

Curriculum Vitae

Personal information **Ivan Milenkovic**

Work experience

Since 2020 Neurologist at the Department of Neurology, Medical University Vienna

Scientific and clinical Experience

2007-2008 Diploma Thesis and PhD at Centre for Brain Research, MedUni Vienna

2008-2012 Dpt. of Biochemistry and Molecular Biology (Prof. W. Sieghart)

I worked on generation of subunits specific antibodies against GABAA receptors and characterization of neurons and interneurons in the hippocampus and the amygdala.

2012-2014 Post doc and resident at the Institute of Neurology (Neuropathology) MedUni Vienna, Member of the European Project DEVELAGE

Project coordinator and group-leader:

Assoc.Prof.Priv.Doiz.Dr. G. G. Kovacs

During my work at the Institute I was involved in characterization of brains with neurodegenerative disorders and the developing brains. I have great experience in neuropathology, immunohistochemistry, immunofluorescence stainings, different microscopic techniques and neuroanatomy.

Since 2015 At the Department of Neurology at the Medical University Vienna (clinical neurology) my regular clinical work includes night shifts at the neurological emergency unit, treating patients with acute neurological conditions. Apart from that, I am specialized in atypical parkinsonism, genetic parkinsonism and rare and complex movement disorders. I work as a consultant neurologist in the outpatient unit for inherited metabolic disorders, with particular clinical and scientific focus on metabolic neurological disorders (including patients with Gaucher's disease, but also many other rare disorders).

2021 - 2023 I spent over 2 years at the Weizmann Institute of Science in Rehovot, Israel, working on the connection between lysosomal disorders and Parkinson's disease. In particular, I am interested in mechanism which drive an increase of alpha-synuclein in lysosomal disorders like Gaucher disease. I have continued working at the Department of Neurology aiming to investigate protein folding and aggregation in lysosomal disorders and Parkinson's. I have several ongoing collaborations with groups at the Weizmann Institute.

Education and training

1990-1998 Elementary School „Zarko Zrenjanin“ Zrenjanin, Serbia

1998-2002 Grammar School, Zrenjanin, Serbia

2002-2005 Medical school, University of Novi Sad, Novi Sad, Serbia

2005-2008 Medical University of Vienna, Vienna, Austria

2008-2014 PhD-Programme in Neuroscience at Centre for Brain Research Dpt. of Biochemistry and Molecular Biology, Medical University of Vienna

Title: GABAA receptors in limbic brain areas of wild-type mice and in the HAB/NAB model of trait anxiety

2012-2014 Institute of Neurology (Neuropathology), Medical University of Vienna

01/12 – 04/12 postdoc at the Institute

04/12 – 12/14 postdoc and residency

2015 - 2020 Residency at Dpt. of Neurology, Medical University of Vienna licence exam November 2019, board certified neurologist since 01/2020

Since 2020 Neurologist at the Department of Neurology, Medical University Vienna

Additional information

Publications

1. Milenkovic I, Blumenreich S, Hochfelder A, Azulay A, Biton IE, Zerbib M, Oren R, Tsoory M, Joseph T, Fleishman SJ, Futerman AH. Efficacy of an AAV vector encoding a thermostable form of glucocerebrosidase in alleviating symptoms in a Gaucher disease mouse model. *Gene Ther.* 2024 Sep;31(9-10):439-444. doi: 10.1038/s41434-024-00476-8.

2.

Blumenreich S, Nehushtan T, Kupervaser M, Shalit T, Gabashvili A, Joseph T, Milenkovic I, Hardy J, Futerman AH. Large-scale proteomics analysis of five brain regions from Parkinson's disease patients with a GBA1 mutation. *NPJ Parkinsons Dis.* 2024 Feb 8;10(1):33. doi: 10.1038/s41531-024-00645-x.

3.

Blumenreich S, Ben-Yashar DP, Shalit T, Kupervaser M, Milenkovic I, Joseph T, Futerman AH. Proteomics analysis of the brain from a Gaucher disease mouse identifies pathological pathways including a possible role for transglutaminase 1. *J Neurochem.* 2024 Jan;168(1):52-65. doi: 10.1111/jnc.16024.

