-gated proton channel Hv1 controls TLR9 activation in plasmacytoid dendritic cells. *J Immunol* 11:3001-3010.

Nasseri NN, Ghezelbash E, Zhai Y, Patra S, Riemann-Lorenz K, Heesen C, Rahn AC, Stellmann JP (2020) Feasibility of a smartphone app to enhance physical activity in progressive MS: a pilot randomized controlled pilot trial over three months. *PeerJ* 8:e9303.

Otte C, Chae WR, Nowacki J, Kaczmarczyk M, Piber D, Roepke S, Märtschenz S, Lischewski S, Schmidt S, Ettrich B, Grabe HJ, Hegerl U, Hinkelmann K, Hofmann T, Janowitz D, Junghanns K, Kahl KG, Klein JP, Krueger THC, Leicht G, Prvulovic D, Reif A, Schoettle D, Strauss M, Westermair A, Friede T, Gold SM (2020) Simvastatin add-on to escitalopram in patients with comorbid obesity and major depression (SIMCODE): study protocol of a multicentre, randomised, double-blind, placebo-controlled trial. *BMJ Open* 10:e040119.

Pöttgen J, van de Vis W, van Nunen A, Rose A, Engelbrecht J, Pirard M, Lau S, Heesen C, Köpke S, Rehabilitation in Multiple Sclerosis (RIMS) Special Interest Group on Psychology and Neuropsychology (2020) Psychobehavioral treatment options for sexual dysfunction in multiple sclerosis: a systematic review. *Int J MS Care* 22:276-284.

Pust GEA, Dettmers C, Randerath J, Rahn AC, Heesen C, Schmidt R, Gold SM (2020) Fatigue in multiple sclerosis is associated with childhood adversities. *Front Psychiatry* 11:811.

Pust GEA, Untiedt B, Weierstall-Pust R, Randerath J, Barabasch A, Rahn AC, Heesen C (2020) Medication beliefs in first-line and second-line treated multiple sclerosis patients. *Mult Scler Relat Dis* 42:102144.

Pust GEA, Untiedt B, Randerath J, Barabasch A, Köpke S, Rahn AC, Hansen H, Heesen C (2020) Exploring adherence to first-line and second-line immunotherapies in multiple sclerosis: an interview study. *Int J MS Care* 22:219-225.

Rahn AC, Riemann-Lorenz K, Alegiani A, Pust GEA, van de Roemer A, Schmitz L, Vettorazzi E, Köpke S, Heesen C (2020) Comprehension of confidence intervals in audio-visual patient information materials for people with multiple sclerosis (COCO-MS): A web-based randomised controlled, parallel group trial. *Patient Educ Couns* 2020 Sep 29; S0738-3991(20)30533-4. doi: 10.1016/j.pec.2020.09.035. Online ahead of print.

Rahn AC, Solari A, Beckerman H, Nicholas R, Wilkie D, Heesen C, Giordano A, Rehabilitation in Multiple Sclerosis (RIMS) Special Interest Group on Patient Autonomy (2020) "I will respect the autonomy of my patient": a scoping review of shared decision making in multiple sclerosis. *Int J MS Care* 22:285-293.

Riemann-Lorenz K, Motl R, Casey B, Coote S, Daubmann A, Heesen C (2020) Possible determinants of long-term adherence to physical activity in multiple sclerosis-theory-based development of a comprehensive questionnaire and results from a German survey study. *Disabil Rehabil* 2;1-14. doi: 10.1080/09638288.2020.1731612. Online ahead of print.

Ringelstein M, Harmel J, Zimmermann H, Brandt AU, Paul F, Haarmann A, Buttmann M, Hümmert MW, Trebst C, Schroeder C, Ayzenberg I, Kleiter I, Hellwig K, Havla J, Kümpfel T, Jarius S, Wildemann B, Rommer P, Weber MS, Pellkofer H, Röpke L, Geis C, Retzlaff N, Zettl U, Deppe M, Klotz L, Young K, Stellmann JP, Kaste M, Kermer P, Marouf W, Lauda F, Tumani H, Graf J, Klistorner A, Hartung HP, Aktas O, Albrecht P; Neuromyelitis Optica Study Group (NEMOS) (2020) Longitudinal optic neuritis-unrelated visual evoked potential changes in NMO spectrum disorders. *Neurology* 94:e407-e418.

Ringelstein M, Harmel J, Zimmermann H, Brandt AU, Paul F, Haarmann A, Buttmann M, Hümmert MW, Trebst C, Schroeder C, Ayzenberg I, Kleiter I, Hellwig K, Havla J, Kümpfel T, Jarius S, Wildemann B, Rommer P, Weber M, Pellkofer H, Röpke L, Geis C, Retzlaff N, Zettl U, Deppe M, Klotz L, Young K, Stellmann J-P, Kaste M, Kermer P, Marouf W, Lauda F, Tumani H, Graf J, Klistorner S, Hartung H-P, Aktas O, Albrecht P (2020) Author response: Longitudinal optic neuritis-unrelated visual evoked potential changes in NMO spectrum disorders. *Neurology* 95: 610.

Rosenkranz SC, Shaposhnykov A, Schnapauff O, Epping L, Vieira V, Heidermann K, Schattling B, Tsvilovskyy V, Liedtke W, Meuth SG, Freichel M, Gelderblom M, Friese MA (2020) TRPV4-mediated regulation of the blood brain barrier is abolished during inflammation. *Front Cell Dev Biol* 8:849.

Rosenkranz SC, Shaposhnykov AA, Träger S, Engler JB, Witte ME, Roth V, Vieira V, Paauw N, Bauer S, Schwencke-Westphal C, Bal L, Schattling B, Pless O, van Horssen J, Freichel M, Friese MA (2020) Enhancing mitochondrial activity in neurons protects against neurodegeneration in CNS inflammation. *bioRxiv* doi: <https://doi.org/10.1101/2020.06.19.161091>

Schiffmann I, Freund M, Vettorazzi E, Stellmann J-P, Heyer-Borchelt S, D'Hooghe M, Häußler V, Rahn AC, Heesen C (2020) Assessing the effect of an evidence-based patient online educational tool for people with multiple sclerosis called UMIMS-understanding magnetic resonance imaging in multiple sclerosis: study protocol for a double-blind, randomized controlled trial. *TRIALS*:1008.

Stellmann JP, Marouf A, Schulz KH, Baquet L, Pöttgen J, Patra S, Penner IK, Gellißen S, Ketels G, Basson P, Ranjeva JP, Guye M, Nolte G, Engel AK, Audion B, Heesen C, Gold SM (2020) Aerobic Exercise induces functional and structural reorganization of CNS networks in multiple sclerosis: a randomized controlled trial. *Front Hum Neurosci* 14:255.

Stürner KH, Werz O, Koeberle A, Otto M, Pless O, Leyboldt F, Friedemann P, Heesen C (2020) Lipid mediator profiles predict response to therapy with an oral Frankincense extract in relapsing-remitting

multiple sclerosis. *Sci Rep* 10:8776.

Topp J, Heesen C, Augustin M, Andrees V, Blome C (2020) Challenges and lessons learned from using anchoring vignettes to explore quality of life response behavior. *Qual Life Res* 29:2149-2159.

van der Ven E, Riemann-Lorenz K, Rosenkranz SC, Patra S, Heesen C (2020) Multiple sclerosis and physical activity: A German-wide survey on the behaviour, barriers and desires of those affected. *Hippocampus* 26:169-178.

Voskuhl RR, Patel K, Paul F, Gold SM, Scheel M, Kuchling J, Cooper G, Asseyer S, Chien C, Brandt AU, Meyer CE, MacKenzie-Graham A (2020) Sex differences in brain atrophy in multiple sclerosis. *Biol Sex Differ* 11:49.

Wakonig K, Eitel F, Ritter K, Hetzer S, Schmitz-Hübsch T, Bellmann-Strobl J, Haynes JD, Brandt AU, Gold SM, Paul F, Weygandt M (2020) Altered coupling of psychological relaxation and regional volume of brain reward areas in multiple sclerosis. *Front Neurol* 11:568850.

Witt G, Keminer O, Leu J, Tandon R, Meiser I, Willing A, Winschel I, Abt J-C, Brändl B, Sébastien I, Friese MA, Müller F-J, Neubauer JC, Claussen C, Zimmermann H, Gribbon P, Pless O (2020) An automated and high-throughput-screening compatible pluripotent stem cell-based test platform for developmental and reproductive toxicity assessment of small molecule compounds. *Cell Biol Toxicol* 2020 Jun 20. doi: 10.1007/s10565-020-09538-0. Online ahead of print.

Woo MS, Malsy J, Pöttgen J, Zai SS, Ufer F, Hadjilaou A, Schmiedel S, Addo MM, Gerloff C, Heesen C, Schulze Zur Wiesch J, Friese MA (2020) Frequent neurocognitive deficits after recovery from mild COVID-19. *Brain Commun* 2:fcaa205.

Zhai Y, Nasser N, Gezhelbash E, Heesen C, Stellmann JP (2020) Smartphone accelerometry: a smart and reliable measurement of real-life physical activity in multiple sclerosis and healthy Individuals. *Front Neurol* 11:688.

Alegiani AC, Albrecht S, Rahn AC, Köpke S, Thomalla G, Heesen C (2019) Reasons for delayed admission after stroke: results of a qualitative and quantitative survey. *Patient Prefer Adherence* 13:739-747.

Andrees V, Westenhöfer J, Blome C, Heesen C, Augustin M, Topp J (2019) Towards patients' understanding of health-related quality of life-a mixed-method study in psoriasis and multiple sclerosis. *Qual Life Res* 28:2717-2729.

Beckmann H, Augustin M, Heesen C, Poettgen J, Blome C (2019) Benefit evaluation in multiple sclerosis relapse treatment from the patients' perspective - Development and validation of a new questionnaire. *Mult Scler Relat Disord* 28:256-261.

Bittner S, Engel S, Lange C, Weber MS, Haghikia A, Luessi F, Korn T, Klotz L, Bayas A, Paul F, Heesen C, Stangel M, Wildemann B, Bergh FT, Tackenberg B, Trebst C, Warnke C, Linker R, Kerschensteiner M, Zettl U, Tumani H, Brück W, Meuth SG, Kümpfel T, Hemmer B, Wiendl H, Gold R, Zipp F (2019) Diagnostik und Therapie von Tuberkulose unter Immuntherapien für Multiple Sklerose: Aktueller Stand und Empfehlungen in Deutschland. *Nervenarzt* 90:1245-1253.

Chae WR, Nagel JM, Kuehl LK, Gold SM, Wingenfeld K, Otte C (2019) Predictors of response and remission in a naturalistic inpatient sample undergoing multimodal treatment for depression. *J Affect Disord* 252:99-106.

Engels K, Schiffmann I, Weierstall R, Rahn AC, Daubmann A, Pust G, Chard D, Lukas C, Scheiderbauer J, Stellmann JP, Heesen C (2019) Emotions towards magnetic resonance imaging in people with multiple sclerosis. *Acta Neurol Scand* 139:497-504.

Engler JB, Heckmann NF, Jäger J, Gold SM, Friese MA (2019) Pregnancy enables expansion of disease-specific regulatory T cells in an animal model of multiple sclerosis. *J Immunol* 203:1743-1752.



Faizy TD, Broocks G, Thaler C, Rauch G, Gebert P, Sturmer KH, Flottmann F, Leischner H, Kniep HC, Stellmann JP, Heesen C, Fiehler J, Gellissen S, Hanning U (2019) Development of cortical lesion volumes on double inversion recovery MRI in patients with relapse-onset multiple sclerosis. *Front Neurol* 10:133.

Faizy TD, Broocks G, Frischmuth I, Westermann C, Flottmann F, Schönfeld MH, Nawabi J, Leischner H, Kutzner D, Stellmann JP, Heesen C, Fiehler J, Gellißen S, Hanning U (2019) Spectrally fat-suppressed coronal 2D TSE sequences may be more sensitive than 2D STIR for the detection of hyperintense optic nerve lesions. *Eur Radiol* 29:6266-6274.

Gold SM, Willing A, Leypoldt F, Paul F, Friese MA (2019) Sex differences in autoimmune disorders of the central nervous system. *Semin Immunopathol* 41:177-188.

Gold SM, Otte C (2019) Differential impact of affective and cognitive symptoms on remission of major depression. *Lancet Psychiatry* 6:980.

Hierweger AM, Engler JB, Friese MA, Reichardt HM, Lydon J, DeMayo F, Mittrucker HW, Arck PC (2019) Progesterone modulates the T-cell response via glucocorticoid receptor-dependent pathways. *Am J Reprod Immunol* 81: e13084.

Johnen A, Bürkner PC, Landmeyer NC, Ambrosius B, Calabrese P, Motte J, Hessler N, Antony G, König IR, Klotz L, Hoshi MM, Aly L, Groppa S, Luessi F, Paul F, Tackenberg B, Bergh FT, Kümpfel T, Tumani H, Stangel M, Weber F, Bayas A, Wildemann B, Heesen C, Zettl UK, Zipp F, Hemmer B9, Meuth SG, Gold R, Wiendl H, Salmen A; German Competence Network Multiple Sclerosis (KKNMS) (2019) Can we predict cognitive decline after initial diagnosis of multiple sclerosis? Results from the German National early MS cohort (KKNMS). *J Neurol* 266:386-397.

Kesgin F, Suddick K, Heesen C, Wright J (2019) Developing a fall prevention program: what are the views and opinions of people with multiple sclerosis? *Disabil Rehabil* 20:1-9.

Köpke S, Giordano A, Veronese S, Christin Rahn A, Kleiter I, Basedow-Rajwich B, Fornari A, Battaglia MA, Drulovic J, Kooij L, Koops J, Mens J, Meza Murillo ER, Milanov I, Milo R, Patti F, Pekmezovic T, Sastre-Garriga J, Vosburgh J, Voltz R, Bay J, Oliver DJ, Solari A (2019) Patient and caregiver involvement in the formulation of guideline questions: findings from the European Academy of Neurology guideline on palliative care of people with severe multiple sclerosis. *Eur J Neurol* 26:41-50.

Largey F, Jelcic I, Sospedra M, Heesen C, Martin R, Jelcic I (2019) Effects of natalizumab therapy on intrathecal antiviral antibody responses in MS. *Neurol Neuroimmunol Neuroinflamm.* 2019 Sep 25;6(6). pii: e621.

Palotai M, Nazeri A, Cavallari M, Healy BC, Glanz B, Gold SM, Weiner HL, Chitnis T, Guttmann CRG (2019) History of fatigue in multiple sclerosis is associated with grey matter atrophy. *Sci Rep* 9:14781.

