

Curriculum Vitae

Markus Breu, MD, PhD, BA

Date of Birth: Jan 29, 1988
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Current position: Specialist in Pediatrics (Facharzt)
Division of Pediatric Neurology,
Department of Pediatrics and Adolescent
Medicine,
Medical University Vienna
Währinger Gürtel 18-20,
1090 Vienna, Austria



Clinical/Scientific Focus: Neuroimmunology
Antibody-associated neurological diseases
Pediatric onset multiple sclerosis

Education:

2006-2013: Medizinische Universität Wien (Medical University Vienna, MUV),
Human medicine (Dr. med. univ., Graduation: 2.7.2013)
2008-2018: Universität Wien (University of Vienna), BA Philosophy
2010-2011: Chung Shan Medical University, Taichung, Taiwan, ROC; Internships in Internal
Medicine, Surgery, Emergency Medicine
2011-2012: Johns Hopkins University, Kennedy Krieger Institute and Department of Neurology;
pre-doctoral research trainee (1 year), Supervisor: Ass. Prof. Dr. Ali Fatemi (Prof.
Dr. M.V. Johnston Lab)
Jan 2013: Medizinski Universitet Sofia, Bulgaria; Internship in OB-GYN
2013-2020: MUV, PhD-studies (Division of Neuropathology and Neurochemistry, PhD-program
Clinical Neurosciences)
2018-present: Universität Wien (University of Vienna), MA Ethics
2021: Zertifikatsprogramm Medizinische Lehre Wien (MLW, Diploma of Medical
Education)

Academic and Hospital Appointments:

Residency: Nov 2013-June 2020: MUV, Department of Pediatrics and Adolescent Medicine,
Division of Pediatric Neurology
Fellowship: July 2020-present: MUV, Department of Pediatrics and Adolescent Medicine,
Division of Pediatric Neurology

Representative Positions:

- 2018-present: Archivist of the Österreichische Gesellschaft für Kinder- und Jugendheilkunde (ÖGKJ, Austrian Pediatric Society)
- 2018-present: Founding Member of Kommission Junge Neuropädiatrie der Gesellschaft für Neuropädiatrie (GNP; Trainee branch of the German-speaking Pediatric Neurology Society)

Research:

Grants

- Medical Scientific Fund of the Mayor of the City of Vienna, Project: Viral Shedding of SARS-CoV2 in Children with Chronic Disease, Project No. COVID034 (€ 10.000,- ad personam)

Awards and Stipends:

- Travel Award of the Student Representation for Postgraduate Studies, summer 2016
- Travel Award of the 11th European Congress of Neuropathology, July 2016 Bordeaux, France
- Travel Award of the Hershey Conference of Developmental Brain Injury, June 2012 London, UK
- Poster Award of the ESMRN Conference, June 2013 Vienna, Austria
- Merit Stipend of the Medical University of Vienna for the study year 2012/2013

Diploma Thesis:

- *Clinical Characteristics of Childhood Epilepsy Patients with Special Focus on Hippocampal Sclerosis*; Epilepsy Monitoring Unit, Department of Pediatrics and Adolescent Medicine, Medical University Vienna; Supervisors: Dr.Dr. Angelika Mühlebner-Fahrngruber, Prof. Dr. Martha Feucht; May 2013

Doctoral Thesis:

- *Antibody-associated Neurological Diseases*, Division of Neuropathology and Neurochemistry, Department of Neurology, Medical University of Vienna, Supervisor: Assoc.-Prof. PD. Dr. Romana Höftberger

Peer-reviewed Publications:

- 1 Zrzavy T, Endmayr V, Bauer J, Macher S, Mossaheb N, Schwaiger C, Ricken G, Winklehner M, Glatter S, Breu M, Wimmer I, Kovacs GG, Risser DU, Klupp N, Simonitsch-Klupp I, Roetzer T, Rommer P, Berger T, Gelpi E, Lassmann H, Graus F, Dalmau J, Höftberger R. **Neuropathological variability within a spectrum of NMDAR-encephalitis.** Ann Neurol. 2021 Sep 25. doi: 10.1002/ana.26223. Online ahead of print. PMID: 34562035
- 2 Breu M, Häfele C, Trimmel-Schwahofer P, Schmidt WM, Laconne F, Vodopiutz J, Male C, Dressler A: **The relation of etiology based on the 2017 ILAE classification to the effectiveness of the ketogenic diet in drug-resistant epilepsy in childhood.** Epilepsia. 2021 Aug 28. doi: 10.1111/epi.17052. Online ahead of print. PMID: 34453316
- 3 Breu M, Häfele C, Glatter S, Trimmel-Schwahofer P, Golej J, Male C, Feucht M, Dressler A: **Ketogenic Diet in the Treatment of Super-Refractory Status Epilepticus at a Pediatric Intensive Care Unit: A Single-Center Experience.** Front Neurol. 2021 Jun 3;12:669296. doi: 10.3389/fneur.2021.669296. eCollection 2021. PMID: 34149600
- 4 Bruijstens A, Lechner C, Flet-Berliac L, Deiva K, Neuteboom RF, Hemingway C, Wassmer E;