4.

Krenn M, Wagner M, Zulehner G, Weng R, Jäger F, Keritam O, Sener M, Brücke C, Milenkovic I, Langer A, Buchinger D, Habersam R, Mayerhanser K, Brugger M, Brunet T, Jacob M, Graf E, Berutti R, Cetin H, Hoefele J, Winkelmann J, Zimprich F, Rath J. Next-generation sequencing and comprehensive data reassessment in 263 adult patients with neuromuscular disorders: insights into the gray zone of molecular diagnoses. *J Neurol.* 2023 Dec 21. doi: 10.1007/s00415-023-12101-6.

5.

Berger-Sieczkowski E, Endmayr V, Haider C, Ricken G, Jauk P, Macher S, Pirker W, Högl B, Heidebreder A, Schnider P, Bradley-Zechmeister E, Mariotto S, Konecny I, Reinecke R, Kasprian G, Weber C, Bergmann M, Milenkovic I,

6. Berger T, Gaig C, Sabater L, Graus F, Gelpi E, Höftberger R. Analysis of inflammatory markers and tau deposits in an autopsy series of nine patients with anti-IgLON5 disease. *Acta Neuropathol.* 2023 Oct;146(4):631-645. doi: 10.1007/s00401-023-02625-6.
7. Milenkovic I, Blumenreich S, Futerman AH. GBA mutations, glucosylceramide and Parkinson's disease. *Curr Opin Neurobiol.* 2022 Feb;72:148-154. doi: 10.1016/j.conb.2021.11.004.
8. Krenn M, Kepa S, Kasprian G, Riedhammer KM, Wagner M, Goedl-Fleischhacker U, Milenkovic I. A de novo truncating variant in CSDE1 in an adult-onset neuropsychiatric phenotype without intellectual disability. *Eur J Med Genet.* 2022 Mar;65(3):104423. doi: 10.1016/j.ejmg.2022.104423.
9. Drtjača J, Popović A, Bulajić D, Stilinović N, Vidičević Novaković S, Sekulić S, Milenković I, Ninković S, Ljubković M, Čapo I. Diazepam diminishes temozolomide efficacy in the treatment of U87 glioblastoma cell line. *CNS Neurosci Ther.* 2022 Sep;28(9):1447-1457. doi: 10.1111/cns.13889.
10. Milenkovic I, Sycha T, Berger-Sieczkowski E, Rommer P, Czerny C, Wiest G. Pulse-synchronous torsional nystagmus. *Pract Neurol.* 2021 Oct;21(5):445-447. doi: 10.1136/practneurol-2021-003027.
11. Milenkovic I, Kasprian G, Wiest G. Saccadic Hypermetria From a Selective Lesion of the Fastigial Oculomotor Region. *Neurology.* 2021 Mar 2;96(9):449-451. doi: 10.1212/WNL.00000000000011462.
12. Lang A, Dassler E, Milenkovic I, Lutz MI, Kovacs GG. Variable expression of mitochondrial complex IV in the course of nigral intracellular accumulation of α -synuclein. *Parkinsonism Relat Disord.* 2021 Sep;90:57-61. doi: 10.1016/j.parkreldis.2021.08.001.
13. Milenkovic I, Bartova L, Papageorgiou K, Kasper S, Traub-Weidinger T, Winkler D. Bupropion Reduces the [123I]FP-CIT Binding to Striatal Dopamine Transporter. *Front Psychiatry.* 2021 Feb 22;12:631357. doi: 10.3389/fpsy.2021.631357.
14. Macher S, Milenkovic I, Zrzavy T, Höftberger R, Seidel S, Berger-Sieczkowski E, Berger T, Rommer PS, Wiest G. Ocular Motor Abnormalities in Anti-IgLON5 Disease. *Front Immunol.* 2021 Sep 30;12:753856. doi: 10.3389/fimmu.2021.753856.
15. Blumenreich S, Jenkins BJ, Barav OB, Milenkovic I, Futerman AH. The Lysosome and Nonmotor Symptoms: Linking Parkinson's Disease and Lysosomal Storage Disorders. *Mov Disord.* 2020 Dec;35(12):2150-2155. doi: 10.1002/mds.28232.
16. Krenn M, Tomschik M, Rath J, Cetin H, Grisold A, Zulehner G, Milenkovic I, Stogmann E, Zimprich A, Strom TM, Meitinger T, Wagner M, Zimprich F. neuromuscular disorders: experiences with a two-step approach. *Eur J Neurol.* 2020 Jan;27(1):51-61. doi: 10.1111/ene.14033.
17. Zech M, Jech R, Boesch S, Škorvák M, Weber S, Wagner M, Zhao C, Jochim A, Necpál J, Dincer Y, Vill K, Distelmaier F, Stoklosa M, Krenn M, Grunwald S, Bock-Bierbaum T, et al. Monogenic variants in dystonia: an exome-wide sequencing study. *Lancet Neurol.* 2020 Nov;19(11):908-918. doi: 10.1016/S1474-4422(20)30312-4.