Pust GEA, Pottgen J, Randerath J, Lau S, Heesen C, Gold SM, Penner IK (2019) In search of distinct MS-related fatigue subtypes: results from a multi-cohort analysis in 1.403 MS patients. *J Neurol* 266:1663-1673.

Rahn AC, Köpke S, Stellmann JP, Schiffmann I, Lukas C, Chard D, Heesen C (2019) Magnetic resonance imaging as a prognostic disability marker in clinically isolated syndrome: A systematic review. *Acta Neurol Scand* 139:18-32.

Rahn, A. C., Jull, J., Köpke, S., Boland, L., Coulter, A., Dunn, S., Graham, I. D., Hutton, B., Kasper, J., Kienlin, S. M., Légaré, F., Lewis, K. B., Lyddiatt, A., Osaka, W., Rader, T., Rutherford, C., Smith, M. & Stacey, D (2019) Decision coaching for people making healthcare decisions. 29.07.2019, COCHRANE DB SYST REV.

Ramien C, Yusko EC, Engler JB, Gamradt S, Patas K, Schweingruber N, Willing A, Rosenkranz SC, Diemert A, Harrison A, Vignali M, Sanders C, Robins HS, Tolosa E, Heesen C, Arck PC, Scheffold A, Chan K, Emerson RO, Friese MA, Gold SM (2019) T cell repertoire dynamics during pregnancy in multiple sclerosis. *Cell Rep* 29:810-815.

Riemann-Lorenz K, Wienert J, Streber R, Motl RW, Coote S, Heesen C (2019) Long-term physical activity in people with multiple sclerosis: exploring expert views on facilitators and barriers. *Disabil Rehabil* 42:3059-3071.

Sauvigny T, Nawka MT, Schweingruber N, Mader MM, Regelsberger J, Schmidt NO, Westphal M, Czorlich P (2019) Early clinical course after aneurysmal subarachnoid hemorrhage: comparison of patients treated with Woven EndoBridge, microsurgical clipping, or endovascular coiling. *Acta Neurochir (Wien)* 161:1763-1773.

Schaefer LM, Poettgen J, Fischer A, Gold S, Stellmann JP, Heesen C (2019) Impairment and restrictions in possibly benign multiple sclerosis. *Brain Behav* 9:e01259.

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, Trager S, Miller KK, Bruck W, Duncan KE, Salinas G, Soba P, Gundelfinger ED, Merkler D, Friese MA (2019) Bassoon proteinopathy drives neurodegeneration in multiple sclerosis. *Nat Neurosci* 22:887-896.

Schirmer L, Velmeshev D, Holmqvist S, Kaufmann M, Werneburg S, Jung D, Vistnes S, Stockley JH, Young A, Steindel M, Tung B, Goyal N, Bhaduri A, Mayer S, Engler JB, Bayraktar OA, Franklin RJM, Haeussler M, Reynolds R, Schafer DP, Friese MA, Shioh LR, Kriegstein AR, Rowitch DH (2019) Neuronal vulnerability and multilineage diversity in multiple sclerosis. *Nature* 573:75-82.

Schreurs RRCE, Baumdick ME, Sagebiel AF, Kaufmann M, Mokry M, Klarenbeek PL, Schaltenberg N, Steinert FL, van Rijn JM, Drewniak A, The SML, Bakx R, Derix JPM, de Vries N, Corpeleijn WE, Pals ST, Gagliani N, Friese MA, Middendorp S, Nieuwenhuis EES, Reinshagen K, Geijtenbeek TBH, van Goudoever JB, Bunders MJ (2019) Human fetal TNF- $\alpha$ -cytokine-producing CD4 effector memory T cells promote intestinal development and mediate inflammation early in life. *Immunity* 50 2:462-476.e8.

Schuster S, Ozga AK, Stellmann JP, Deb-Chatterji M, Haussler V, Matschke J, Gerloff C, Thomalla G, Magnus T (2019) Relapse rates and long-term outcome in primary angiitis of the central nervous system. *J Neurol* 266:1481-1489.

Solari A, Giovannetti AM, Giordano A, Tortorella C, Torri Clerici V, Bricchetto G, Granella F, Lugaresi A, Patti F, Salvetti M, Pesci I, Pucci E, Centonze D, Danni MC, Bonavita S, Ferraro D, Gallo A, Gajofatto A, Nociti V, Grimaldi L, Grobberio M, Lanzillo R, Di Giovanni R, Gregori S, Manni A, Pietrolongo E, Bertagnoli S, Ronzoni M, Compagnucci L, Fantozzi R, Allegri B, Arena S, Buscarinu MC, Sabattini L, Quartuccio ME, Tsantes E, Confaloneri P, Tacchino A, Schiffmann I, Rahn AC, Kleiter I, Messmer Uccelli M, Barabasch A, Heesen C, The ManTra P (2019) Conversion to Secondary Progressive Multiple Sclerosis: Patient Awareness and Needs. Results from an online survey in Italy and Germany. *Front Neurol* 10:916.

Sonner JK, Keil M, Falk-Paulsen M, Mishra N, Rehman A, Kramer M, Deumelandt K, Röwe J, Sanghvi K, Wolf L, von Landenberg A, Wolff H, Bharti R, Oezen I, Lanz TV, Wanke F, Tang Y, Brandao I, Soumya R Mohapatra SR, Epping L, Grill A, Röth R, Niesler B, Meuth SG, Opitz CA, Okun JG, Reinhardt C, Kurschus FC, Wick W, Bode HB, Rosenstiel P, Platten M (2020) Dietary tryptophan links encephalogenicity of autoreactive T cells with gut microbial ecology. *Nat Commun* 10:4877.

Stork L, Brück W, von Gottberg P, Pulkowski U, Kirsten F, Glatzel M, Rauer S, Scheibe F, Radbruch H, Hammer E, Stürner KH, Kaulen B, Heesen C, Hoffmann F, Brock S, Pawlitzki M, Bopp T, Metz I (2019) Severe meningo-/encephalitis after daclizumab therapy for multiple sclerosis. *Mult Scler* 25:1618-1632.

Stürner KH, Siembab I, Schön G, Stellmann JP, Heidari N, Fehse B, Heesen C, Eiermann TH, Martin R, Binder TM (2019) Is multiple sclerosis progression associated with the HLA-DR15 haplotype? *Mult Scler J Exp Transl Clin* 5:2055217319894615.

Tintelnot J, Ufer F, Engler JB, Winkler H, Lucke K, Mittrucker HW, Friese MA (2019) Arc/Arg3.1 defines

dendritic cells and Langerhans cells with superior migratory ability independent of phenotype and ontogeny in mice. *Eur J Immunol* 49:724-736.

Topp J, Andrees V, Heesen C, Augustin M, Blome C (2019) Recall of health-related quality of life: how does memory affect the SF-6D in patients with psoriasis or multiple sclerosis? A prospective observational study in Germany. *BMJ Open* 9:e032859.

Ufer F, Friese M (2019) Neurosarkoidose in Neurologie. Diener H-C, Steinmetz H, Kastrup O (Hrsg.). 1. Aufl. Essen, Frankfurt am Main: Georg Thieme Verlag KG Stuttgart · New York, Band 1. p. 484-492 1169 p. 70

van der Lee SJ, Conway OJ, Jansen I, Carrasquillo MM, Kleineidam L, van den Akker E, Hernandez I, van Eijk KR, Stringa N, Chen JA, Zettergren A, Andlauer TFM, Diez-Fairen M, Simon-Sanchez J, Lleo A, Zetterberg H, Nygaard M, Blauwendraat C, Savage JE, Mengel-From J, Moreno-Grau S, Wagner M, Fortea J, Keogh MJ, Blennow K, Skoog I, Friese MA, Pletnikova O, Zulaica M, Lage C, de Rojas I, Riedel-Heller S, Illan-Gala I, Wei W, Jeune B, Orellana A, Then Bergh F, Wang X, Hulsman M, Beker N, Tesi N, Morris CM, Indakoetxea B, Collij LE, Scherer M, Morenas-Rodriguez E, Ironside JW, van Berckel BNM, Alcolea D, Wiendl H, Strickland SL, Pastor P, Rodriguez Rodriguez E, Desgesco E, Eadb, lfgc I, lpdgc, RiMod FTD, Netherlands Brain B, Boeve BF, Petersen RC, Ferman TJ, van Gerpen JA, Reinders MJT, Uitti RJ, Tarraga L, Maier W, Dols-Icardo O, Kawalia A, Dalmaso MC, Boada M, Zettl UK, van Schoor NM, Beekman M, Allen M, Masliah E, de Munain AL, Pantelyat A, Wszolek ZK, Ross OA, Dickson DW, Graff-Radford NR, Knopman D, Rademakers R, Lemstra AW, Pijnenburg YAL, Scheltens P, Gasser T, Chinnery PF, Hemmer B, Huisman MA, Troncoso J, Moreno F, Nohr EA, Sorensen TIA, Heutink P, Sanchez-Juan P, Posthuma D, Group GS, Clarimon J, Christensen K, Ertekin-Taner N, Scholz SW, Ramirez A, Ruiz A, Slagboom E, van der Flier WM, Holstege H (2019) A nonsynonymous mutation in *PLCG2* reduces the risk of Alzheimer's disease, dementia with Lewy bodies and frontotemporal dementia, and increases the likelihood of longevity. *Acta Neuropathol* 138:237-250.

Weygandt M, Behrens J, Brasanac J, Söder E, Meyer-Arndt L, Wakonig K, Ritter K, Brandt AU (2019) Neural mechanisms of perceptual decision-making and their link to neuropsychiatric symptoms in multiple sclerosis. *Mult Scler Relat Dis* 33:139-145.

Akbulak RO, Rosenkranz SC, Schaeffer BN, Pinnschmidt HO, Willems S, Heesen C, Hoffmann BA (2018) Acute and long-term effects of fingolimod on heart rhythm and heart rate variability in patients with multiple sclerosis. *Mult Scler Relat Disord* 19:44-49.

Baquet L, Hasselmann H, Patra S, Stellmann JP, Vettorazzi E, Engel AK, Rosenkranz SC, Poettgen J, Gold SM, Schulz KH, Heesen C (2018) Short-term interval aerobic exercise training does not improve memory functioning in relapsing-remitting multiple sclerosis-a randomized controlled trial. *PeerJ* 6:e6037.

Buhse S, Rahn A, Bock M, Mühlhauser I (2018) Causal interpretation of correlational studies - Analysis of medical news on the website of the official journal for German physicians. *PLoS One* 13:e0196833.

Faizy TD, Kumar D, Broocks G, Thaler C, Flottmann F, Leischner H, Kutzner D, Hewera S, Dotzauer D, Stellmann JP, Reddy R, Fiehler J, Sedlacik J, Gellissen S (2018) Age-Related Measurements of the Myelin Water Fraction derived from 3D multi-echo GRASE reflect Myelin Content of the Cerebral White Matter. *Sci Rep* 8:14991.

Filser M, Schreiber H, Pöttgen J, Ullrich S, Lang M, Penner IK (2018) The Brief International Cognitive Assessment in Multiple Sclerosis (BICAMS): results from the German validation study. *J Neurol* 265:2587-2593.

Gaissmaier W, Giese H, Galesic M, Garcia-Retamero R, Kasper J, Kleiter I, Meuth SG, Köpke S, Heesen C (2018) Numeracy of multiple sclerosis patients: A comparison of patients from the PERCEPT study to a German probabilistic sample. *Patient Educ Couns* 101:74-78.

Giordano A, Liethmann K, Köpke S, Poettgen J, Rahn AC, Drulovic J, Beckmann Y, Sastre-Garriga J, Galea

- I, Heerings M, Jongen PJ, Vettorazzi E, Solari A, Heesen C; AutoMS group (2018) Risk knowledge of people with relapsing-remitting multiple sclerosis - Results of an international survey. *PLoS One* 13:e0208004.
- Hasselmann H, Gamradt S, Taenzer A, Nowacki J, Zain R, Patas K, Ramien C, Paul F, Wingenfeld K, Piber D, Gold SM, Otte C (2018) Pro-inflammatory monocyte phenotype and cell-specific steroid signaling alterations in unmedicated patients with major depressive disorder. *Front Immunol* 9:2693.
- Heesen C, Haase R, Melzig S, Poettgen J, Berghoff M, Paul F, Zettl U, Marziniak M, Angstwurm K, Kern R, Ziemssen T, Stellmann JP (2018) Perceptions on the value of bodily functions in multiple sclerosis. *Acta Neurol Scand* 137:356-362.
- Heesen C, Rahn AC (2018) Guest Editorial: Shared Decision Making in Managing Multiple Sclerosis: Revisiting the Research Agenda. *Int J MS Care* 20:v-vi.
- Jarius S, Ruprecht K, Stellmann J, Huss A, Ayzenberg I, Willing A, Trebst C, Pawlitzki M, Abdelhak A, Grüter T, Leyboldt F, Haas J, Kleiter I, Tumani H, Fechner K, Reindl M, Paul F, Wildemann B (2018) MOG-IgG in primary and secondary chronic progressive multiple sclerosis: a multicenter study of 200 patients and review of the literature. *J Neuroinflamm* 15:88.
- Kjølhede T, Siemonsen S, Wenzel D, Stellmann JP, Ringgaard S, Pedersen BG, Stenager E, Petersen T, Vissing K, Heesen C, Dalgas U (2018) Can resistance training impact MRI outcomes in relapsing-remitting multiple sclerosis? *Mult Scler* 24:1356-1365.
- Kleiter I, Gahlen A, Borisow N, Fischer K, Wernecke KD, Hellwig K, Pache F, Ruprecht K, Havla J, Kumpfel T, Aktas O, Hartung HP, Ringelstein M, Geis C, Kleinschnitz C, Berthele A, Hemmer B, Angstwurm K, Stellmann JP, Schuster S, Stangel M, Lauda F, Tumani H, Mayer C, Krumbholz M, Zeltner L, Ziemann U, Linker R, Schwab M, Marziniak M, Then Bergh F, Hofstadt-van Oy U, Neuhaus O, Zettl UK, Faiss J, Wildemann B, Paul F, Jarius S, Trebst C, Nemos (2018) Apheresis therapies for NMOSD attacks: A retrospective study of 207 therapeutic interventions. *Neurol Neuroimmunol Neuroinflamm* 5:e504.
- Köpke S, Solari A, Rahn A, Khan F, Heesen C, Giordano A (2018) Information provision for people with multiple sclerosis. *Cochrane Database Syst Rev* 10:CD008757.
- Mueller S, Färber A, Prüss H, Melzer N, Golombek K, Kümpfel T, Thaler F, Elisak M, Lewerenz J, Kaufmann M, Sühs K, Ringelstein M, Kellinghaus C, Bien C, Kraft A, Zettl U, Ehrlich S, Handreka R, Rostásy K, Then Bergh F, Faiss J, Lieb W, Franke A, Kuhlenbäumer G, Wandinger K, Leyboldt F (2018) Genetic predisposition in anti-LGI1 and anti-NMDA receptor encephalitis. *Ann Neurol* 83:863-869.
- Patas K, Willing A, Demiralay C, Engler J, Lupu A, Ramien C, Schäfer T, Gach C, Stumm L, Chan K, Vignali M, Arck P, Friese M, Pless O, Wiedemann K, Agorastos A, Gold S (2018) T cell phenotype and T cell receptor repertoire in patients with major depressive disorder. *Front Immunol* 9:291.
- Pöttgen J, Moss-Morris R, Wendebourg J, Feddersen L, Lau S, Köpke S, Meyer B, Friede T, Penner I, Heesen C, Gold S (2018) Randomised controlled trial of a self-guided online fatigue intervention in multiple sclerosis. *J Neurol Neurosurg Psychiatry* 89:970-976.
- Pöttgen J, Rose A, van de Vis W, Engelbrecht J, Pirard M, Lau S, Heesen C, Köpke S (2018) Sexual dysfunctions in MS in relation to neuropsychiatric aspects and its psychological treatment: A scoping review. *PLOS ONE*. 13:e0193381.
- Rahn AC, Köpke S, Backhus I, Kasper J, Anger K, Untiedt B, Alegiani A, Kleiter I, Muhlhauser I, Heesen C (2018) Nurse-led immunotreatment decision coaching in people with Multiple Sclerosis (DECIMS) - Feasibility testing, pilot randomised controlled trial and mixed methods process evaluation. *Int J Nurs Stud* 78:26-36.
- Rosenkranz SC, Kaulen B, Neuhaus A, Siemonsen S, Köpke S, Daumer M, Stellmann JP, Heesen C (2018) Low clinical conversion rate in clinically isolated syndrome (CIS) patients - diagnostic benefit of

