

# Curriculum vitae

Name

**Balázs Pósfai**

Place and date of birth

Budapest, 1991.10.03.

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Qualification

Doctor of Medicine



Education

2017-2021	János Szentágotthai Doctoral School of Neurosciences
2011-2017	Semmelweis University, Faculty of Medicine
2006-2011	Baár-Madas Calvinist High School
2002-2006	Thomas Mann Gymnasium, Deutsche Schule Budapest

Workplace

**Institute of Experimental Medicine**, Szigony utca 43, Budapest 1083, Hungary

2021-	<i>Junior Research Fellow</i> Department of Molecular and Developmental Neuroscience, Momentum Laboratory of Neuroimmunology
2017-2021	<i>PhD student</i> Department of Molecular and Developmental Neuroscience, Momentum Laboratory of Neuroimmunology
2010-2017	<i>undergraduate student</i> Department of Cellular and Network Neurobiology, Laboratory of Cerebral Cortex Research

Research Area

Molecular Anatomy of Microglia-Neuron Contacts

Scientometric data (as of 2022.04.13)

Publications in international, peer-reviewed journals: **10**  
Cumulative impact factor: **145+**  
Citations (Google Scholar): **488**  
Hirsch index: **7**

Publications

*Microglia modulate blood flow, neurovascular coupling, and hypoperfusion via purinergic actions*

E. Császár, N. Lénárt, C. Cserép, Z. Környei, R. Fekete, **B. Pósfai**, D. Balázsfői, B. Hangya, AD. Schwarcz, E. Szabadits, D. Szöllősi, K. Szigeti, D. Máthé, BL. West, K. Sviatkó, AR. Brás, JC. Mariani, A. Kliewer, Z. Lenkei, L. Hricisák, Z. Benyó, M. Baranyi, B. Sperlágh, Á. Menyhárt, E. Farkas, Á. Dénes

**Journal of Experimental Medicine** (2022), DOI: 10.1084/jem.20211071

*The NKCC1 ion transporter modulates microglial phenotype and inflammatory response to brain injury in a cell-autonomous manner*

K. Tóth, N. Lénárt, P. Berki, R. Fekete, E. Szabadits, **B. Pósfai**, C. Cserép, A. Alatshan, S. Benkő, D. Kiss, CA. Hübner, AI. Gulyás, K. Kaila, Z. Környei, Á. Dénes  
**PLoS Biology** (2022), DOI: 10.1371/journal.pbio.3001526

*Shaping Neuronal Fate: Functional Heterogeneity of Direct Microglia-Neuron Interactions*

C. Cserép, **B. Pósfai**, Á. Dénes  
**Neuron** (2021), DOI: 10.1016/j.neuron.2020.11.007

*Microglia alter the threshold of spreading depolarization and related potassium uptake in the mouse brain*

DP. Varga, Á. Menyhárt, **B. Pósfai**, E. Császár, N. Lénárt, C. Cserép, B. Orsolits, B. Martinecz, T. Szlepák, F. Bari, E. Farkas, Á. Dénes  
**Journal of Cerebral Blood Flow & Metabolism** (2020), DOI: 10.1177/0271678X19900097

*Microglia monitor and protect neuronal function through specialized somatic purinergic junctions*

C. Cserép\*, **B. Pósfai\***, B. Orsolits, G. Molnár, S. Heindl, N. Lénárt, R. Fekete, ZI. László, Z. Lele, AD. Schwarcz, K. Ujvári, L. Csiba, T. Hortobágyi, Z. Maglóczy, B. Martinecz, G. Szabó, F. Erdélyi, R. Szipőcs, B. Gesierich, M. Duering, I. Katona, A. Liesz, G. Tamás, Á. Dénes  
**Science** (2019), DOI: 10.1126/science.aax6752  
\* equal contribution