- E.U. paediatric MOG consortium. ***E.U. paediatric MOG consortium consensus: Part 1 – Classification of clinical phenotypes of paediatric myelin oligodendrocyte glycoprotein antibody-associated disorders.*** Eur J Paediatr Neurol. 2020 Nov;29:2-13. doi: 10.1016/j.ejpn.2020.10.006. Epub 2020 Nov 4., PMID: 33162302 Review. Collaborators: E.U. paediatric MOG consortium: Bruijstens AL; Wendel EM; Lechner C; Breu M; Flet-Berliac L; de Chalus A; Capobianco M; Giorgi L; Hemingway C; Wassmer E; Lim M; Wickström R; Armangue T; Deiva K; Neuteboom RF
- 5 Baumann M; Bartels F; Finke C; Adamsbaum C; Hacoheh Y; Rostásy K; E.U. paediatric MOG consortium: ***E.U. paediatric MOG consortium consensus: Part 2 - Neuroimaging features of paediatric myelin oligodendrocyte glycoprotein antibody-associated disorders*** Review DOI: 10.1016/j.ejpn.2020.10.002 PMID: 33158737 Collaborators: E.U. paediatric MOG consortium: Bruijstens AL; Wendel EM; Lechner C; Breu M; Flet-Berliac L; de Chalus; A; Capobianco M; Giorgi L; Hemingway C; Wassmer E; Lim M; Wickström R; Armangue T; Deiva K; Neuteboom RF
- 6 Armangue T, Capobianco M, de Chalus A, Laetitia G, Deiva K; E.U. paediatric MOG consortium. ***E.U. paediatric MOG consortium consensus: Part 3 - Biomarkers of paediatric myelin oligodendrocyte glycoprotein antibody-associated disorders.*** Eur J Paediatr Neurol. 2020 Nov;29:22-31. doi: 10.1016/j.ejpn.2020.11.001. Epub 2020 Nov 7. PMID: 33191096 Review. Collaborators: E.U. paediatric MOG consortium: Bruijstens AL; Wendel EM; Lechner C; Bartels F; Finke C; Breu M; Flet-Berliac L; Adamsbaum C; Hacoheh Y; Hemingway C; Wassmer E; Lim M; Baumann M; Wickström R; Rostasy K; Neuteboom RF
- 7 Bruijstens AL, Breu M, Wendel EM, Wassmer E, Lim M, Neuteboom RF, Wickström R; E.U. paediatric MOG consortium. ***E.U. paediatric MOG consortium consensus: Part 4 - Outcome of paediatric myelin oligodendrocyte glycoprotein antibody-associated disorders.*** Eur J Paediatr Neurol. 2020 Nov;29:32-40. doi: 10.1016/j.ejpn.2020.10.007. Epub 2020 Nov 4. PMID: 33183945 Review.
- 8 Bruijstens AL, Wendel EM, Lechner C, Bartels F, Finke C, Breu M, Flet-Berliac L, de Chalus A, Adamsbaum C, Capobianco M, Laetitia G, Hacoheh Y, Hemingway C, Wassmer E, Lim M, Baumann M, Wickström R, Armangue T, Rostasy K, Deiva K, Neuteboom RF. ***E.U. paediatric MOG consortium consensus: Part 5 - Treatment of paediatric myelin oligodendrocyte glycoprotein antibody-associated disorders.*** Eur J Paediatr Neurol. 2020 Nov;29:41-53. doi: 10.1016/j.ejpn.2020.10.005. Epub 2020 Nov 4. PMID: 33176999 Review.
- 9 Jarius S; Lechner C; Wendel EM; Baumann M; Breu M; Schimmel M; Karenfort M; Della Marina A; Merckenschlager A; Thiels C; Blaschek A; Salandin M; Leiz S; Leypoldt F; Pschibul A; Hackenberg A; Hahn A; Syrbe S; Strautmanis J; Häusler M; Krieg P; Eisenkölbl A; Stoffels J; Eckenweiler M; Ayzenberg I; Haas J; Kleiter J; Korporal-Kuhnke M; Ringelstein M; Rommer PS; Ruprecht K; Siebert N; Schanda K; Aktas O; Friedemann P; Reindl M; Wildemann B; Rostasy K: ***Cerebrospinal fluid findings in patients with myelin oligodendrocyte glycoprotein (MOG) antibodies. Part 2: Results from 108 lumbar punctures in 80 pediatric patients.*** J Neuroinflammation. 2020 Sep 3;17(1):262. doi: 10.1186/s12974-020-01825-1. PMID:32883358
- 10 Paolilo RB, Hacoheh Y, Yazbeck E, Armangue T, Bruijstens A, Lechner C, Apostolos-Pereira SL, Martynenko Y, Breu M, de Medeiros Rimkus C, Wassmer E, Baumann M, Papetti L, Capobianco M, Kornek B, Rostásy K, da Paz JA, Cicarelli O, Lim M, Saiz A, Neuteboom R, Marignier R, Hemingway C, Sato DK, Deiva K. ***Treatment and outcome of aquaporin-4 antibody-positive NMOSD: A multinational pediatric study.*** Neurol Neuroimmunol