McDonald 2010 criteria? Eur J Neurol 25:247-e9.

Schiffmann I, Scheiderbauer J, Riemann-Lorenz K, Heesen C (2018) Does cladribine have an impact on brain atrophy in people with relapsing remitting multiple sclerosis? Mult Scler 24:1387-1388.

Stanelle-Bertram S, Walendy-Gnirß K, Speiseder T, Thiele S, Asantewaa Asante I, Dreier C, Kouassi NM, Preuß A, Pilnitz- Stolze G, Müller U, Thanisch S, Richter M, Scharrenberg R, Kraus V, Dörk R, Schau L, Herder V, Gerhauser I, Pfankuche VM, Käufer C, Waltl I, Moraes T, Sellau J, Hoenow S, Schmidt- Chanasit J, Jansen S, Schattling B, Ittrich H, Bartsch B, Renné T, Bartenschlager R, Arck P, Cadar D, Friese MA, Vapalahti O, Lotter H, Gabriel M, Baumgärtner W, Morellini F, Hölter SM, Amarie O, Fuchs H, Hrabe de Angelis M, Löscher W, Calderon de Anda F, Gabriel G (2018) Male offspring with high testosterone levels born to mildly ZIKV infected mice 1 are at high risk to develop neurocognitive disorders in their adulthood. Nat Microbiol 3:1161-1174

Stoessel D, Stellmann J, Willing A, Behrens B, Rosenkranz S, Hodecker S, Stürner K, Reinhardt S, Fleischer S, Deuschle C, Maetzler W, Berg D, Heesen C, Walther D, Schauer N, Friese M, Pless O (2018) Metabolomic profiles for primary progressive multiple sclerosis stratification and disease course monitoring. Front Hum Neurosci 12:226.

Stürner KH, Stellmann JP, Dörr J, Paul F, Friede T, Schammler S, Reinhardt S, Gellissen S, Weissflog G, Faizy TD, Werz O, Fleischer S, Vaas LAI, Herrmann F, Pless O, Martin R, Heesen C (2018) A standardised frankincense extract reduces disease activity in relapsing-remitting multiple sclerosis (the SABA phase IIa trial). J Neurol Neurosurg Psychiatry 89:330-338.

Tezer FI, Erdal A, Gumusyayla S, Has AC, Gocmen R, Oguz KK (2018) Differences in diffusion tensor imaging changes between narcolepsy with and without cataplexy. Sleep Med 52:128-133

Thaler C, Faizy TD, Sedlacik J, Bester M, Stellmann JP, Heesen C, Fiehler J, Siemonsen S (2018) The use of multiparametric quantitative magnetic resonance imaging for evaluating visually assigned lesion groups in patients with multiple sclerosis. J Neurol 265:127-133.

von Bismarck O, Dankowski T, Ambrosius B, Hessler N, Antony G, Ziegler A, Hoshi M, Aly L, Luessi F, Groppa S, Klotz L, Meuth S, Tackenberg B, Stoppe M, Then Bergh F, Tumani H, Kümpfel T, Stangel M, Heesen C, Wildemann B, Paul F, Bayas A, Warnke C, Weber F, Linker R, Ziemann U, Zettl U, Zipp F, Wiendl H, Hemmer B, Gold R, Salmen A (2018) Treatment choices and neuropsychological symptoms of a large cohort of early MS. Neurol Neuroimmunol Neuroinflamm 5:e446.

Weygandt M, Wakonig K, Behrens J, Meyer-Arndt L, Soder E, Brandt AU, Bellmann-Strobl J, Ruprecht K, Gold SM, Haynes JD, Paul F (2018) Brain activity, regional gray matter loss, and decision-making in multiple sclerosis. Mult Scler 24:1163-1173.

Willing A, Jäger J, Reinhardt S, Kursawe N, Friese M (2018) Production of IL-17 by MAIT cells is increased in multiple sclerosis and is associated with IL-7 receptor expression. J Immunol 200:974-982.

### Institute of Synaptic Physiology (Director: Prof. Dr. Thomas Oertner)

Mitlöhner J, Kaushik R, Niekisch H, Blondiaux A, Gee CE, Happel MFK, Gundelfinger E, Dityatev A, Frischknecht R, Seidenbecher C (2020) Dopamine receptor activation modulates the integrity of the perisynaptic extracellular matrix at excitatory synapses. Cells 9:260.

Perez-Alvarez A, Yin S, Schulze C, Hammer JA, Wagner W, Oertner TG (2020) Endoplasmic reticulum visits highly active spines and prevents runaway potentiation of synapses. Nat Commun 11:5083.

Perez-Alvarez A\*, Fearey BC\*, O'Toole RJ, Yang W, Arganda-Carreras I, Lamothe-Molina PJ, Moeyaert B, Mohr MA, Panzera LC, Schulze C, Schreiter ER, Wiegert JS, Gee CE, Hoppa MB, Oertner TG (2020) Freeze-frame imaging of synaptic activity using SynTagMA. Nature Comm 11:2464 \*equal contribution

Anisimova M, van Bommel Bas, Wiegert JS, Mikhaylova M, Oertner TG, Gee CE (2019) Long vs short-term synaptic learning rules after optogenetic spike-timing-dependent plasticity. bioRxiv 863365; doi: <https://doi.org/10.1101/863365>

Dürst CD, Wiegert JS, Helassa N, Kerruth S, Coates C, Schulze C, Geeves MA, Török K, Oertner TG (2019) High-speed imaging of glutamate release with genetically encoded sensors. *Nature Protocols* 14:1401-1424.

Hüll K, Benster T, Manookin MB, Trauner D, Van Gelder RN, Laprell L (2019) Photopharmacologic vision restoration reduces pathological rhythmic field potentials in blind mouse retina. *Sci Rep* 9:13561.

Kerruth S, Coates C, Durst CD, Oertner TG, Torok K (2019) The kinetic mechanisms of fast-decay red-fluorescent genetically encoded calcium indicators. *J Biol Chem* 294:3934-3946.

Konietzny A, Gonzalez-Gallego J, Bar J, Perez-Alvarez A, Drakew A, Demmers JAA, Dekkers DHW, Hammer JA, 3rd, Frotscher M, Oertner TG, Wagner W, Kneussel M, Mikhaylova M (2019) Myosin V regulates synaptopodin clustering and localization in the dendrites of hippocampal neurons. *J Cell Sci* 132:jcs230177.

Trads JB, Hüll K, Matsuura BS, Laprell L, Fehrentz T, Gördlt N, Kozek KA, Weaver CD, Klöcker N, Barber DM, Trauner D (2019) Sign Inversion in Photopharmacology: Incorporation of Cyclic Azobenzenes in Photoswitchable Potassium Channel Blockers and Openers. *Angew Chem Int Ed Engl.* 58:15421- 15428.  
Beck S, Yu-Strzelczyk J, Pauls D, Constantin OM, Gee CE, Ehmann N, Kittel RJ, Nagel G, Gao S (2018) Synthetic Light-Activated Ion Channels for Optogenetic Activation and Inhibition. *Front Neurosci* 12:643.

Gromova KV, Muhia M, Rothhammer N, Gee, CE, Thies E, Schaefer I, Kress S, Kilimann MW, Shevchuk O, Oertner TG, Kneussel M (2018) Neurobeachin and the Kinesin KIF21B are critical for Endocytic Recycling of NMDA Receptors and Regulate Social Behavior. *Cell Reports* 23:2705–2717.

Helassa N, Dürst CD, Coates C, Arif U, Schulze C, Wiegert JS, Geeves M, Oertner TG, Török K (2018) Ultrafast glutamate sensors resolve high-frequency release at Schaffer collateral synapses. *Proc Natl Acad Sci USA* 115:5594-5599.

Moeyaert B, Holt G, Madangopal R, Perez-Alvarez A, Fearey BC, Trojanowski NF, Ledderose J, Zolnik TA, Das A, Patel D, Brown TA, Sachdev RNS, Eickholt BJ, Larkum ME, Turrigiano GG, Dana H, Gee CE, Oertner TG, Hope BT, Schreier ER (2018) Improved methods for marking active neuron populations. *Nat Commun* 9:4440.

Scheib U, Broser M, Constantin OM, Yang S, Gao S, Mukherjee S, Stehfest K, Nagel G, Gee CE\*, Hegemann P\* (2018) Rhodopsin-cyclases for photocontrol of cGMP/cAMP and 2.3 Å structure of the adenylyl cyclase domain. *Nat Commun* 9:2046 \*equal contribution

Wiegert JS, Pulin M, Gee CE, Oertner TG (2018) The fate of hippocampal synapses depends on the sequence of plasticity-inducing events. *Elife* 7:e39151.

## [Institute of Structural Neurobiology \(Director: Prof. Dr. Dr. h. c. Michael Frotscher\)](#)

Institute closed on December 31, 2018 after Prof. Frotscher's death on May 27, 2017

Konietzny A, Gonzalez-Gallego J, Bar J, Perez-Alvarez A, Drakew A, Demmers JAA, Dekkers DHW, Hammer JA, 3rd, Frotscher M, Oertner TG, Wagner W, Kneussel M, Mikhaylova M (2019) Myosin V regulates synaptopodin clustering and localization in the dendrites of hippocampal neurons. *J Cell Sci* 132:jcs230177.

Pahle J, Muhia M, Wagener RJ, Tippmann A, Bock HH, Graw J, Herz J, Staiger JF, Drakew A, Kneussel M, Rune GM, Frotscher M, Brunne B (2019) Selective inactivation of Reelin in inhibitory interneurons leads to subtle changes in the dentate gyrus but leaves cortical layering and behavior unaffected. *Cereb*

Cortex 30:1688-1707.

Shehabeldin R, Lutz D, Karsak M, Frotscher M, Krieglstein K, Sharaf A (2019) Correction: Reelin controls the positioning of brainstem serotonergic raphe neurons. *PLoS One* 14:e0211849.

Grüner F, Blumendorf F, Schmutzler O, Staufer T, Bradbury M, Wiesner U, Rosentreter T, Loers G, Lutz D, Richter B, Fischer M, Schulz F, Steiner S, Warmer M, Burkhardt A, Meents A, Kupinski M, Hoeschen C (2018) Localising functionalised gold-nanoparticles in murine spinal cords by X-ray fluorescence imaging and background-reduction through spatial filtering for human-sized objects. *Sci Rep* 8:16561.

Kraus K, Kleene R, Braren I, Loers G, Lutz D, Schachner M (2018) A fragment of adhesion molecule L1 is imported into mitochondria, and regulates mitochondrial metabolism and trafficking. *J Cell Sci* 131:jcs210500.

Kraus K, Kleene R, Henis M, Braren I, Kataria H, Sharaf A, Loers G, Schachner M, Lutz D (2018) A fragment of adhesion molecule L1 binds to nuclear receptors to regulate synaptic plasticity and motor coordination. *Mol Neurobiol* 55:7164-7178.

Meseke M, Neumüller F, Brunne B, Li X, Anstötz M, Pohlkamp T, Rogalla MM, Herz J, Rune GM, Bender RA (2018) Distal dendritic enrichment of HCN1 channels in hippocampal CA1 is promoted by estrogen, but does not require Reelin. *eNeuro* 5(5)ENEURO.0258-18.2018.

Scharkowski F, Frotscher M, Lutz D, Korte M, Michaelsen-Preusse K (2018) Altered connectivity and synapse maturation of the hippocampal mossy fiber pathway in a mouse model of the fragile X syndrome. *Cereb Cortex* 28:852-867.

Shehabeldin R, Lutz D, Karsak M, Frotscher M, Krieglstein K, Sharaf A (2018) Reelin controls the positioning of brainstem serotonergic raphe neurons. *PLoS ONE* 13(7): e0200268.

Wang S, Brunne B, Zhao S, Chai X, Li J, Lau J, Failla AV, Zobiak B, Sibbe M, Westbrook GL, Lutz D, Frotscher M (2018) Trajectory analysis unveils Reelin's role in the directed migration of granule cells in the dentate gyrus. *J Neurosci* 38:137-148.

### Institute of Molecular Neurogenetics (Director: Prof. Dr. Matthias Kneussel)

Hausrat TJ, Radwitz J, Lombino F, Breiden P, Kneussel M (2020) Alpha- and beta-tubulin isotypes are differentially expressed during brain development. *Dev Neurobiol.* 2020 Apr 15. doi: 10.1002/dneu.22745. Online ahead of print.