18. Gasser M, Boonsimma P, Netbaramee W, Wechapinan T, Srichomthong C, Ittiwut C, Krenn M, Zimprich F, Milenkovic I, Abicht A, Biskup S, Roser T, Shotelersuk V, Tacke M, Kuersten M, Wagner M, Borggraefe I, Suphateetiporn K, von Stülpnagel C. ATP1A3-related epilepsy: Report of seven cases and literature-based analysis of treatment response. *J Clin Neurosci.* 2020 Feb;72:31-38. doi: 10.1016/j.jocn.2020.01.041.
19. Krenn M, Milenkovic I, Eckstein G, Zimprich F, Meitinger T, Foki T, Wagner M. Adult-onset variant ataxia-telangiectasia diagnosed by exome and cDNA sequencing. *Neurol Genet.* 2019 Jun 25;5(4):e346. doi: 10.1212/NXG.0000000000000346.
20. Milenkovic I, Klotz S, Zulehner G, Sycha T, Wiest G. Slowed vertical saccades as a hallmark of hereditary spastic paraplegia type 7. *Ann Clin Transl Neurol.* 2019 Oct;6(10):2127-2132. doi: 10.1002/acn3.50907.
21. Stefanits H, Milenkovic I, Mahr N, Pataria E, Baumgartner C, Hainfellner JA, Kovacs GG, Kasprian G, Sieghart W, Yilmazer-Hanke D, Czech T. Alterations in GABAA Receptor Subunit Expression in the Amygdala and Entorhinal Cortex in Human Temporal Lobe Epilepsy. *J Neuropathol Exp Neurol.* 2019 Nov 1;78(11):1022-1048. doi: 10.1093/jnen/nlz085.
22. Kasugai Y, Vogel E, Hörtnagl H, Schönherr S, Paradiso E, Hauschild M, Göbel G, Milenkovic I, Peterschmitt Y, Tasan R, Sperk G, Shigemoto R, Sieghart W, Singewald N, Lüthi A, Ferraguti F. Structural and Functional Remodeling of Amygdala GABAergic Synapses in Associative Fear Learning. *Neuron.* 2019 Nov 20;104(4):781-794.e4. doi: 10.1016/j.neuron.2019.08.013.
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24. Bartova L, Papageorgiou K, Milenkovic I, Dold M, Weidenauer A, Willeit M, Winkler D, Kasper S. Rapid antidepressant effect of S-ketamine in schizophrenia. *Eur Neuropsychopharmacol.* 2018 Aug;28(8):980-982. doi: 10.1016/j.euroneuro.2018.05.007.
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26. Cipriani S, Ferrer I, Aronica E, Kovacs GG, Verney C, Nardelli J, Khung S, Delezoide AL, Milenkovic I, Rasika S, Manivet P, Benifla JL, Deriot N, Gressens P, Adle-Biasette H. Hippocampal Radial Glial Subtypes and Their Neurogenic Potential in Human Fetuses and Healthy and Alzheimer's Disease Adults. *Cereb Cortex.* 2018 doi: 10.1093/cercor/bhy096.
27. Milenkovic I, Stojanovic T, Aronica E, Fülöp L, Bozsó Z, Máté Z, Yanagawa Y, Adle-Biasette H, Lubec G, Szabó G, Harkany T, Kovács GG, Keimpema E. GABAA receptor subunit deregulation in the hippocampus of human fetuses with Down syndrome. *Brain Struct Funct.* 2018 Apr;223(3):1501-1518. doi: 10.1007/s00429-017-1563-3.
28. Stefanits H, Milenkovic I, Mahr N, Pataria E, Hainfellner JA, Kovacs GG, Sieghart W, Yilmazer-Hanke D, Czech T. GABAA receptor subunits in the human amygdala and hippocampus: Immunohistochemical distribution of 7 subunits. *J Comp Neurol.* 2018 Feb 1;526(2):324-348. doi: 10.1002/cne.24337.
29. Milenkovic I, Jarc J, Dassler E, Aronica E, Iyer A, Adle-Biasette H, Scharrer A, Reischer T, Hainfellner JA, Kovacs GG. The physiological phosphorylation of tau is critically changed in fetal brains of individuals with Down syndrome. *Neuropathol Appl Neurobiol.* 2018 Apr;44(3):314-327. doi: 10.1111/nan.12406.
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consumption of cocoa-based dark chocolate enhances seizure-like events in the mouse hippocampus. *Food Funct.* 2018 Mar 1;9(3):1532-1544. doi: 10.1039/c7fo01668a.