*Brainstem nucleus incertus controls contextual memory formation*

A. Szőnyi, KE. Sós, R. Nyilas, D. Schlingloff, A. Domonkos, VT. Takács, **B. Pósfai**, P. Hegedüs, J. Priestley, A. Gundlach, AI. Gulyás, V. Varga, A. Losonczy, TF. Freund, G. Nyiri  
**Science** (2019), DOI: 10.1126/science.aaw0445

*New Insights into Microglia–Neuron Interactions: A Neuron’s Perspective*

**B. Pósfai\***, C. Cserép\*, B. Orsolits, Á. Dénes  
**Neuroscience** (2019), DOI: 10.1016/j.neuroscience.2018.04.046  
\* equal contribution

*Co-transmission of acetylcholine and GABA regulates hippocampal states*

VT. Takács, C. Cserép, D. Schlingloff, **B. Pósfai**, A. Szőnyi, KE. Sós, Z. Környei, Á. Dénes, AI. Gulyás, TF. Freund, G. Nyiri  
**Nature Communications** (2018), DOI: 10.1038/s41467-018-05136-1

*Mitochondrial Ultrastructure Is Coupled to Synaptic Performance at Axonal Release Sites*

C. Cserép, **B. Pósfai**, AD. Schwarcz, Á. Dénes  
**eNeuro** (2018), DOI: 10.1523/ENEURO.0390-17.2018

*Synaptic and cellular changes induced by the schizophrenia susceptibility gene G72 are rescued by N-acetylcysteine treatment*

**B. Pósfai\***, C. Cserép\*, P. Hegedüs, E. Szabadits, DM. Otte, A. Zimmer, M. Watanabe, TF. Freund, G. Nyiri  
**Translational Psychiatry** (2016), DOI: 10.1038/tp.2016.74.  
\* equal contribution

## Awards

- 2022 Stephen W. Kuffler Publication Award
- 2021 Junior Prima Prize  
New National Excellence Program Scholarship  
Simmelweis 250+ PhD Excellence Scholarship
- 2020 Outstanding Paper Award - European Microscopy for Society  
Doctoral Student Scholarship of the Co-Operative Doctoral Program  
New National Excellence Program Scholarship  
Best Presentation Award (4th Hungarian Neuroscience Doctoral Conference)
- 2019 Electron Microscopic Award (Hungarian Society for Microscopy)  
New National Excellence Program Scholarship  
Best Poster Award - Life Sciences (14th Multinational Congress on Microscopy)
- 2018 Prize for Best Poster (9th World Congress on Targeting Mitochondria)
- 2017 Pro Scientia Gold Medal  
XXXIII. National University Scientific Report Award - 1<sup>st</sup> prize  
XXXIII. National USRA - Special prize from Pro Scientia Gold Medalists' Society  
Simmelweis University Scientific Report Award – 1<sup>st</sup> prize
- 2016 Stephen W. Kuffler Research Scholarship for Central European Students  
New National Excellence Program Scholarship  
Scholarship of the Hungarian Republic for the academic year 2016/2017
- 2015 Scholarship of the Hungarian Republic for the academic year 2015/2016  
Simmelweis University Scientific Report Award – 1<sup>st</sup> prize  
XX. Korányi Frigyes Scientific Forum – 2<sup>nd</sup> prize
- 2014 Scholarship of the Hungarian Republic for the academic year 2014/2015  
Simmelweis University Scientific Report Award – 2<sup>nd</sup> prize  
Simmelweis University Scientific Report Award – 3<sup>rd</sup> prize  
XIX. Korányi Frigyes Scientific Forum – 3<sup>rd</sup> prize
- 2013 XXXI. National University Scientific Report Award - 1<sup>st</sup> prize  
Simmelweis University Scientific Report Award – 1<sup>st</sup> prize  
XVIII. Korányi Frigyes Scientific Forum – 3<sup>rd</sup> prize