Lopes AT, Hausrat TJ, Heisler FF, Gromova KV, Lombino FL, Fischer T, Ruschkies L, Breiden P, Thies E, Hermans-Borgmeyer I, Schweizer M, Schwarz JR, Lohr C, Kneussel M (2020) Spastin depletion increases tubulin polyglutamylation and impairs kinesin-mediated neuronal transport, leading to working and associative memory deficits. *PLoS Biol* 18:e3000820.

Pahle J, Muhia M, Wagener RJ, Tippmann A, Bock HH, Graw J, Herz J, Staiger JF, Drakew A, Kneussel M, Rune GM, Frotscher M, Brunne B (2020) Selective inactivation of Reelin in inhibitory interneurons leads to subtle changes in the dentate gyrus but leaves cortical layering and behavior unaffected. *Cereb Cortex* 30:1688-1707.

Perez-Alvarez A, Yin S, Schulze C, Hammer JA, Wagner W, Oertner TG (2020) Endoplasmic reticulum visits highly active spines and prevents runaway potentiation of synapses. *Nat Commun* 11:5083.

Andres-Alonso M, Ammar MR, Butnaru I, Gomes GM, Sanhueza GA, Raman R, Yuanxiang PA, Borgmeyer M, Lopez-Rojas J, Raza SA, Brice N, Hausrat TJ, Macharadze T, Diaz-Gonzalez S, Carlton M, Failla AV, Stork O, Schweizer M, Gundelfinger ED, Kneussel M, Spilker C, Karpova A, Kreutz MR (2019) SIPA1L2 controls trafficking and local signaling of TrkB-containing amphisomes at presynaptic terminals. *Nat Commun* 10: 5448.

Brohawn SG, Wang W, Handler A, Campbell EB, Schwarz JR, MacKinnon R (2019) The mechanosensitive ion channel TRAAK is localized to the mammalian node of Ranvier. *Elife* 8: e50403.

Gao X, Grendel J, Muhia M, Castro-Gomez S, Süsens U, Isbrandt D, Kneussel M, Kuhl D, Ohana O (2019) Disturbed prefrontal cortex activity in the absence of Schizophrenia-like behavioral dysfunction in Arc/Arg3.1 deficient mice. *J Neurosci* 39:8149-8163.

Kasaragod VB, Hausrat TJ, Schaefer N, Kuhn M, Christensen NR, Tessmer I, Maric HM, Madsen KL, Sotriffer C, Villmann C, Kneussel M, Schindelin H (2019) Elucidating the molecular basis for inhibitory neurotransmission regulation by Artemisinins. *Neuron* 101:673-689 e611.

Konietzny A, Gonzalez-Gallego J, Bar J, Perez-Alvarez A, Drakew A, Demmers JAA, Dekkers DHW, Hammer JA, 3rd, Frotscher M, Oertner TG, Wagner W, Kneussel M, Mikhaylova M (2019) Myosin V regulates synaptopodin clustering and localization in the dendrites of hippocampal neurons. *J Cell Sci* 132:jcs230177.

Lombino FL, Muhia M, Lopez-Rojas J, Brill MS, Thies E, Ruschkies L, Lutz D, Richter M, Hausrat TJ, Lopes AT, McNally FJ, Hermans-Borgmeyer I, Dunleavy JEM, Hoffmeister-Ullerich S, Frotscher M, Misgeld T, Kreutz MR, de Anda FC, Kneussel M (2019) The microtubule severing protein katanin regulates proliferation of neuronal progenitors in embryonic and adult neurogenesis. *Sci Rep* 9:15940.

Roesler MK, Lombino FL, Freitag S, Schweizer M, Hermans-Borgmeyer I, Schwarz JR, Kneussel M, Wagner W (2019) Myosin XVI Regulates Actin Cytoskeleton Dynamics in Dendritic Spines of Purkinje Cells and Affects Presynaptic Organization. *Front Cell Neurosci* 13:330.

Wagner W, Lippmann K, Heisler FF, Gromova KV, Lombino FL, Roesler MK, Pechmann Y, Hornig S, Schweizer M, Polo S, Schwarz JR, Eilers J, Kneussel M (2019) Myosin VI drives clathrin-mediated AMPA receptor endocytosis to facilitate cerebellar long-term depression. *Cell Rep* 28:11-20.e9.

Alexander CJ, Wagner W, Copeland NG, Jenkins NA, Hammer JA (2018) Creation of a myosin Va-TAP-tagged mouse and identification of potential myosin Va-interacting proteins in the cerebellum. *Cytoskeleton (Hoboken)* 75:395-409.

Bauer CK, Schwarz JR (2018) Ether-à-go-go K<sup>+</sup> channels: effective modulators of neuronal excitability. *J Physiol* 596:769-783.

Gromova KV, Muhia M, Rothhammer N, Gee, CE, Thies E, Schaefer I, Kress S, Kilimann MW, Shevchuk O, Oertner TG, Kneussel M (2018) Neurobeachin and the kinesin KIF21B are critical for endocytic recycling of NMDA receptors and regulate social behavior. *Cell Reports* 23:2705–2717.

Heisler FF, Pechmann Y, Wieser I, Altmepfen HC, Veenendaal L, Muhia M, Schweizer M, Glatzel M, Krasemann S, Kneussel M (2018) Muskeln koordiniert PrPC 1 Lysosom versus Exosom-Targeting und beeinflusst Prionerkrankungsprogression. *Neuron* 99:1155-1169.e9

Magiera MM, Bodakuntla S, Ziak J, Lacomme S, Marques Sousa P, Leboucher S, Hausrat TJ, Bosc C, Andrieux A, Kneussel M, Landry M, Calas A, Balastik M, Janke C (2018) Excessive tubulin polyglutamylation causes neurodegeneration and perturbs neuronal transport. *EMBO J* 37: e100440.

Schiewek J, Schumacher U, Lange T, Wikman H, Pantel K, Mikhaylova M, Kneussel M, Linder S, Schmalfeldt B, Oliveira-Ferrer L, Windhorst S (2018) Clinical relevance of cytoskeleton associated proteins for ovarian cancer. *J Cancer Res Clin Oncol* 144:2195-2205.

Vulinovic F, Krajka V, Hausrat TJ, Seibler P, Alvarez-Fischer D, Park J-S, Kumar KR, Sue CM, Lohmann K, Kneussel M, Klein C, Rakovic A (2018) Motor protein binding and mitochondrial transport are altered by pathogenic TUBB4A variants. *Hum Mutat* 39:1901-1915.



## Institute of Molecular and Cellular Cognition (Director: Prof. Dr. Dietmar Kuhl)

Baumgart KG, Byvshev P, Sliby AN, Strube A, König P, Wahn B (2020) Neurophysiological correlates of collective perceptual decision-making. *Eur J Neurosci* 51:1676-1696.

Briševac D, Scholz R, Du D, Elagabani MN, Köhr G, Kornau HC (2020) The small GTPase Arf6 is dysregulated in a mouse model for fragile X syndrome. *J Neurochem* 2020 Oct 30. doi: 10.1111/jnc.15230. Online ahead of print.

Denkena J, Zaisser A, Merz B, Klinger B, Kuhl D, Blüthgen N, Hermey G (2020) Neuronal activity regulates alternative exon usage. *Mol Brain* 13:148.

Dührsen L, Sauvigny T, Ricklefs FL, Hamel W, Koeppen JA, Hebel JM, Lanz M, Martens T (2020) Decision-making in temporal lobe epilepsy surgery based on invasive stereo-electroencephalography (sEEG). *Neurosurg Rev* 43:1403-1408.

Yasa S, Modica G, Sauvageau E, Kaleem A, Hermey G, Lefrancois S (2020) CLN3 regulates endosomal function by modulating Rab7A effector interactions. *J Cell Sci* 133:jcs234047.

Ansar M, Chung HL, Al-Otaibi A, Elagabani MN, Ravenscroft TA, Paracha SA, Scholz R, Abdel Magid T, Sarwar MT, Shah SF, Qaisar AA, Makrythanasis P, Marcogliese PC, Kamsteeg EJ, Falconnet E, Ranza E, Santoni FA, Aldhalaan H, Al-Asmari A, Fageih EA, Ahmed J, Kornau HC, Bellen HJ, Antonarakis SE (2019) Bi-allelic variants in IQSEC1 cause intellectual disability, developmental delay, and short stature. *Am J Hum Genet* 105:907-920.

Dührsen L, Sauvigny T, Ricklefs FL, Mende KC, Schaper M, Matschke J, Goebell E, Westphal M, Martens T (2019) Seizures as presenting symptom in patients with glioblastoma. *Epilepsia* 60:149-154.

Gao X, Grendel J, Muhia M, Castro-Gomez S, Süssens U, Isbrandt D, Kneussel M, Kuhl D, Ohana O (2019) Disturbed prefrontal cortex activity in the absence of Schizophrenia-like behavioral dysfunction in *Arc/Arg3.1* deficient mice. *J Neurosci* 39:8149-8163.

Hermey G, Hoffmeister-Ullerich SA, Merz B, Gross D, Kuhl D, Kins S (2019) Amyloidosis causes downregulation of SorLA, SorCS1 and SorCS3 expression in mice. *Biol Chem* 400:1181-1189.

Schob C, Morellini F, Ohana O, Bakota L, Hrynychak MV, Brandt R, Brockmann MD, Cichon N, Hartung H, Hanganu-Opatz IL, Kraus V, Scharf S, Herrmans-Borgmeyer I, Schweizer M, Kuhl D, Woehr M, Vorckel KJ, Calzada-Wack J, Fuchs H, Gailus-Durner V, Hrabe de Angelis M, Garner CC, Kreienkamp HJ, Kindler S (2019) Cognitive impairment and autistic-like behaviour in *SAPAP4*-deficient mice. *Transl Psychiatry* 9:7.

Eggert S, Gonzalez AC, Thomas C, Schilling S, Schwarz SM, Tischer C, Adam V, Strecker P, Schmidt V, Willnow TE, Hermey G, Pietrzik CU, Koo EH, Kins S (2018) Dimerization leads to changes in APP (amyloid precursor protein) trafficking mediated by LRP1 and SorLA. *Cell Mol Life Sci* 75:301-322.

Eggert S, Thomas C, Kins S, Hermey G (2018) Trafficking in Alzheimer's Disease: Modulation of APP Transport and Processing by the Transmembrane Proteins LRP1, SorLA, SorCS1c, Sortilin, and Calsyntenin. *Mol Neurobiol* 55:5809-5829.

Gao X, Castro-Gomez S, Grendel J, Graf S, Süssens U, Binkle L, Mensching D, Isbrandt D, Kuhl D\*, Ohana O\* (2018) *Arc/Arg3.1* mediates a critical period for spatial learning and hippocampal networks. *Proc Natl Acad Sci USA (PNAS)* 115:12531-12536. \*corresponding authors

Subkhangulova A, Malik AR, Hermey G, Popp O, Dittmar G, Rathjen T, Poy MN, Stumpf A, Beed PS, Schmitz D, Breiderhoff T, Willnow TE (2018) SORCS1 and SORCS3 control energy balance and orexigenic peptide production. *EMBO Rep* 19:e44810.

Rollenhagen A\*, Ohana O\*, Sätzler K, Hilgetag CC, Kuhl D, Lübke JHR (2018) Structural properties of synaptic transmission and temporal dynamics at excitatory layer 5B synapses in the adult rat somatosensory cortex. *Front Synaptic Neurosci* 10:24. \*equal contribution

Voelkl J, Luong TTD, Tuffaha R, Musculus K, Auer T, Lian XM, Daniel C, Zickler D, Boehme B, Sacherer M, Metzler B, Kuhl D, Gollasch M, Amann K, Muller DN, Pieske B, Lang F, Alesutan I (2018) SGK1 induces vascular smooth muscle cell calcification through NF-kappa B signaling. *J Clin Invest* 128:3024-3040.

## RG Synaptic Wiring and Information Processing (Head: Dr. J. Simon Wiegert)

Perez-Alvarez A\*, Fearey B\*, Schulze C, O'Toole RJ, Moeyaert B, Mohr MA, Arganda-Carreras I, Yang W, Wiegert JS, Schreiter ER, Gee CE, Hoppa MB, Oertner TG (2020) Freeze-frame imaging of synaptic activity using SynTagMA. *Nature Comm* 11:2464 \*equal contribution

Westermann LM, Lutz Fleischhauer L, Vogel J, Jenei-Lanzl Z, Ludwig NF, Schau L, Morellini F, Baranowsky A, Yorgan TA, Di Lorenzo G, Schweizer M, de Souza Pinheiro B, Guarany NR, Sperb-Ludwig F, Visioli F, Silva TO, Soul J, Hendrickx G, Wiegert JS, Schwartz IVD, Clausen-Schaumann H, Zaucke F, Schinke T, Pohl S, Danyukova T (2020) Imbalanced cellular metabolism compromises cartilage homeostasis and joint function in a mouse model of mucopolidosis type III gamma. *Dis Model Mech* 13:dmm046425.

Anisimova M, van Bommel Bas, Wiegert JS, Mikhaylova M, Oertner TG, Gee CE (2019) Long vs short-term synaptic learning rules after optogenetic spike-timing-dependent plasticity. *bioRxiv* 863365; doi: <https://doi.org/10.1101/863365>

Binder S, Mölle M, Lippert M, Bruder R, Aksamaz S, Ohl F, Wiegert JS, Marshall L (2019) Monosynaptic hippocampal-prefrontal projections contribute to spatial memory consolidation in mice. *J Neurosci* 39:6978-6991.

Dürst CD, Wiegert JS, Helassa N, Kerruth S, Coates C, Schulze C, Geeves MA, Török K, Oertner TG (2019) High-speed imaging of glutamate release with genetically encoded sensors. *Nature Protocols* 14:1401-1424.

Oppermann J, Fischer P, Silapetere A, Liepe B, Rodriguez-Rozada S, Flores-Urbe J, Peter E, Keidel A, Vierock J, Kaufmann J, Broser M, Luck M, Bartl F, Hildebrandt P, Wiegert JS, Béjà O, Hegemann P, Wietek J (2019) MerMAIDs: a family of metagenomically discovered marine anion-conducting and intensely desensitizing channelrhodopsins. *Nat Commun* 10:3315.

Yizhar O, Wiegert JS (2019) Designer drugs for designer receptors: unlocking the translational potential of chemogenetics. *Trends Pharmacol Sci* 40:362-364.

Helassa N, Dürst CD, Coates C, Arif U, Schulze C, Wiegert JS, Geeves M, Oertner TG, Török K (2018) Ultrafast glutamate sensors resolve high-frequency release at Schaffer collateral synapses. *Proc Natl Acad Sci USA* 115:5594-5599.

