



Name: Gergő Porkoláb

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#### EDUCATION

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2018-            Biology MSc, University of Szeged  
2015-2018      Biology BSc, University of Szeged  
2011-2015      István Tömörkény Secondary School, Szeged

#### LANGUAGES

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English        C1  
German        B1

#### RESEARCH EXPERIENCE

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Period         2016-  
Institute       Institute of Biophysics, BRC of the Hungarian Academy of Sciences  
Mentors        Prof. Mária Deli and Dr. Szilvia Veszélka  
Topic          Targeted drug delivery to the brain by nanoparticles

#### SCIENTIFIC STUDENTS' ASSOCIATIONS CONFERENCES

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2019            XXXIV. National Scientific Students' Associations Conference – 2nd prize  
2018            Annual Scientific Students' Associations Conference, University of Szeged,  
Faculty of Science and Informatics – 1st prize  
2018            Annual Scientific Students' Associations Conference, University of Szeged,  
Faculty of Medicine – special prize  
2017            Annual Scientific Students' Associations Conference, University of Szeged,  
Faculty of Medicine – special prize

## AWARDS AND SCHOLARSHIPS

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2019	Stephen W. Kuffler Research Scholarship
2019	ISCOMS 2019 – session winner
2019	SZTE József Sófi Foundation scholarship, biology MSc category – 1st prize
2019	SZTE József Sófi Foundation – prize of Board of Trustees
2019	SZTE Talent Scholarship – silver grade
2018	New National Excellence Program fellowship for the academic year of 2018/19
2018	National Higher Educational Scholarship for the academic year of 2018/19
2017	National Higher Educational Scholarship for the academic year of 2017/18
2016-	Szent-Györgyi Scholarship of the Foundation for the Future of Biomedical Sciences in Szeged
2015	Kazinczy-medal

## PUBLICATIONS

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### a) Articles

- Mészáros M, Porkoláb G, Kiss L, Pilbat AM, Kóta Z, Kupihár Z, Kéri A, Galbács G, Siklós L, Tóth A, Fülöp L, Csete M, Sipos Á, Hülper P, Sipos P, Páli T, Rákhely G, Szabó-Révész P, Deli MA, Veszelka S. Niosomes decorated with dual ligands targeting brain endothelial transporters increase cargo penetration across the blood-brain barrier. Eur. J. Pharm. Sci. 2018 Oct 15; 123:228-240
- Ungor D, Juhász Á, Berta K, Mészáros M, Porkoláb G, Veszelka S, Deli MA, Dékány I, Csapó E. Effect of drug encapsulation methods on the binding efficiency and release kinetics of size-controlled liposomes (under review)

### b) Presentations

- Veszelka Szilvia\*, Mészáros Mária, Porkoláb Gergő, Deli Mária  
Célzott agyi nanorészecske bejuttatás a vér-agy gát transzporterek segítségével  
Farmakokinetika és Gyógyszermetabolizmus Szimpózium, Galyatető, 2019
- Porkoláb Gergő  
Targeted nanoparticles for drug delivery to the brain  
Nobel-díjasok és tehetséges diákok XII. találkozója, Szeged, 2018

\* : presenting author

- Szilvia Veszelka, Mária Mészáros, Lóránd Kiss, Gergő Porkoláb, Zsolt Bozsó, Livia Fülöp, Zoltán Kupihár, Ana-Maria Pilbat, Zsolt Török, Piroska Szabó-Révész, Mária A. Deli\*  
Targeting the BBB with vesicular nanoparticles decorated with ligands of solute carriers  
12th Brains for Brain Foundation (B4B) International Workshop, Frankfurt, 2018

