



MFT
Magyar Kísérletes és
Klinikai Farmakológiai Társaság

HUPHAR 2024

MATRAHAZA 5-7, JUNE

F-KB3-1 Ádám Dénes 20'

HUN-REN Institute of Experimental Medicine

Role of microglia in modulation of cerebral circulation and neurovascular coupling

F-KB3-2 Imola Wilhelm, Kinga Molnár, Ádám Mészáros, Csilla Fazakas, István Krizbai 20'

HUN-REN Biological Research Centre, Szeged

Targeting the brain metastatic environment

F-KB3-3 ¹Szilvia Veszelka, ¹Mária Mészáros, ^{1,2}Anikó Szecskó, ^{1,2}Gergő Porkoláb,

¹Koppány Párdi, ¹Janet Adegbite, ¹Mária Deli 20'

¹HUN-REN Biological Research Centre, Szeged,

²Doctoral School of Biology, University of Szeged, Szeged

Protection of brain endothelial cells as a therapeutic target in central nervous system diseases

F-KB3-4 ¹Mária Mészáros, ²Thi Ha My Phan, ^{1,3}Judit P. Vigh, ^{1,3}Gergő Porkoláb, ¹Anna Kocsis, ¹Emese K. Páli, ^{1,4}Tamás F. Polgár, ¹Fruzsina R. Walter, ²Jeng-Shiung Jan, ⁵Tamás Janáky, ¹Szilvia Veszelka and ¹Mária A. Deli 15'

¹Institute of Biophysics, HUN-REN Biological Research Centre, Temesvári krt. 62, H-6726 Szeged, Hungary;

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Alanine and glutathione targeting of dopamine- or ibuprofen-coupled polypeptide nanocarriers elevates crossing across the blood-brain barrier and protective effects

F-KB3-5 ^{1,2}Szilvia Kecskés, ^{1,2}Akos Menyhart, ^{1,2}Eszter Farkas 15'

¹HCEMM-USZ Cerebral Blood Flow and Metabolism Research Group, HCEMM Nonprofit Ltd., Szeged, Hungary,

²Department of Cell Biology and Molecular Medicine, University of Szeged, Szeged, Hungary

Dasatinib and Quercetin are protective in focal cerebral ischemia in aged rats

14:00-15:30 F-KC3 The power of systematic reviews and meta-analyses in the translation of available clinical evidence and to initiate further research

Chair: Gábor Varga

F-KC3-1 ^{1,2,3}Péter Hegyi 40'

PROGRAM • Friday • 7. June • 2024



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F-KB3-3 PROTECTION OF BRAIN ENDOTHELIAL CELLS AS A THERAPEUTIC TARGET IN CENTRAL NERVOUS SYSTEM DISEASES

¹Veszelka Szilvia, ¹Mészáros Mária, ^{1,2}Szecső Anikó, ^{1,2}Porkoláb Gergő, ¹Párdi Koppány, ¹Janet Adegbite, ¹Deli Mária

¹HUN-REN Biological Research Centre, Szeged,

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Blood-brain barrier (BBB) provides a special compartment necessary for the proper functioning of the CNS by actively controlling cellular and molecular trafficking between the blood and the nervous system. The continuous layer of cerebral endothelial cells attached to each other by tight intercellular junctions (TJs) constitutes the morphological basis of the BBB. The phenotype of the BBB including TJs, the lack of fenestrae, specific transendothelial transport systems and active efflux pumps regulates the entry of solutes and cells into the brain, and performs metabolic and detoxifying functions to protect the CNS.

The structural and functional integrity of the BBB is one of the most critical factors for maintaining the normal brain homeostasis. Emerging evidence supports the crucial role of BBB disruption in the early stages of various brain disorders, and BBB dysfunction has therefore been identified as a potential new therapeutic target for a number of brain disorders.

The degree of BBB disruption is tightly correlated with cognitive dysfunction in neurodegenerative disorders, especially in Alzheimer's disease (AD). Enhancing amyloid beta clearance across the BBB, as well as protection of the BBB from injury are among the proposed new strategies for the therapy of AD. In our experiments, pentosan polysulfate (PPS), a polyanionic polysaccharide decreased the toxic effects of amyloid beta peptides in brain endothelial cells and protected the function of the BBB. This new observation may suggest a potential therapeutical application of PPS in AD.

The intake of the polyunsaturated fatty acid docosahexaenoic acid (DHA) has been associated with decreased amyloid deposition and reduced risk in AD. Our results proved that DHA may protect not only neurons but also the other elements of the neurovascular unit from the toxic effects of amyloid and this effect may be beneficial in the therapy of AD.

BBB damage is also a major feature of neurovascular diseases, such as stroke. During and after ischemic stroke, BBB disruption facilitates injury progression and increases the risk of hemorrhage predicting high mortality. Since junctional proteins are key in the regulation of BBB function, we targeted three different signaling pathways of the BBB with small molecular inducers using parallelly which resulted in tighter junctions and improved BBB functions after oxygen glucose deprivation in a stroke model.

Our results demonstrated that protecting BBB functions as a therapeutic target in brain disorders may lead to the development of new approaches for the treatment of CNS diseases.