Oda K, Vierock J, Oishi S, Rodriguez-Rozada S, Taniguchi R, Yamashita K, Wiegert JS, Nishizawa T, Hegemann P, Nureki O (2018) Crystal structure of the red light-activated channelrhodopsin Chrimson. *Nat Commun* 9:3949.

Wiegert JS, Pulin M, Gee CE, Oertner TG (2018) The fate of hippocampal synapses depends on the sequence of plasticity-inducing events. *Elife* 7:e39151.

## RG Neuronal Protein Transport (Head: Dr. Marina Mikhaylova)

(Since 07/2020 Guest Group at ZMNH)

Bucher M, Niebling S, Han Y, Molodenskiy D, Kreienkamp HJ, Svergun D, Kim E, Kostyukova AS, Kreutz MR, Mikhaylova M (2020) Autism associated SHANK3 missense point mutations impact conformational fluctuations and protein turnover at synapses. *bioRxiv* 2020.12.31.424970; <https://doi.org/10.1101/2020.12.31.424970>

Bucher M, Fanutza T, Mikhaylova M (2020) Cytoskeletal makeup of the synapse: shaft versus spine. *Cytoskeleton (Hoboken)* 77:55-64.

Hu C, Kanellopoulos AK, Richter M, Petersen M, Konietzny A, Tenedini FM, Hoyer N, Cheng L, Poon CLC, Harvey KF, Windhorst S, Parrish JZ, Mikhaylova M, Bagni C, Calderon de Anda F, Soba P (2020) Conserved Tao kinase activity regulates dendritic arborization, cytoskeletal dynamics, and sensory function in *Drosophila*. *J Neurosci* 40:1819-1833.

Konietzny A, Grendel J, Hertrich N, Dekkers DHW, Demmers JAA, Mikhaylova M (2020) Synaptic anchoring of the endoplasmic reticulum depends on myosin V and caldendrin activity. *bioRxiv* 2020.08.14.250746; doi: <https://doi.org/10.1101/2020.08.14.250746>

Marques ARA, Di Spiezio A, Thiessen N, Schmidt L, Grotzinger J, Lullmann-Rauch R, Damme M, Storck SE, Pietrzik CU, Fogh J, Bar J, Mikhaylova M, Glatzel M, Bassal M, Bartsch U, Saftig P (2020) Enzyme replacement therapy with recombinant pro-CTSD (cathepsin D) corrects defective proteolysis and autophagy in neuronal ceroid lipofuscinosis. *Autophagy* 16:811-825.

Mikhaylova M, Rentsch J, Ewers H (2020) Actomyosin Contractility in the Generation and Plasticity of Axons and Dendritic Spines. *Cells* 9:E2006.

Pelucchi S, Vandermeulen L, Pizzamiglio L, Aksan B, Yan J, Konietzny A, Bonomi E, Borroni B, Padovani A, Rust MB, Di Marino D, Mikhaylova M, Mauceri D, Antonucci F, Edefonti V, Gardoni F, Di Luca M, Marcello E (2020) Cyclase-associated protein 2 dimerization regulates cofilin in synaptic plasticity and Alzheimer's disease. *Brain Commun* 2:fcaa086. eCollection 2020.

Anisimova M, van Bommel Bas, Wiegert JS, Mikhaylova M, Oertner TG, Gee CE (2019) Long vs short-term synaptic learning rules after optogenetic spike-timing-dependent plasticity. *bioRxiv* 863365.

Konietzny A, Gonzalez-Gallego J, Bar J, Perez-Alvarez A, Drakew A, Demmers JAA, Dekkers DHW, Hammer JA, 3rd, Frotscher M, Oertner TG, Wagner W, Kneussel M, Mikhaylova M (2019) Myosin V regulates synaptopodin clustering and localization in the dendrites of hippocampal neurons. *J Cell Sci* 132:jcs230177.

Meka DP, Scharrenberg R, Zhao B, Koenig T, Schaefer I, Schwanke B, Kobler O, Klykov S, Richter M, Eggert D, Windhorst S, Dotti CG, Kreutz MR, Mikhaylova M, Calderon de Anda F (2019) Radial F-actin organization during early neuronal development. *EMBO Rep* 20:e47743

van Bommel B, Konietzny A, Kobler O, Bar J, Mikhaylova M (2019) F-actin patches associated with glutamatergic synapses control positioning of dendritic lysosomes. *Embo Journal* 38:e101183

Mikhaylova M, Bär J, van Bommel B, Schatzle P, YuanXiang P, Raman R, Hradsky J, Konietzny A, Loktionov EY, Reddy PP, Lopez-Rojas J, Spilker C, Kobler O, Raza SA, Stork O, Hoogenraad CC, Kreutz MR (2018) Caldendrin directly couples postsynaptic calcium signals to actin remodeling in dendritic spines. *Neuron* 97:1110-1125 e1114.

Schiewek J, Schumacher U, Lange T, Joosse SA, Wikman H, Pantel K, Mikhaylova M, Kneussel M, Linder S, Schmalfeldt B, Oliveira-Ferrer L, Windhorst S (2018) Clinical relevance of cytoskeleton associated proteins for ovarian cancer. *J Cancer Res Clin Oncol* 144:2195-2205.

Seipold L, Altmepfen H, Koudelka T, Tholey A, Kasperek P, Sedlacek R, Schweizer M, Bar J, Mikhaylova M, Glatzel M, Saftig P (2018) In vivo regulation of the A disintegrin and metalloproteinase 10 (ADAM10) by the tetraspanin 15. *Cell Mol Life Sci* 75:3251-3267.

## RG Neuronal and Cellular Signal Transduction (Head: Prof. Dr. Meliha Karsak)

Karsak M, Glebov K, Scheffold M, Bajaj T, Kawalia A, Karaca I, Rading S, Kornhuber J, Peters O, Diez-Fairen M, Frölich L, Hüll M, Wiltfang J, Scherer M, Riedel-Heller S, Schneider A, Heneka MT, Fließbach K, Sharaf A, Thiele H, Lennarz M, Jessen F, Maier W, Kubisch C, Ignatova Z, Nürnberg P, Pastor P, Walter J, Ramirez A (2020) A rare heterozygous TREM2 coding variant identified in familial clustering of dementia affects an intrinsically disordered protein region and function of TREM2. *Hum Mutat* 41:169-181.

Mensching L, Rading S, Nikolaev V, Karsak M (2020) Monitoring Cannabinoid CB2 -Receptor Mediated cAMP Dynamics by FRET-Based Live Cell Imaging. *Int J Mol Sci* 21:7880.

Yorgan T, Rolvien T, Stürznickel J, Vollersen N, Lange F, Zhao W, Baranowsky A, Rosenthal L, Hermans-Borgmeyer I, Sharaf A, Karsak M, David J, Oheim R, Amling M, Schinke T (2020) Mice carrying a ubiquitous R235W mutation of Wnt1 display a bone-specific phenotype. *J Bone Miner Res* 35:1726-1737.

Anstötz M, Karsak M, Rune G (2019) Integrity of Cajal-Retzius cells in the reeler-mouse hippocampus. *Hippocampus* 29:550-565. *Int J Mol Sci* 29:550-565.

Endig J, Unrau L, Sprezyna P, Rading S, Karsak M, Goltz D, Heukamp LC, Tiegs G, Diehl L (2019) Acute liver injury after CCl<sub>4</sub> administration is independent of Smad7 expression in myeloid cells. *Int J Mol Sci* 20:5538.

Mensching L, Djogo N, Keller C, Rading S, Karsak M (2019) Stable adult hippocampal neurogenesis in cannabinoid receptor CB2 deficient mice. *Int J Mol Sci* 20:3759.

Sharaf A, Mensching L, Keller C, Rading S, Scheffold M, Palkowitsch L, Djogo N, Rezgaoui M, Kestler HA, Moepps B, Failla AV, Karsak M (2019) Systematic Affinity Purification Coupled to Mass Spectrometry Identified p62 as Part of the Cannabinoid Receptor CB2 Interactome. *Front Mol Neurosci* 12:224.

Shehabeldin R, Lutz D, Karsak M, Frotscher M, Kriegelstein K, Sharaf A (2019) Correction: Reelin controls the positioning of brainstem serotonergic raphe neurons. *PLoS One* 14:e0211849.

Dumitru CA, Sandalcioglu IE, Karsak M (2018) Cannabinoids in Glioblastoma Therapy: New Applications for Old Drugs. *Front Mol Neurosci* 11:159.

Shehabeldin R, Lutz D, Karsak M, Frotscher M, Kriegelstein K, Sharaf A (2018) Reelin controls the positioning of brainstem serotonergic raphe neurons. *Plos One* 13:e0200268.

## RG Behavioral Biology (Head: Dr. Fabio Morellini)

Blechner C, Becker L, Fuchs H, Rathkolb B, Prehn C, Adler T, Caluzada-Wack J, Garrett L, Gailus-Durner V, Morellini F, Conrad S, Hölter SM, Wolf E, Klopstock T, Adamski J, Busch D, Hrabe de Angelis M, Schmeisser MJ, Windhorst S (2020) Physiological relevance of the neuronal isoform of inositol-1,4,5-trisphosphate 3-kinases in mice. *Neurosci Lett* 735:135206.

Kähler B, Romswinkel EV, Jakovcevski M, Moses A, Schachner M, Morellini F (2020) Hyperfunction of the stress response system and novelty-induced hyperactivity correlate with enhanced cocaine-induced conditioned place preference in NCAM-deficient mice. *Addiction biology*: e12887

Meier K, Merseburg A, Isbrandt D, Marguet SL, Morellini F (2020) Dentate Gyrus Sharp Waves, a Local Field Potential Correlate of Learning in the Dentate Gyrus of Mice. *J Neurosci* 40:7105-7118.

Westermann LM, Lutz Fleischhauer L, Vogel J, Jenei-Lanzl Z, Ludwig NF, Schau L, Morellini F, Baranowsky A, Yorgan TA, Di Lorenzo G, Schweizer M, de Souza Pinheiro B, Guarany NR, Sperb-Ludwig F, Visioli F, Silva TO, Soul J, Hendrickx G, Wiegert JS, Schwartz IVD, Clausen-Schaumann H, Zaucke F, Schinke T, Pohl S, Danyukova T (2020) Imbalanced cellular metabolism compromises cartilage homeostasis and joint function in a mouse model of mucopolidosis type III gamma. *Dis Model Mech* 13:dmm046425.

Reinicke AT, Laban K, Sachs M, Kraus V, Walden M, Damme M, Sachs W, Reichelt J, Schweizer M, Janiesch PC, Duncan KE, Saftig P, Rinschen MM, Morellini F\*, Meyer-Schwesinger C\* (2019) Ubiquitin C-terminal hydrolase L1 (UCH-L1) loss causes neurodegeneration by altering protein turnover in the first postnatal weeks. *Proc Natl Acad Sci USA* 116:7963-7972. \*equal contribution

Richter M, Murtaza N, Scharrenberg R, White S, Johanns O, Walker S, Yuen RK, Schwanke B, Bedürftig B, Henis M, Scharf S, Kraus V, Dörk R, Hellmann J, Lindenmaier Z, Ellegood J, Hartung H, Kwan V, Sedlacik J, Fiehler J, Schweizer M, Lerch JP, Hanganu-Opatz I, Morellini F, Scherer SW, Singh KK, Calderon de Anda F, (2019) Altered TAOK2 activity causes autism-related neurodevelopmental and cognitive abnormalities through RhoA signaling. *Mol Psychiatry* 24:1329-1350.

Schob C, Morellini F, Ohana O, Bakota L, Hrynychak MV, Brandt R, Brockmann MD, Cichon N, Hartung H, Hanganu-Opatz IL, Kraus V, Scharf S, Herrmans-Borgmeyer I, Schweizer M, Kuhl D, Woehr M, Vorckel KJ, Calzada-Wack J, Fuchs H, Gailus-Durner V, Hrabe de Angelis M, Garner CC, Kreienkamp HJ, Kindler S (2019) Cognitive impairment and autistic-like behaviour in SAPAP4-deficient mice. *Transl Psychiatry* 9:7.

Stanelle-Bertram S, Walendy-Gnirß K, Speiseder T, Thiele S, Asantewaa Asante I, Dreier C, Kouassi NM, Preuß A, Pilnitz- Stolze G, Müller U, Thanisch S, Richter M, Scharrenberg R, Kraus V, Dörk R, Schau L, Herder V, Gerhauser I, Pfankuche VM, Käufer C, Waltl I, Moraes T, Sellau J, Hoenow S, Schmidt- Chanasit J, Jansen S, Schattling B, Ittrich H, Bartsch B, Renné T, Bartenschlager R, Arck P, Cadar D, Friese MA, Vapalahti O, Lotter H, Gabriel M, Baumgärtner W, Morellini F, Hölter SM, Amarie O, Fuchs H, Hrabe de Angelis M, Löscher W, Calderon de Anda F, Gabriel G (2018) Male offspring with high testosterone levels born to mildly ZIKV infected mice 1 are at high risk to develop neurocognitive disorders in their adulthood. *Nat Microbiol* 3:1161-1174.

## RG Neuronal Development (Head: Dr. Froylan Calderon de Anda)

Hu C, Kanellopoulos AK, Richter M, Petersen M, Konietzny A, Tenedini FM, Hoyer N, Cheng L, Poon CLC, Harvey KF, Windhorst S, Parrish JZ, Mikhaylova M, Bagni C, Calderon de Anda F, Soba P (2020) Conserved Tao kinase activity regulates dendritic arborization, cytoskeletal dynamics, and sensory function in *Drosophila*. *J Neurosci* 40:1819-1833.

Lombino FL, Muhia M, Lopez-Rojas J, Brill MS, Thies E, Ruschkies L, Lutz D, Richter M, Hausrat TJ, Lopes AT, McNally FJ, Hermans-Borgmeyer I, Dunleavy JEM, Hoffmeister-Ullerich S, Frotscher M, Misgeld T, Kreutz MR, de Anda FC, Kneussel M (2019) The microtubule severing protein katanin regulates proliferation of neuronal progenitors in embryonic and adult neurogenesis. *Sci Rep* 9:15940.

Meka DP, Kobler O, Wuesthoff S, Schwanke B, Krisp C, Schmuelling N, Rueter R, Ruecker T, Schlüter H, Fornasiero EF, Calderon de Anda F (2020) Centrosome-dependent microtubule organization sets the conditions for axon formation. *BioRxiv* doi: <https://doi.org/10.1101/2020.12.29.424696>

Meka DP, Scharrenberg R, Calderon de Anda F (2020) Emerging roles of the centrosome in neuronal development. *Cytoskeleton (Hoboken)* 77: 84-96.