c) Posters

- Gergő Porkoláb, Mária Mészáros, Mária A. Deli, Szilvia Veszelka  
Nanoparticles targeted with ligands of brain endothelial transporters increase cargo penetration across a culture model of the blood-brain barrier  
ISCOMS 2019, Groningen, 2019
- Mária Mészáros, Gergő Porkoláb, Mária A. Deli, Szilvia Veszelka  
Nanovesicles targeted with two different ligands of brain endothelial transporters increase cargo penetration across the blood-brain barrier  
Straub-napok 2019, Szeged, 2019
- Mária Mészáros, Gergő Porkoláb, Mária A. Deli, Szilvia Veszelka  
Nanovesicles targeted with two different ligands of brain endothelial transporters increase cargo penetration across the blood-brain barrier  
21st International Symposium on Signal Transduction at the Blood-Brain Barriers, Arad, 2019
- Gergő Porkoláb, Mária Mészáros, Zoltán Kóta, Tibor Páli, Ana-Maria Pilbat, Zsolt Török, Zoltán Kupihár, Piroska Szabó-Révész, Mária A. Deli, Szilvia Veszelka  
Targeted delivery of vesicular nanoparticles across a culture model of the blood-brain barrier  
Straub-napok 2018, Szeged, 2018
- Gergő Porkoláb, Mária Mészáros, Zoltán Kóta, Tibor Páli, Ana-Maria Pilbat, Zsolt Török, Zsolt Bozsó, Piroska Szabó-Révész, Mária A. Deli, Szilvia Veszelka  
Targeting the BBB with vesicular nanoparticles decorated with ligands of solute carriers  
7th BBBB International Conference on Pharmaceutical Sciences, Balatonfüred, 2017
- Mészáros, Gergő Porkoláb, Lóránd Kiss, Ana-Maria Pilbat, Zsolt Török, Zsolt Bozsó, Livia Fülöp, Mária A. Deli and Szilvia Veszelka  
Targeted delivery of nanoparticles across a culture model of the blood-brain barrier  
International Symposium on Signal Transduction at the Blood-Brain Barriers, Krakkó, 2017

\* : presenting author

- Mészáros Mária, Porkoláb Gergő, Kiss Loránd, Kóta Zoltán, Páli Tibor, Hoyk Zsófia, Bozsó Zsolt, Fülöp Lívía, Deli Mária, Veszelka Szilvia  
Nanorészecskék irányított átjuttatása a vér-agy gáton SLC transzporterek segítségével  
47. sümegei membrán-transzport konferencia, Sümeg, 2017
- Mária Mészáros, Gergő Porkoláb, Lóránd Kiss, Ana-Maria Pilbat, Zsolt Török, Zsolt Bozsó, Lívía Fülöp, Mária A. Deli and Szilvia Veszelka  
Targeted delivery of vesicular nanoparticles across a culture model of the blood-brain barrier  
Straub- napok 2017, Szeged, 2017

## RESEARCH OBJECTIVES

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Pharmaceutical treatment of most neurological diseases – like Alzheimer’s disease, Parkinson’s disease or brain tumours – is hindered by the low permeability of drugs across the blood-brain barrier (BBB). Nanoparticles targeting nutrient transporters at the BBB are promising new candidates to increase the brain penetration of therapeutics.

Our research group has been developing a novel drug delivery system for the brain that targets nutrient transporters at the BBB. For that, we prepared vesicular nanoparticles from nonionic surfactants and cholesterol, so-called niosomes, that can be loaded with both hydrophilic and hydrophobic, large or small molecules. The surface of niosomes were decorated either with alanine or glutathione for single ligand labelling, as well as their combination for dual ligand labelling.

We verified that the presence of targeting ligands on the surface of nanoparticles elevated the permeability of the cargo across the BBB both *in vitro* and *in vivo*, and that dual-ligand decoration of niosomes was more effective than single ligand labelling. We also identified several mechanism for the cellular uptake of nanoparticles and proved that the negatively charged glycocalyx plays an important role in the process. Currently, with the support of the New National Excellence Program, I investigate nanoparticle-endothelial cell interactions in a microfluidic chip model of the BBB that enables the mimicking of cerebral blood flow.