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31. Stojanovic T, Orlova M, Sialana FJ, Höger H, Stuchlik S, Milenkovic I, Aradska J, Lubec G. Validation of dopamine receptor DRD1 and DRD2 antibodies using receptor deficient mice. *Amino Acids.* 2017. 49(6):1101-1109. doi: 10.1007/s00726-017-2408-3.

32. Rohan Z, Milenkovic I, Lutz MI, Matej R, Kovacs GG. Shared and Distinct Patterns of Oligodendroglial Response in α -Synucleinopathies and Tauopathies. *J Neuropathol Exp Neurol.* 2016. 1;75(12):1100-1109. doi: 10.1093/jnen/nlw087.

33. Kovacs GG, Ferrer I, Grinberg LT, Alafuzoff I, Attems J, Budka H, Cairns NJ, Crary JF, Duyckaerts C, Ghetti B, Halliday GM, Ironside JW, Love S, Mackenzie IR, Munoz DG, Murray ME, Nelson PT, Takahashi H, Trojanowski JQ, Ansorge O, Arzberger T, Baborie A, Beach TG, Bieniek KF, Bigio EH, Bodi I, Dugger BN, Feany M, Gelpi E, Gentleman SM, Giaccone G, Hatanpaa KJ, Heale R, Hof PR, Hofer M, Hortobágyi T, Jellinger KA, Jicha GA, Ince P, Kofler J, Kovari E, Kril JJ, Mann DM, Matej R, McKee AC, McLean C, Milenkovic I, Montine TJ, Murayama S, Lee EB, Rahimi J, Rodriguez RD, Rozemüller A, Schneider JA, Schultz C, Seeley W, Seilhean D, Smith C, Tagliavini F, Takao M, Thal DR, Toledo JB, Tolnay M, Troncoso JC, Vinters HV, Weis S, Wharton SB, White CL 3rd, Wisniewski T, Woulfe JM, Yamada M, Dickson DW. Aging-related tau astroglialopathy (ARTAG): harmonized evaluation strategy. *Acta Neuropathol.* 2016. 131(1):87-102. doi: 10.1007/s00401-015-1509-x.