Ezan J, Moreau MM, Mamo TM, Shimbo M, Decroo M, Richter M, Peyrourou R, Rachel R, Tissir F, Calderon de Anda F, Sans N, Montcouquiol M (2019) Selective neurodevelopmental and behavioral deficits in *Scrib* conditional knock-out mice recapitulate some phenotypes associated with the *Verheij/8q23.4* deletion syndrome. *BioRxiv* doi: <https://doi.org/10.1101/780130>

Meka DP, Scharrenberg R, Zhao B, Koenig T, Schaefer I, Schwanke B, Kobler O, Klykov S, Richter M, Eggert D, Windhorst S, Dotti CG, Kreutz MR, Mikhaylova M, Calderon de Anda F (2019) Radial F-actin organization during early neuronal development. *EMBO Rep* 20:e47743

Richter M, Murtaza N, Scharrenberg R, White S, Johanns O, Walker S, Yuen RK, Schwanke B, Bedürftig B, Henis M, Scharf S, Kraus V, Dörk R, Hellmann J, Lindenmaier Z, Ellegood J, Hartung H, Kwan V, Sedlacik J, Fiehler J, Schweizer M, Lerch JP, Hanganu-Opatz I, Morellini F, Scherer SW, Singh KK, Calderon de Anda

F (2019) Altered TAOK2 activity causes autism-related neurodevelopmental and cognitive abnormalities through RhoA signaling. *Mol Psychiatry* 24:1329-1350.

Tenedini FM, Saez Gonzalez M, Hu C, Pedersen LH, Petruzzi MM, Spitzweck B, Wang D, Richter M, Petersen M, Szpotowicz E, Schweizer M, Sigrist SJ, Calderon de Anda F, Soba P (2019) Maintenance of cell type-specific connectivity and circuit function requires Tao kinase. *Nat Commun* 10:3506.

Calderon de Anda, Gaertner A (2018) Editorial: Neuronal Polarity: Establishment and Maintenance. *Front Cell Neurosci* 12:137.

Cox RL, Calderon de Anda F, Mangoubi T, Yoshii A (2018) Multiple critical periods for rapamycin treatment to correct structural defects in Tsc-1-suppressed brain. *Front Mol Neurosci* 11:409.

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 e2265.

Stanelle-Bertram S, Walendy-Gnirß K, Speiseder T, Thiele S, Asantewaa Asante I, Dreier C, Kouassi NM, Preuß A, Pilnitz-Stolze G, Müller U, Thanisch S, Richter M, Scharrenberg R, Kraus V, Dörk R, Schau L, Herder V, Gerhauser I, Pfankuche VM, Käufer C, Waltl I, Moraes T, Sellau J, Hoenow S, Schmidt-Chanasit J, Jansen S, Schattling B, Ittrich H, Bartsch B, Renné T, Bartenschlager R, Arck P, Cadar D, Friese MA, Vapalahti O, Lotter H, Gabriel M, Baumgärtner W, Morellini F, Hölter SM, Amarie O, Fuchs H, Hrabe de Angelis M, Löscher W, Calderon de Anda F, Gabriel G (2018) Male offspring with high testosterone levels born to mildly ZIKV infected mice 1 are at high risk to develop neurocognitive disorders in their adulthood. *Nat Microbiol* 3:1161-1174.

## RG Neuronal Patterning and Connectivity (Head: Dr. Peter Šoba)

Dannhäuser S, Lux TJ, Hu C, Selcho M, Chen JT-C, Ehmann N, Sachidanandan D, Stopp S, Pauls KD, Pawlak M, Langenhan T, Soba P, Rittner HL, Robert J Kittel RJ (2020) Antinociceptive modulation by the adhesion GPCR C1RL promotes mechanosensory signal discrimination. *Elife* 9:e56738

Hu C, Kanellopoulos AK, Richter M, Petersen M, Konietzny A, Tenedini FM, Hoyer N, Cheng L, Poon CLC, Harvey KF, Windhorst S, Parrish JZ, Mikhaylova M, Bagni C, Calderon de Anda F, Soba P (2020) Conserved Tao kinase activity regulates dendritic arborization, cytoskeletal dynamics, and sensory function in Drosophila. *J Neurosci* 40:1819-1833.

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, Trager S, Miller KK, Bruck W, Duncan KE, Salinas G, Soba P, Gundelfinger ED, Merkler D, Friese MA (2019) Bassoon proteinopathy drives neurodegeneration in multiple sclerosis. *Nat Neurosci* 22:887-896.

Tenedini FM, Saez Gonzalez M, Hu C, Pedersen LH, Petruzzi MM, Spitzweck B, Wang D, Richter M, Petersen M, Szpotowicz E, Schweizer M, Sigrist SJ, Calderon de Anda F, Soba P (2019) Maintenance of cell type-specific connectivity and circuit function requires Tao kinase. *Nat Commun* 10:3506.

Zhu S, Chen R, Soba P, Jan YN (2019) JNK signaling coordinates with ecdysone signaling to promote dendrite pruning of sensory neurons. *Development* 146:dev163592.

Hoyer N, Petersen M, Tenedini FM, Soba P (2018) Assaying mechanonociceptive behavior in Drosophila larvae. *bio-protocol* 8:4.

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 e2265.

Petersen M, Tenedini FM, Hoyer N, Kutschera F, Soba P (2018) Assaying thermo-nociceptive behavior in Drosophila larvae. *bio-protocol* 8:4.

## RG Neuronal Translational Control (Head: Dr. Kent Duncan)

Duncan KE (2020) RNA-binding proteins and translation in neurodegenerative disease. In: The Oxford Handbook of Neuronal Protein Synthesis, Ed. Wayne S. Sossin. DOI: 10.1093/oxfordhb/9780190686307.013.25

Marques RF, Engler JB, Küchler K, Jones RA, Lingner T, Salinas G, Gillingwater TH, Friese MA, Duncan KE (2020) Motor neuron transcriptome reveals deregulation of SYNGR4 and PLEKHB1 in mutant TDP-43 amyotrophic lateral sclerosis models. *Hum Mol Genet* 29:2647-2661.

Otsuka H, Fukao A, Tomohiro T, Adachi S, Suzuki T, Takahashi A, Funakami Y, Natsume T, Yamamoto T, Duncan KE, Toshinobu Fujiwara T (2020) ARE-binding protein ZFP36L1 interacts with CNOT1 to directly repress translation via a deadenylation-independent mechanism. *Biochimie* 174:49-56.

Otsuka H, Fukao A, Funakami Y, Duncan KE, Fujiwara T (2019) Emerging evidence of translational control by AU-rich element-binding proteins. *Front Genet* 10:332.

Neelagandan N, Gonnella G, Dang S, Janiesch PC, Miller KK, Kuchler K, Marques RF, Indenbirken D, Alawi M, Grundhoff A, Kurtz S, Duncan KE (2019) TDP-43 enhances translation of specific mRNAs linked to neurodegenerative disease. *Nucleic Acids Res* 47:341-361.

Reinicke AT, Laban K, Sachs M, Kraus V, Walden M, Damme M, Sachs W, Reichelt J, Schweizer M, Janiesch PC, Duncan KE, Saftig P, Rinschen MM, Morellini F, Meyer-Schwesinger C (2019) Ubiquitin C-terminal hydrolase L1 (UCH-L1) loss causes neurodegeneration by altering protein turnover in the first postnatal weeks. *Proc Natl Acad Sci USA* 116:7963-7972.

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, Trager S, Miller KK, Bruck W, Duncan KE, Salinas G, Soba P, Gundelfinger ED, Merkler D, Friese MA (2019) Bassoon proteinopathy drives neurodegeneration in multiple sclerosis. *Nat Neurosci* 22:887-896.

Sadahiro A, Fukao A, Kosaka M, Funakami Y, Takizawa N, Takeuchi O, Duncan KE, Fujiwara T (2018) Translation of Hepatitis A Virus IRES Is Upregulated by a Hepatic Cell-Specific Factor. *Front Genet* 9:307.

## Emeritus Group Biosynthesis of Neural Structures (Head: Prof. Dr. Dr. h. c. Melitta Schachner Camartin)

\* No authors with ZMNH affiliation. Affiliation of Schachner M: Keck Center for Collaborative Neuroscience and Department of Cell Biology and Neuroscience, Rutgers University, Piscataway, NJ, USA. or/and Center for Neuroscience, Shantou University Medical College, Shantou, China.

Chen S, Jiang Q, Huang P, Hu C, Shen H, Schachner M, Zhao W (2020) The L1 cell adhesion molecule affects protein kinase D1 activity in the cerebral cortex in a mouse model of Alzheimer's disease. *Brain Res Bull* 162:141-150.\*

Chen SX, He JH, Mi YJ, Shen HF, Schachner M, Zhao WJ (2020) A mimetic peptide of  $\alpha$ 2,6-sialyllactose promotes neuritogenesis. *Neural Regen Res* 15:1058-1065.\*

Girbes Minguez M, Wolters-Eisfeld G, Lutz D, Buck F, Schachner M, Kleene R (2020) The cell adhesion molecule L1 interacts with nuclear proteins via its intracellular domain. *FASEB J* 34:9869-9883.

Grońska-Pęski M, Schachner M, Hébert, JM (2020) L1cam curbs the differentiation of adultborn hippocampal neurons. *Stem Cell Res* 2020 Sep 17; 48:101999. doi: 10.1016/j.scr.2020.101999. Online ahead of print. \*

Hu C, Hu J, Meng X, Zhang H, Shen H, Huang P, Schachner M, Zhao W (2020) L1CAM Beneficially Inhibits Histone Deacetylase 2 Expression under Conditions of Alzheimer's Disease. *Curr. Alzheimer Res.* 17:382-392.\*

Huang R, Yuan DJ, Li S, Liang XS, Gao Y, Lan XY, Qin HM, Ma YF, Xu GY, Schachner M, Sytnyk V, Boltze J, Ma QH, Li S (2020) NCAM regulates temporal specification of neural progenitor cells via profilin2 during corticogenesis. *J Cell Biol* 219:e201902164.\*

Jakovcevski I, Schachner M (2020) Perforin affects regeneration in a mouse spinal cord injury model. *Int. J. Neurosci.* 2020 Jul 27: 1-12. doi: 10.1080/00207454.2020.1796662. Online ahead of print.

Joseph TP, Jagadeesan N, Sai LY, Lin SL, Sahu S, Schachner M (2020) Adhesion Molecule L1 Agonist mimetics protect against the pesticide paraquat-induced locomotor deficits and biochemical alterations in zebrafish. *Front Neurosci* 14:458.\*

Kähler B, Romswinkel EV, Jakovcevski M, Moses A, Schachner M, Morellini F (2020) Hyperfunction of the stress response system and novelty-induced hyperactivity correlate with enhanced cocaine-induced conditioned place preference in NCAM-deficient mice. *Addiction biology*: e12887.

Kleene R, Lutz D, Loers G, Bork U, Borgmeyer U, Hermans-Borgmeyer I, Schachner M (2020) Revisiting the proteolytic processing of cell adhesion molecule L1. *J Neurochem* 2020 Sep 28. doi: 10.1111/jnc.15201. Online ahead of print.

Kotarska A, Fernandes L, Kleene R, Schachner M (2020) Cell adhesion molecule close homolog of L1 binds to the dopamine receptor D2 and inhibits the internalization of its short isoform. *FASEB J* 34:4832-4851.

Nagaraj V, Theis T, Johal AS, Seth A, Gore J, Arsha N, Patel M, Hao HB, Kurian N, Schachner M (2020) Application of antibodies to neuronally expressed Nogo-A increases neuronal survival and neurite outgrowth. *Int J Mol Sci* 21: 5417.\*

Pan H, Xue W, Zhao W, Schachner M (2020) Expression and function of chondroitin 4-sulfate and chondroitin 6-sulfate in human glioma. *FASEB J* 34:2853-2868.\*

Sytnyk V, Leshchyn'ska I, Schachner M (2020) Neural glycomics: the sweet side of nervous system functions. *Cell Mol Life Sci.* 2020 Jul 1. doi: 10.1007/s00018-020-03578-9. Online ahead of print.\*

Theis T, Kumar S, Wei E, Nguyen J, Glynos V, Paranjape N, Askarifirouzjaei H, Khajouienejad L, Berthiaume F, Young W, Schachner M (2020) Myristoylated alanine-rich C-kinase substrate effector domain peptide improves sex-specific recovery and axonal regrowth after spinal cord injury. *FASEB J* 34:12677-12690. \*

Wang M, Theis T, Kabat M, Loers G, Agre LA, Schachner M (2020) Functions of small organic compounds that mimic the HNK-1 glycan. *Int J Mol Sci* 21:7018.

Yoo M, Kayastha N, Kwon O, Man W, Cai L, Schachner M (2020) Analysis of the functional sequences in the promoter region of the human adhesion molecule close homolog of L1. *Int J Neurosci* 2020 Oct 15:1-8. doi: 10.1080/00207454.2020.1822357. Online ahead of print. \*

Zhang N, Liu C, Zhang R, Jin L, Yin X, Zheng X, Siebert H-C, Li Y, Wang Z, Loers G, Petridis AK (2020) Amelioration of clinical course and demyelination in the cuprizone mouse model in relation to ketogenic diet. *Food Funct* 11: 5647-5663.

Zhu JW, Zou MM, Li YF, Chen WJ, Liu JC, Chen H, Fang LP, Zhang Y, Wang ZT, Chen JB, Huang W, Li S, Jia WQ, Wang QQ, Zhen XC, Liu CF, Li S, Xiao ZC, Xu GQ, Schwamborn JC, Schachner M, Ma QH, Xu RX (2020) Absence of TRIM32 leads to reduced GABAergic interneuron generation and autism-like behaviors in mice via suppressing mTOR signaling. *Cereb Cortex* 30:3240-3258.\*

Fendler C, Denker C, Harberts J, Bayat P, Zierold R, Loers G, Münzenberg M, Blick RH (2019) Microscaffolds by direct laser writing for neurite guidance leading to tailor-made neuronal networks. *Adv Biosyst* 3: e1800329

Jiang Q, Xie Q, Hu C, Yang Z, Huang P, Shen H, Schachner M, Zhao W (2019) Glioma malignancy is linked to interdependent and inverse AMOG and L1 adhesion molecule expression. *BMC Cancer* 19:911.\*

Kleene R, Loers G, Jakovcevski I, Mishra B, Schachner M (2019) Histone H1 improves regeneration after mouse spinal cord injury and changes shape and gene expression of cultured astrocytes. *Restor Neurol Neurosci* 37:291-313.