Neuroinflamm. 2020 Jul 30; 7(5):e837. doi: 10.1212/NXI.0000000000000837. Print 2020 Sep. PMID: 32732259

- 11 Lechner C, Breu M, Wendel EM, Kornek B, Schanda K, Baumann M, Reindl M, Rostásy K. ***Epidemiology of Pediatric NMOSD in Germany and Austria.*** Front Neurol. 2020 May 15;11:415. doi: 10.3389/fneur.2020.00415. eCollection 2020. PMID: 32670175
- 12 De Simoni D, Ricken G, Winklehner M, Koneczny I, Karenfort M, Hustedt U, Seidel U, Abdel-Mannan O, Munot P, Rinaldi S, Steen C, Freilinger M, Breu M, Seidl R, Reindl M, Wanschitz J, Lleixà C, Bernert G, Wandinger KP, Junker R, Querol L, Leyboldt F, Rostásy K, Höftberger R. ***Antibodies to nodal/paranodal proteins in paediatric immune-mediated neuropathy.*** Neurol Neuroimmunol Neuroinflamm. 2020 Jun 2;7(4):e763. doi: 10.1212/NXI.00000000000000763. Print 2020 Jul. PMID: 32487720
- 13 Wegener-Panzer A, Cleaveland R, Wendel EM, Baumann M, Bertolini A, Häusler M, Knierim E, Reiter-Fink E, Breu M, Sönmez Ö, Della Marina A, Peters R, Lechner C, Piepkorn M, Roll C, Höftberger R, Leyboldt F, Reindl M, Rostásy K.: ***Clinical and imaging features of children with autoimmune encephalitis and MOG antibodies.*** Neurol Neuroimmunol Neuroinflamm. 2020 May 1;7(4). pii: e731. doi: 10.1212/NXI.0000000000000731. Print 2020 Jul. PMID: 32358225
- 14 Bartels F, Krohn S, Nikolaus M, Johannsen J, Wickström R, Schimmel M, Häusler M, Berger A, Breu M, Blankenburg M, Stoffels J, Hendricks O, Bernert G, Kurlemann G, Knierim E, Kaindl A, Rostásy K, Finke C.: ***Clinical and MRI Outcome Predictors in Pediatric Anti-NMDA Receptor Encephalitis.*** Ann Neurol. 2020 Apr 21. doi: 10.1002/ana.25754 PMID:32314416
- 15 Breu M, Reisinger D, Tao L, Wu D, Zhang Y, Budde MD, Fatemi A, Pathak AP, Zhang J. ***In vivo high-resolution diffusion tensor imaging of the developing neonatal rat cortex and its relationship to glial and dendritic maturation.*** Brain Struct Funct. 2019 Jun;224(5):1815-1829. doi: 10.1007/s00429-019-01878-w. Epub 2019 Apr 22. PMID: 31011813
- 16 Breu M, Glatter S, Höftberger R, Freilinger M, Kircher K, Kasprian G, Seidl R, Kornek B: ***Two Cases of Pediatric AQP4-Antibody Positive Neuromyelitis Optica Spectrum Disorder Successfully Treated with Tocilizumab.*** Neuropediatrics. 2019 Jun;50(3):193-196. doi: 10.1055/s-0039-1684004. Epub 2019 Mar 26. PMID: 30913570
- 17 Körtvélyessy P*, Breu M*, Pawlitzki M, Metz I, Heinze HJ, Matzke M, Mawrin C, Rommer P, Kovacs GG, Mitter C, Reindl M, Brück W, Wandinger KP, Lassmann H, Höftberger R, Leyboldt F. ***ADEM-like presentation, anti-MOG antibodies, and MS pathology: Two case reports.*** Neurol Neuroimmunol Neuroinflamm. 2017 Mar 14;4(3):e335. PMID: 28331892 (* Both authors contributed equally to this paper)
- 18 Breu M, Zhang J, Porambo M, Pletnikov MV, Goeral K, Kakara M, Johnston MV, Fatemi A: ***Diffusion Tensor Imaging Abnormalities in the Cerebral White Matter Correlate with Sex-Dependent Neurobehavioral Deficits in Adult Mice with Neonatal Ischemia.*** Dev Neurosci. 2016 Mar 16. PMID: 26977597
- 19 Mühlebner A, Breu M, Kasprian G, Schmook MT, Stefanits H, Scholl T, Samueli S, Gröppel G, Dressler A, Prayer D, Czech T, Hainfellner JA, Feucht M: ***Childhood onset temporal lobe epilepsy: Beyond hippocampal sclerosis.*** Eur J Paediatr Neurol. 2016 Mar;20(2):228-35. doi: 10.1016/j.ejpn.2015.12.010. Epub 2015 Dec 31. PMID:26791392
- 20 Falahati S*, Breu M*, Goeral K, Waickman AT, Phillips AW, Arauz EJ, Snyder S, Porambo M, Goeral K, Comi A, Wilson MA, Johnston MV, Fatemi A: ***Ischemia Induced Neuroinflammation is Associated with Disrupted Development of Oligodendrocyte Progenitors in a Model of Periventricular Leukomalacia.*** Dev Neurosci. 2013;35(2-3):182-