34. Stojanovic T, Capo I, Aronica E, Adle-Biasette H, Höger H, Sieghart W, Kovacs GG, Milenkovic I. The $\alpha 1$, $\alpha 2$, $\alpha 3$, and $\gamma 2$ subunits of GABAA receptors show characteristic spatial and temporal expression patterns in rhombencephalic structures during normal human brain development. *J Comp Neurol.* 2016. 15;524(9):1805-24. doi: 10.1002/cne.23923.

35. Rahimi J, Milenkovic I, Kovacs GG. Patterns of Tau and α -Synuclein Pathology in the Visual System. *J Parkinsons Dis.* 2015. 5(2):333-40. doi: 10.3233/JPD-140485.

36. Sieczkowski E, Milenkovic I, Venkataramani V, Giera R, Ströbel T, Höftberger R, Liberski PP, Auff E, Wirths O, Bayer TA, Kovacs GG. I716F A β PP Mutation Associates with the Deposition of Oligomeric Pyroglutamate Amyloid- β and α -Synucleinopathy with Lewy Bodies. *J Alzheimers Dis.* 2015. 44(1):103-14. doi: 10.3233/JAD-141524.

37. Stefanits H, Konstantopoulou V, Kuess M, Milenkovic I, Matula C. Initial diagnosis of the congenital disorder of glycosylation PMM2-CDG (CDG1a) in a 4-year-old girl after neurosurgical intervention for cerebral hemorrhage. *J Neurosurg Pediatr.* 2014. 14(5):546-9. doi: 10.3171/2014.7.PEDS14102.

38. Milenkovic I, Petrov T, Kovacs GG. Patterns of hippocampal tau pathology differentiate neurodegenerative dementias. *Dement Geriatr Cogn Disord.* 2014. 38(5-6):375-88. doi: 10.1159/000365548.

39. Iyer A, van Scheppingen J, Milenkovic I, Anink A.J., Lim D, Genazzani A.A, Adle-Biasette H, Kovacs G.G, Aronica E. mGluR5 in Down's syndrome hippocampus during development: Increased expression in astrocytes. *Curr Alzheimer Res.* 2014. 11(7):694-705. doi: 10.2174/1567205011666140812115423.

40. Alpár A, Tortoriello G, Calvigioni D, Niphakis MJ, Milenkovic I, Bakker J, Cameron GA, Hanics J, Morris CV, Fuzik J, Kovacs GG, Cravatt BF, Parnavelas JG, Andrews WD, Hurd YL, Keimpema E, Harkany T. Endocannabinoids modulate cortical development by configuring Slit2/Robo1 signalling. *Nat Commun.* 2014. 17;5:4421. doi: 10.1038/ncomms5421.

41. Iyer AM, van Scheppingen J, Milenkovic I, Anink JJ, Adle-Biasette H, Kovacs GG, Aronica E. mTOR Hyperactivation in Down Syndrome Hippocampus Appears Early During Development. *J Neuropathol Exp Neurol.* 2014. 73(7):671-83. doi: 10.1097/NEN.0000000000000083.

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44. Kanaumi T, Milenkovic I, Adle-Biasette H, Aronica E, Kovacs GG. Non-neuronal cell responses differ between normal and Down syndrome developing brains. *Int J Dev Neurosci.* 2013. 31(8):796-803. doi: 10.1016/j.ijdevneu.2013.09.011.

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the clustering protein gephyrin. J Biol Chem. 2011. 286(43):37702-11. doi: 10.1074/jbc.M111.291336. 53.
Kovacs GG, Milenkovic IJ, Preusser M, Budka H. Nigral burden of alpha-synuclein correlates with striatal dopamine deficit. Mov Disord. 2008. 23(11):1608-12. doi: 10.1002/mds.22207. 54.
Preusser M, Heinzl H, Gelpi E, Höftberger R, Fischer I, Pipp I, Milenkovic I, Wöhrer A, Popovici F, Wolfsberger S, Hainfellner JA. Ki67 index in intracranial ependymoma: a promising histopathological candidate biomarker. Histopathology. 2008. 53(1):39-47. doi: 10.1111/j.1365-2559.2008.03065.x.

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