Loers G, Liao Y, Hu C, Xue W, Shen H1, Zhao W, Schachner M (2019) Identification and characterization of synthetic chondroitin-4-sulfate binding peptides in neuronal functions. *Sci Rep* 9:1064.

Mohan V, Wade SD, Sullivan CS, Kasten MR, Sweetman C, Stewart R, Truong Y, Schachner M, Manis PB, Maness PF (2019) Close homolog of L1 regulates dendritic spine density in the mouse cerebral cortex through Semaphorin 3B. *J Neurosci* 39:6233-6250.\*

Sahu S, Li R, Loers G, Schachner M (2019) Knockdown of chondroitin-4-sulfotransferase-1, but not of dermatan-4-sulfotransferase-1, accelerates regeneration of zebrafish after spinal cord injury. *FASEB J* 33:2252-2262.

Er EE, Valiente M, Ganesh K, Zou Y, Agrawal S, Hu J, Griscom B, Rosenblum M, Boire A, Brogi E, Giancotti FG, Schachner M, Malladi S, Massagué J (2018) Pericyte-like spreading by disseminated cancer cells activates YAP and MRTF for metastatic colonization. *Nat Cell Biol* 20:966-978.\*

Fan Y, Xue W, Schachner M, Zhao W (2018) Honokiol eliminates glioma/glioblastoma stem cell-like cells via JAK-STAT3 signaling and inhibits tumor progression by targeting epidermal growth factor receptor. *Cancers (Basel)* 11:22.\*

Grüner F, Blumendorf F, Schmutzler O, Staufer T, Bradbury M, Wiesner U, Rosentreter T, Loers G, Lutz D, Richter B, Fischer M, Schulz F, Steiner S, Warmer M, Burkhardt A, Meents A, Kupinski M, Hoeschen C (2018) Localising functionalised gold-nanoparticles in murine spinal cords by X-ray fluorescence imaging and background-reduction through spatial filtering for human-sized objects. *Sci Rep* 8:16561.

Guseva D, Jakovcevski I, Irintchev A, Leshchyn'ska I, Sytnyk V, Ponimaskin E, Schachner M (2018) Cell Adhesion Molecule Close Homolog of L1 (CHL1) Guides the Regrowth of Regenerating Motor Axons and Regulates Synaptic Coverage of Motor Neurons. *Front Mol Neurosci* 11:174.

Koitmäe A, Müller M, Bausch CS, Harberts J, Hansen W, Loers G, Blick RH (2018) Designer neural networks with embedded semiconductor microtube arrays. *Langmuir* 34:1528-1534.

Kraus K, Kleene R, Braren I, Loers G, Lutz D, Schachner M (2018) A fragment of adhesion molecule L1 is imported into mitochondria, and regulates mitochondrial metabolism and trafficking. *J Cell Sci* 131:jcs210500.

Kraus K, Kleene R, Henis M, Braren I, Kataria H, Sharaf A, Loers G, Schachner M, Lutz D (2018) A fragment of adhesion molecule L1 binds to nuclear receptors to regulate synaptic plasticity and motor coordination. *Mol Neurobiol* 55:7164-7178.

Li R, Sahu S, Schachner M (2018) Phenelzine, a small organic compound mimicking the functions of cell adhesion molecule L1, promotes functional recovery after mouse spinal cord injury. *Restor Neurol Neurosci* 36:469-483.\*

Li R, Sahu S, Schachner M. (2018) Phenelzine, a cell adhesion molecule L1 mimetic small organic compound, promotes functional recovery and axonal regrowth in spinal cord-injured zebrafish. *Pharmacol Biochem Behav* 171:30-38.\*

Sahu S, Zhang Z, Li R, Hu J, Shen H, Loers G, Shen Y, Schachner M (2018) A small organic compound mimicking the L1 cell adhesion molecule promotes functional recovery after spinal cord injury in zebrafish. *Mol Neurobiol* 55:859-878.

Sahu S, Li R, Kadeyala PK, Liu S, Schachner M (2018) The human natural killer-1 (HNK-1) glycan mimetic ursolic acid promotes functional recovery after spinal cord injury in mouse. *J Nutr Biochem* 55:219-228.\*

Theis T, Johal AS, Kabat M, Basak S, Schachner M (2018) Enhanced neuronal survival and neurite outgrowth triggered by novel small organic compounds mimicking the LewisX glycan. *Mol Neurobiol* 55:8203-8215.\*

Wei Z, Zhao W, Schachner M (2018) Electroacupuncture restores locomotor functions after mouse spinal cord injury in correlation with reduction of PTEN and p53 expression. *Front.Mol Neurosci* 11:411.\*

## Leibniz Group Dendritic Organelles and Synaptic Function (Head: Dr. Michael R. Kreutz)

Andres-Alonso M, Kreutz MR, Karpova A (2020) Autophagy and the endolysosomal system in presynaptic function. *Cell Mol Life Sci.* 2020 Dec 19. doi: 10.1007/s00018-020-03722-5. Online ahead of print.

Bayraktar G, Yuanxiang P, Confettura AD, Gomes GM, Raza SA, Stork O, Tajima S, Suetake I, Karpova A, Yildirim F, Kreutz MR (2020) Synaptic control of DNA methylation involves activity-dependent degradation of DNMT3A1 in the nucleus. *Neuropsychopharmacology* 45:2120-2130.

Bucher M, Niebling S, Han Y, Molodenskiy D, Kreienkamp HJ, Svergun D, Kim E, Kostyukova AS, Kreutz MR, Mikhaylova M (2020) Autism associated SHANK3 missense point mutations impact conformational fluctuations and protein turnover at synapses. *bioRxiv* 2020.12.31.424970; <https://doi.org/10.1101/2020.12.31.424970>

Kopczynski D, Hentschel A, Coman C, Schebb NH, Hornemann T, Mashek DG, Hartung NM, Shevchuk O, Schött HF (2020) Simple targeted assays for metabolic pathways and signaling: a powerful tool for targeted proteomics. *Anal Chem* 92:13672-13676.

Vemula SK, Malci A, Junge L, Lehmann AC, Rama R, Hradsky J, Matute RA, Weber A, Prigge M, Naumann M, Kreutz MR, Seidenbecher CI, Gundelfinger ED, Herrera-Molina R (2020) The interaction of TRAF6 with neuroligin promotes spinogenesis during early neuronal development. *Front Cell Dev Biol* 9:8:579513. eCollection 2020.

Andres-Alonso M, Ammar MR, Butnaru I, Gomes GM, Sanhueza GA, Raman R, Yuanxiang PA, Borgmeyer M, Lopez-Rojas J, Raza SA, Brice N, Hausrat TJ, Macharadze T, Diaz-Gonzalez S, Carlton M, Failla AV, Stork O, Schweizer M, Gundelfinger ED, Kneussel M, Spilker C, Karpova A, Kreutz MR (2019) SIPA1L2 controls trafficking and local signaling of TrkB-containing amphisomes at presynaptic terminals. *Nat Commun* 10: 5448.

Kiran U, Kreutz MR, Sharma Y, Chakraborty A (2019) Tryptophan scanning mutagenesis of EF-hand motifs. *Methods Mol Biol* 1929:567-581.

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, MacGillivray 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, Sudhof TC, Tilgner HU, Bagni C, Bayes A, 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 e214.

Lombino FL, Muhia M, Lopez-Rojas J, Brill MS, Thies E, Ruschkies L, Lutz D, Richter M, Hausrat TJ, Lopes AT, McNally FJ, Hermans-Borgmeyer I, Dunleavy JEM, Hoffmeister-Ullerich S, Frotscher M, Misgeld T, Kreutz MR, de Anda FC, Kneussel M (2019) The microtubule severing protein katanin regulates proliferation of neuronal progenitors in embryonic and adult neurogenesis. *Sci Rep* 9:15940.

Meka DP, Scharrenberg R, Zhao B, Koenig T, Schaefer I, Schwanke B, Kobler O, Klykov S, Richter M, Eggert D, Windhorst S, Dotti CG, Kreutz MR, Mikhaylova M, Calderon de Anda F (2019) Radial F-actin organization during early neuronal development. *EMBO Rep* 20:e47743

Mundhenk J, Fusi C, Kreutz MR (2019) Caldendrin and Calneurons-EF-Hand CaM-Like Calcium Sensors With Unique Features and Specialized Neuronal Functions. *Front Mol Neurosci* 12:16.

Neumann JR, Dash-Wagh S, Jack A, Räk A, Jüngling K, Hamad MIK, Pape HC, Kreutz MR Puskarjov M,

Wahle P (2019) The primate-specific peptide Y-P30 regulates morphological maturation of neocortical dendritic spines. *PLoS One* 14(2):e0211151.

Angelats E, Requesens M, Aguinaga D, Kreutz MR, Franco R, Navarro G (2018) Neuronal calcium and cAMP cross-talk mediated by cannabinoid CB1 receptor and EF-hand calcium sensor interactions. *Front Cell Dev Biol* 6:67.

Bayraktar G, Kreutz MR (2018) Neuronal DNA methyltransferases: epigenetic mediators between synaptic activity and gene expression? *Neuroscientist* 24:171-18.

Bayraktar G, Kreutz MR (2018) The role of activity-dependent DNA demethylation in the adult brain and in neurological disorders. *Front Mol Neurosci* 11:169.

Dumenieu M, Senkov O, Mironov A, Bourinet E, Kreutz MR, Dityatev A, Heine M, Bikbaev A, Lopez-Rojas J (2018) The low-threshold calcium channel Cav3.2 mediates burst firing of mature dentate granule cells. *Cereb Cortex* 28:2594-2609.

Franco R, Aguinaga D, Reyes I, Canela EI, Lillo J, Tarutani A, Hasegawa M, Del Ser-Badia A, Del Rio JA, Kreutz MR, Saura CA, Navarro G (2018) N-Methyl-D-Aspartate Receptor Link to the MAP Kinase Pathway in Cortical and Hippocampal Neurons and Microglia Is Dependent on Calcium Sensors and Is Blocked by alpha-Synuclein, Tau, and Phospho-Tau in Non-transgenic and Transgenic APPSw, Ind Mice. *Front Mol Neurosci* 11:273.

Kaushik R, Morkovin E, Schneeberg J, Confettura AD, Kreutz MR, Senkov O, Dityatev A (2018) Traditional Japanese Herbal Medicine Yokukansan Targets Distinct but Overlapping Mechanisms in Aged Mice and in the 5xFAD Mouse Model of Alzheimer's Disease. *Front Aging Neurosci* 10:411. eCollection 2018.

Mikhaylova M\*, Bär J, van Bommel B, Schätzle P, YuanXiang PY, Raman R, Hradsky J, Konietzny A, Loktionov EY, Reddy PP, Lopez-Rojas J, Spilker C, Kobler O, Raza SA, Stork O, Hoogenraad CC, Kreutz MR\* (2018) Caldendrin directly couples postsynaptic calcium signals to actin-remodeling in dendritic spines. *Neuron* 97:1110-1125 e1114.

Yun D, Zhuang Y, Kreutz MR, Behnisch T (2018) The role of 19S proteasome associated deubiquitinases in activity-dependent hippocampal synaptic plasticity. *Neuropharmacology* 133:354-365.

### Core Facility Electron Microscopy and Morphology (Head: Dr. Michaela Schweizer)

Arnold J, Schattschneider J, Blechner C, Krisp C, Schlüter H, Schweizer M, Nalaskowski M, Oliveira-Ferrer L, Windhorst S (2020) Tubulin Tyrosine Ligase Like 4 (TLL4) overexpression in breast cancer cells is associated with brain metastasis and alters exosome biogenesis. *J Exp Clin Cancer Res* 39:205.

Feyen DAM, McKeithan WL, Bruyneel AAN, Spiering S, Hörmann L, Ulmer B, Zhang H, Briganti F, Schweizer M, Hegyi B, Liao Z, Pölönen RP, Ginsburg KS, Lam CK, Serrano R, Wahlquist C, Kreymerman A, Vu M, Amatya PL, Behrens CS, Ranjbarvaziri S, Maas RGC, Greenhaw M, Bernstein D, Wu JC, Bers DM, Eschenhagen T, Metallo CM, Mercola M (2020) Metabolic maturation media improve physiological function of human iPSC-derived cardiomyocytes. *Cell Rep* 32:107925.

Hendrickx G, Danyukova T, Baranowsky A, Rolvien T, Angermann A, Schweizer M, Keller J, Schröder J, Meyer-Schwesinger C, Muschol N, Paganini C, Rossi A6, Amling M, Pohl S1, Schinke T (2020) Enzyme replacement therapy in mice lacking arylsulfatase B targets bone remodeling cells, but not chondrocytes. *Hum Mol Genet* 29:803-816.

Hendrickx G, Fischer V, Liedert A, Simon von Kroge S, Haffner-Luntzer M, Brylka L, Pawlus E, Schweizer M, Yorgan T, Baranowsky A, Rolvien T, Neven M, Schumacher U, Beech DJ, Amling M, Ignatius A, Schinke T (2020) Piezo1 inactivation in chondrocytes impairs trabecular bone formation. *J Bone Miner Res* 2020 Nov 12. doi: 10.1002/jbmr.4198. Online ahead of print.

Hermann M, Reumann R, Schostak K, Kement D, Gelderblom M, Bernreuther C, Frischknecht R, Schipanski A, Marik S, Krasemann S, Sepulveda-Falla D, Schweizer M, Magnus T, Glatzel M, Galliciotti G (2020) Deficits in developmental neurogenesis and dendritic spine maturation in mice lacking the serine protease inhibitor neuroserpin. *Mol Cell Neurosci* 102:103420.

Lopes AT, Hausrat TJ, Heisler FF, Gromova KV, Lombino FL, Fischer T, Ruschkies L, Breiden P, Thies E, Hermans-Borgmeyer I, Schweizer M, Schwarz JR, Lohr C, Kneussel M (2020) Spastin depletion increases tubulin polyglutamylation and impairs kinesin-mediated neuronal transport, leading to working and associative memory deficits. *PLoS Biol* 18:e3000820.

Madsen A, Höppner G, Krause J, Hirt MN, Laufer SD, Schweizer M, Wen Tan WL, Mosqueira D, Anene-Nzelu CG, Lim I, Foo RSY, Eschenhagen T, Stenzig J (2020) An Important role for DNMT3A-mediated DNA methylation in cardiomyocyte metabolism and contractility. *Circulation* 142:1562-1578.