## Other Communications

*Microglia, housekeepers of the brain (invited lecture)*

**B. Pósfai**

Ortvay Kollokvium

Budapest, December 2, 2021

*Molecular Anatomy and Function of Somatic Microglia-Neuron Junctions*

**B. Pósfai**, C. Cserép, K. Ujvári, AD. Schwarcz, Á. Dénes

PhD Scientific Days 2021

Budapest, July 7-8, 2021

*P2Y12 receptors are essential for physiological tissue distribution, 3D morphology and motility of microglia*

**B. Pósfai**, C. Cserép, R. Fekete, K. Tóth, AD. Schwarcz, K. Ujvári, Á. Dénes

1st International Stroke-Immunology Conference

March 1-3, 2021

*P2Y12 receptors are essential for physiological tissue distribution, 3D morphology and motility of microglia*

**B. Pósfai**, C. Cserép, R. Fekete, K. Tóth, AD. Schwarcz, K. Ujvári, Á. Dénes  
PhD Scientific Days 2020  
Budapest, August 31-September 1, 2020

*Microglia monitor and protect neuronal function via specialized somatic purinergic junctions*

**B. Pósfai**  
4th Hungarian Neuroscience Doctoral Conference  
Szeged, January 28, 2020  
**Best Presentation Award**

*Studying the complex roles of microglia with high resolution imaging and microglia manipulation approaches (invited lecture)*

**B. Pósfai**  
14th Multinational Congress on Microscopy  
Belgrade, September 15-20, 2019

*A novel type of microglia-neuron interaction and the role of P2Y12 receptors*

**B. Pósfai**, C. Cserép, R. Fekete, AD. Schwarcz, K. Ujvári, N. Lénárt, B. Orsolits, ZI. László, Z. Lele, I. Katona, Á. Dénes  
14th Multinational Congress on Microscopy  
Belgrade, September 15-20, 2019  
**Best Poster Award**

*P2Y12 receptors are essential for physiological tissue distribution, 3D morphology and motility of microglia*

**B. Pósfai**, C. Cserép, R. Fekete, N. Lénárt, AD. Schwarcz, K. Ujvári, Á. Dénes  
Brain & Brain PET 2019 – The 29th International Symposium on Cerebral Blood Flow, Metabolism and Function; Yokohama, July 4-7, 2019

*Mitochondrial Ultrastructure Is Coupled to Synaptic Performance at Axonal Release Sites*

C. Cserép, **B. Pósfai**, AD. Schwarcz, Á. Dénes  
Conference of the Hungarian Society for Microscopy; Siófok, May 23-25, 2019

*Microglia monitor and protect neuronal function via specialized somatic purinergic junctions*

**B. Pósfai**, C. Cserép, K. Ujvári, AD. Schwarcz, R. Fekete, N. Lénárt, Á. Dénes  
PhD Scientific Days; Budapest, April 25-26, 2019

*Microglia monitor and influence neuronal function via specialized somatic contact sites in a mitochondrial activity- and P2Y12R-dependent manner*

C. Cserép, **B. Pósfai**, B. Orsolits, G. Molnár, S. Heindl, N. Lénárt, R. Fekete, AD. Schwarcz, K. Ujvári, Z. László, Z. Lele, I. Katona, R. Szipócs, A. Liesz, G. Tamás, Á. Dénes  
Neuroimmune Communication in Health and Disease, Gordon Research Conference  
Ventura, CA, January 13-18, 2019

*The importance of nanometer-scale molecular imaging in studying dynamic cellular actions*

**B. Pósfai**  
New approaches and applications of STORM super-resolution imaging in life sciences,  
Scientific Symposium, Budapest, November 30, 2018

*Mitochondrial ultrastructure is coupled to synaptic performance at axonal release sites*