96. doi: 10.1159/000346682. Epub 2013 Feb 27. PMID:23445614 (* Both authors contributed equally to this paper)

Other publications:

1. Lechner C, Beddies T, Breu M, Kerbl R, Karall D (Hrsg.): ***Hans Asperger und die Heilpädagogik***. September 2020 Monatsschrift Kinderheilkunde 168(Suppl 3):151-153 DOI: 10.1007/s00112-020-01013-8 [German]
2. Breu M, Seidl R, Höftberger R: ***Antineuronale Autoimmunenzephalitis***. psychopraxis.neuropraxis 2017 · 20:83–86 DOI 10.1007/s00739-017-0376-8 [German]
3. Breu M, Höftberger R: ***Antikörperassozierte Autoimmunenzephalitiden und ihre Bedeutung in der Schlafmedizin***. neurologisch 01/2017 [German]

Oral Presentations:

1. Breu M, Häfele C, Glatter S, Trimmel-Schwahofer P, Golej J, Male C, Feucht M, Dressler A: ***Ketogenic diet in the treatment of super-refractory status epilepticus at a pediatric intensive care unit – a single center experience***; ÖGKJ 2020; Innsbruck, Austria
2. Breu M, Kovacs GG, Macher S, Mitter C, Reindl M, Lassmann H, Höftberger R: ***Neuropathology of ADEM associated with MOG-antibodies***; ECNP 2016, Bordeaux, France
3. Breu M, Freilinger M, Seidl R, Höftberger R: ***Anti-NMDA receptor antibody status in 3 cases of infant choreo-athetotic movement disorder following HSV-1 encephalitis***; EPNS 2015, Vienna, Austria
4. Breu M, Reisinger D, Wu D, Zhang Y, Goeral K, Fatemi A, Zhang J: ***In Vivo Diffusion Tensor Imaging of the Neonatal Rat Brain***; Online Poster (EPOS) ECR 2013 Vienna, Austria
5. Breu M, Falahati S, Goeral K, Porambo M, Phillips AW, Waickman A, Wilson MA, Johnston MV, Fatemi A: ***Study of Neuroinflammation, Glial Progenitor Cells, and Growth Factors in an Ischemic Model of Perinatal White Matter Injury***; Hershey Conference of Developmental Brain Injury 2012 London, UK

Lab Experience

- Animal handling (mice, rats)
- Animal surgery (carotid artery ligation, perfusion)
- Cell culture (rat embryo hippocampus, HEK cells)
- Immunohistochemistry (tissue and cell culture), ELISA, RT-PCR

10.10.2021