Mailer RK, Allende M, Heestermans M, Schweizer M, Deppermann C, Frye M, Pula G, Odeberg J, Gelderblom MP, Rose-John S, Sickmann A, Blankenberg S, Huber TB, Kubisch C, Maas C, Gambaryan S, Firsov D, Stavrou EX, Butler L, Renné T (2020) Xenotropic and polytropic retrovirus receptor 1 regulates procoagulant platelet polyphosphate. *Blood* blood.2019004617. Online ahead of print.

Müller-Komorowska D, Opitz T, Elzoheiry S, Schweizer M, Ambrad Giovannetti E, Beck H (2020) Nonspecific expression in limited excitatory cell populations in interneuron-targeting Cre-driver lines can have large functional effects. *Front Neural Circuits* 14:16.

Westermann LM, Lutz Fleischhauer L, Vogel J, Jenei-Lanzl Z, Ludwig NF, Schau L, Morellini F, Baranowsky A, Yorgan TA, Di Lorenzo G, Schweizer M, de Souza Pinheiro B, Guarany NR, Sperb-Ludwig F, Visioli F, Silva TO, Soul J, Hendrickx G, Wiegert JS, Schwartz IVD, Clausen-Schaumann H, Zaucke F, Schinke T, Pohl S, Danyukova T (2020) Imbalanced cellular metabolism compromises cartilage homeostasis and joint function in a mouse model of mucopolysaccharidosis type III gamma. *Dis Model Mech* 13:dmm046425.

Andres-Alonso M, Ammar MR, Butnaru I, Gomes GM, Sanhueza GA, Raman R, Yuanxiang PA, Borgmeyer M, Lopez-Rojas J, Raza SA, Brice N, Hausrat TJ, Macharadze T, Diaz-Gonzalez S, Carlton M, Failla AV, Stork O, Schweizer M, Gundelfinger ED, Kneussel M, Spilker C, Karpova A, Kreutz MR (2019) SIPA1L2 controls trafficking and local signaling of TrkB-containing amphisomes at presynaptic terminals. *Nat Commun* 10: 5448.

Reinicke AT, Laban K, Sachs M, Kraus V, Walden M, Damme M, Sachs W, Reichelt J, Schweizer M, Janiesch PC, Duncan KE, Saftig P, Rinschen MM, Morellini F, Meyer-Schwesinger C (2019) Ubiquitin C-terminal hydrolase L1 (UCH-L1) loss causes neurodegeneration by altering protein turnover in the first postnatal weeks. *Proc Natl Acad Sci U S A* 116:7963-7972.

Richter M, Murtaza N, Scharrenberg R, White S, Johanns O, Walker S, Yuen RK, Schwanke B, Bedürftig B, Henis M, Scharf S, Kraus V, Dörk R, Hellmann J, Lindenmaier Z, Ellegood J, Hartung H, Kwan V, Sedlacik J, Fiehler J, Schweizer M, Lerch JP, Hanganu-Opatz I, Morellini F, Scherer SW, Singh KK, Calderon de Anda F (2019) Altered TAOX2 activity causes autism-related neurodevelopmental and cognitive abnormalities through RhoA signaling. *Mol Psychiatry* 24:1329-1350.

Roesler MK, Lombino FL, Freitag S, Schweizer M, Hermans-Borgmeyer I, Schwarz JR, Kneussel M, Wagner W (2019) Myosin XVI Regulates Actin Cytoskeleton Dynamics in Dendritic Spines of Purkinje Cells and Affects Presynaptic Organization. *Front Cell Neurosci* 13:330.

Schmidtke C, Tiede S, Thelen M, Kakela R, Jabs S, Makrypidi G, Sylvester M, Schweizer M, Braren I, Brocke-Ahmadinejad N, Cotman SL, Schulz A, Gieselmann V, Bräulke T (2019) Lysosomal proteome analysis reveals that CLN3-defective cells have multiple enzyme deficiencies associated with changes in intracellular trafficking. *J Biol Chem* 294:9592-9604.

Schob C, Morellini F, Ohana O, Bakota L, Hrynychak MV, Brandt R, Brockmann MD, Cichon N, Hartung H, Hanganu-Opatz IL, Kraus V, Scharf S, Herrmans-Borgmeyer I, Schweizer M, Kuhl D, Woehr M, Vorckel KJ, Calzada-Wack J, Fuchs H, Gailus-Durner V, Hrabe de Angelis M, Garner CC, Kreienkamp HJ, Kindler S (2019) Cognitive impairment and autistic-like behaviour in SAPAP4-deficient mice. *Transl Psychiatry* 9:7.

Tenedini FM, Saez Gonzalez M, Hu C, Pedersen LH, Petruzzi MM, Spitzweck B, Wang D, Richter M, Petersen M, Szpotowicz E, Schweizer M, Sigrist SJ, Calderon de Anda F, Soba P (2019) Maintenance of cell type-specific connectivity and circuit function requires Tao kinase. *Nat Commun* 10:3506.

Wagner W, Lippmann K, Heisler FF, Gromova KV, Lombino FL, Roesler MK, Pechmann Y, Hornig S, Schweizer M, Polo S, Schwarz JR, Eilers J, Kneussel M (2019) Myosin VI drives clathrin-mediated AMPA receptor endocytosis to facilitate cerebellar long-term depression. *Cell Rep* 28:11-20.e9.

Di Lorenzo G, Velho RV, Winter D, Thelen M, Ahmadi S, Schweizer M, De Pace R, Cornils K, Yorgan TA, Grüb S, Hermans-Borgmeyer I, Schinke T, Müller-Loennies S, Bräulke T, Pohl S (2018) Lysosomal proteome and secretome analysis identifies missorted enzymes and their nondegraded substrates in mucopolidosis III mouse cells. *Mol Cell Proteomics* 17:1612-1626.

Gonzalez AC, Schweizer M, Jagdmann S, Bernreuther C, Reinheckel T, Saftig P, Damme M (2018) Unconventional trafficking of mammalian phospholipase D3 to lysosomes. *Cell Rep* 22:1040-1053.

Heisler FF, Pechmann Y, Wieser I, Altmeyen HC, Veenendaal L, Muhia M, Schweizer M, Glatzel M, Krasemann S, Kneussel M (2018) Muskeln koordiniert PrPC 1 Lysosom versus Exosom-Targeting und beeinflusst Prion-Erkrankungsprogression. *Neuron* 99:1155-1169.e9.

Luther J, Yorgan T A, Rolvien T, Ulsamer L, Koehne T, Liao N, Keller D, Vollersen N, Teufel S, Neven M, Peters S, Schweizer M, Trumpp A, Rosigkeit S, Bockamp E, Mundlos S, Kornak U, Oheim R, Amling M, Schinke T, David J (2018) Wnt1 is an Lrp5-independent bone-anabolic Wnt ligand. *Sci Transl Med* 10:466

Nauth T, Huschka F, Schweizer M, Bosse JB, Diepold A, Failla AV, Steffen A, Stradal T, Wolters M, Aepfelbacher M (2018) Visualization of translocons in Yersinia type III protein secretion machines during host cell infection. *PLoS Pathog* 14:e1007527. eCollection 2018 Dec.

Pohl S, Angermann A, Jeschke A, Hendrickx G, Yorgan TA, Makrypidi-Fraune G, Steigert A, Kuehn SC, Rolvien T, Schweizer M, Koehne T, Neven M, Winter O, Velho RV, Albers J, Streichert T, Pestka JM, Baldauf C, Breyer S, Stuecker R, Muschol N, Cox TM, Saftig P, Paganini C, Rossi A, Amling M, Bräulke T, Schinke T (2018) The Lysosomal Protein Arylsulfatase B Is a Key Enzyme Involved in Skeletal Turnover. *J Bone Miner Res* 33:2186-2201.

Schmiesing J, Storch S, Dörfler AC, Schweizer M, Makrypidi-Fraune G, Thelen M, Sylvester M, Gieselmann V, Meyer-Schwesinger C, Koch-Nolte F, Tidow H, Mühlhausen C, Waheed A, Sly WS, Bräulke T (2018) Disease-Linked Glutarylation Impairs Function and Interactions of Mitochondrial Proteins and Contributes to Mitochondrial Heterogeneity. *Cell Rep* 24:2946-2956.

Seipold L, Altmeyen H, Koudelka T, Tholey A, Kasperek P, Sedlacek R, Schweizer M, Bar J, Mikhaylova M, Glatzel M, Saftig P (2018) In vivo regulation of the A disintegrin and metalloproteinase 10 (ADAM10) by the tetraspanin 15. *Cell Mol Life Sci* 75:3251-3267.

### Core Facility Transgenic Mouse Facility (Head: Priv.-Doz. Dr. Irm Hermans-Borgmeyer)

Kleene R, Lutz D, Loers G, Bork U, Borgmeyer U, Hermans-Borgmeyer I, Schachner M (2020) Revisiting the proteolytic processing of cell adhesion molecule L1. *J Neurochem* 2020 Sep 28. doi: 10.1111/jnc.15201. Online ahead of print.

Lopes AT, Hausrat TJ, Heisler FF, Gromova KV, Lombino FL, Fischer T, Ruschkies L, Breiden P, Thies E, Hermans-Borgmeyer I, Schweizer M, Schwarz JR, Lohr C, Kneussel M (2020) Spastin depletion increases tubulin polyglutamylation and impairs kinesin-mediated neuronal transport, leading to working and

associative memory deficits. *PLoS Biol* 18:e3000820.

Lossow K, Hermans-Borgmeyer I, Meyerhof W, Behrens M (2020) Segregated expression of ENaC subunits in taste cells. *Chem Senses* 45:235-248.

Meyer-Schwesinger C, Tomas NM, Dehde S, Seifert L, Hermans-Borgmeyer I, Wiech T, Koch-Nolte F, Huber TB, Zahner G (2020) A novel mouse model of phospholipase A2 receptor 1-associated membranous nephropathy mimics podocyte injury in patients. *Kidney Int* 97:913-919.

Müller M, Manrique S, Schumacher N, Wall SA, Jung J, Damm T, Glüer CC, Scheller J, Rose-John S, Jones EY, Laurence A, Wilkie AOM, Schmidt-Arras D, Uhlig HH (2020) A variant in IL6ST with a selective IL-11 signaling defect in human and mouse. *Bone Res* 8:24. eCollection 2020.

Rolvien T, Yorgan TA, Kornak U, Hermans-Borgmeyer I, Mundlos S, Schmidt T, Niemeier A, Schinke T, Amling M, Oheim R (2020) Skeletal deterioration in COL2A1-related spondyloepiphyseal dysplasia occurs prior to osteoarthritis. *Osteoarthritis Cartilage* 28:334-343.

Vogel JK, Weider M, Engler LA, Hillgärtner S, Schmitt C, Hermans-Borgmeyer I, Wegner M (2020) Sox9 overexpression exerts multiple stage-dependent effects on mouse spinal cord development. *Glia* 68:932-946.

Yorgan T, Rolvien T, Stürznickel J, Vollersen N, Lange F, Zhao W, Baranowsky A, Rosenthal L, Hermans-Borgmeyer I, Sharaf A, Karsak M, David J, Oheim R, Amling M, Schinke T (2020) Mice carrying a ubiquitous R235W mutation of Wnt1 display a bone-specific phenotype. *J Bone Miner Res* 35:1726-1737.

Roesler MK, Lombino FL, Freitag S, Schweizer M, Hermans-Borgmeyer I, Schwarz JR, Kneussel M, Wagner W (2019) Myosin XVI Regulates Actin Cytoskeleton Dynamics in Dendritic Spines of Purkinje Cells and Affects Presynaptic Organization. *Front Cell Neurosci* 13:330.

Schob C, Morellini F, Ohana O, Bakota L, Hrynychak MV, Brandt R, Brockmann MD, Cichon N, Hartung H, Hanganu-Opatz IL, Kraus V, Scharf S, Herrmans-Borgmeyer I, Schweizer M, Kuhl D, Woehr M, Vorckel KJ, Calzada-Wack J, Fuchs H, Gailus-Durner V, Hrabe de Angelis M, Garner CC, Kreienkamp HJ, Kindler S (2019) Cognitive impairment and autistic-like behaviour in SAPAP4-deficient mice. *Transl Psychiatry* 9:7.

Vogel JK, Weider M, Engler LA, Hillgärtner S, Schmitt C, Hermans-Borgmeyer I, Wegner M (2019) Sox9 overexpression exerts multiple stage-dependent effects on mouse spinal cord development. *Glia* 68:932-946.

Di Lorenzo G, Velho RV, Winter D, Thelen M, Ahmadi S, Schweizer M, De Pace R, Cornils K, Yorgan TA, Grüb S, Hermans-Borgmeyer I, Schinke T, Müller-Loennies S, Bräulke T, Pohl S (2018) Lysosomal proteome and secretome analysis identifies missorted enzymes and their nondegraded substrates in mucopolipidosis III mouse cells. *Mol Cell Proteomics* 17:1612-1626.

Stockebrand M, Sasani A, Das D, Hornig S, Hermans-Borgmeyer I, Lake HA, Isbrandt D, Lygate CA, Heerschap A, Neu A, Choe CU (2018) A Mouse Model of Creatine Transporter Deficiency Reveals Impaired Motor Function and Muscle Energy Metabolism. *Front Physiol* 9:773.

Vollersen N, Hermans-Borgmeyer I, Cornils K, Fehse B, Rolvien T, Triviai I, Jeschke A, Oheim R, Amling M, Schinke T, Yorgan TA (2018) High bone turnover in mice carrying a pathogenic Notch2-mutation causing Hajdu-Cheney syndrome. *J Bone Miner Res* 33:70-83.

## Core Facility Bioanalytics (Head: Priv.-Doz. Dr. Sabine Hoffmeister-Ullerich)

Hoffmeister-Ullerich S (2020) Competitive and clonal dominance behavior: raising awareness of their role in shape generation. *Bioessays* 42:2000127

Hermey G, Hoffmeister-Ullerich SA, Merz B, Gross D, Kuhl D, Kins S (2019) Amyloidosis causes downregulation of SorLA, SorCS1 and SorCS3 expression in mice. *Biol Chem* 400:1181-1189.

Lombino FL, Muhia M, Lopez-Rojas J, Brill MS, Thies E, Ruschkies L, Lutz D, Richter M, Hausrat TJ, Lopes AT, McNally FJ, Hermans-Borgmeyer I, Dunleavy JEM, Hoffmeister-Ullerich S, Frotscher M, Misgeld T, Kreuz MR, de Anda FC, Kneussel M (2019) The microtubule severing protein katanin regulates proliferation of neuronal progenitors in embryonic and adult neurogenesis. *Sci Rep*9:15940.