**B. Pósfai**, C. Cserép, AD. Schwarcz, Á. Dénes

9th World Congress on Targeting Mitochondria, Berlin, October 24-25, 2018

**Best Poster Award**

*Mitochondria: Central Players in Microglia-Neuron Interactions*

C. Cserép, **B. Pósfai**, B. Orsolits, G. Molnár, N. Lénárt, R. Fekete, AD. Schwarcz, K. Ujvári, G. Tamás, Á. Dénes

9th World Congress on Targeting Mitochondria, Berlin, October 24-25, 2018

*The nucleus incertus specifically targets neurons responsible for the formation of contextual memory*

Zichó K, Szőnyi A, Schlingloff D, Sós KE, Takács VT, **Pósfai B**, Hegedüs P, Bardóczi Zs, Gulyás A, Freund TF, Nyiri G

FENS Regional Meeting; Pécs, September 20-23, 2017

*Synaptic and cellular changes induced by the schizophrenia susceptibility gene G72 are rescued by N-acetylcysteine treatment*

**B. Pósfai**, C. Cserép, P. Hegedüs, E. Szabadits, DM. Otte, A. Zimmer, M. Watanabe, TF. Freund, G. Nyiri

10<sup>th</sup> FENS Forum of Neuroscience; Copenhagen, July 2-6, 2016

*N-acetyl cysteine treatment rescues cellular deficits in the animal model of schizophrenia*

Hegedüs P, **Pósfai B**, Cserép Cs, Szabadits E, Freund TF, Nyiri G

XV. Congress of Hungarian Neuroscience Society; Budapest, January 22-23, 2015

*Positive effects of N-acetyl cysteine in the animal model of schizophrenia*

**Pósfai B**, Cserép Cs, Hegedüs P, Szabadits E, Freund TF, Nyiri G

Conference of the Hungarian Society for Microscopy; Siófok, May 29-31, 2014

*Positive effects of N-acetyl cysteine in the animal model of schizophrenia*

**Pósfai B**, Cserép Cs, Hegedüs P, Szabadits E, Freund TF, Nyiri G

From Medicine To Bionics European PhD Conference; Budapest, May 9-10, 2014

*Synapse-specific distribution of neuroligin-2 in the hippocampus*

**Pósfai B**, Hegedüs P, Takács V, Freund TF, Nyiri G

IBRO International Workshop; Debrecen, January 16-17, 2014

*Ultrastructural changes in the hippocampus of G72 gene-expressing animal model of schizophrenia*

Hegedüs P, **Pósfai B**, Cserép Cs, Szabadits E, Watanabe M, Freund TF, Nyiri G

IBRO International Workshop; Debrecen, January 16-17, 2014

*Szinaptikus változások transzgenikus szkizofrénia-modell állat hippokampuszában*

**Pósfai B**, Cserép Cs, Szabadits E, Watanabe M, Freund TF, Nyiri G

Annual Congress of Hungarian Anatomical Society; Budapest, June 13-15, 2013

*Szinaptikus változások transzgenikus szkizofrénia-modell állat hippokampuszában*

**Pósfai B**, Cserép Cs, Szabadits E, Watanabe M, Freund TF, Nyiri G

XIV. Congress of Hungarian Neuroscience Society; Budapest, January 17-19, 2013

## Research Interest

Neurological and mental disorders impose a ponderous socio-economic burden on society. Despite dedicating exceptional resources to research, there is no efficient therapy for most of these pathologies. Clinical trials so far have mainly concentrated on neuronal interventions, however, these therapies had very limited success, urging a need for new approaches. In our research group, we are focusing on the main immunocompetent cell type of the brain, called microglia. Beyond their roles in immune-related actions, microglia are also essential in a wide range of neuronal processes. Our previous results show that microglia serve as a continuous quality-check system, meaning they constantly monitor their environment and contribute to the maintenance of brain homeostasis. In our experiments, we focus on unveiling the details of these microglial actions, because we believe that supporting our innate protective mechanisms might be sufficient to prevent pathological processes, and as such, the evolution of disorders. A better understanding of microglial functions under both physiological and pathological circumstances can lead to effective therapies in a broad range of neurodegenerative diseases.