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RESEARCH AREA

Microglia are the main immune-competent cells of the brain that form transient contacts with other cellular elements of the central nervous system using their evermoving processes. We set out to examine the role of microglia in basic physiological and pathological processes of the nervous system. We combine cutting-edge anatomical techniques with in vivo, ex vivo and in vitro approaches to investigate microglial contactomics, especially somatic junctions established with the cell bodies of neurons and contacts with elements of the neurovascular unit. Our experiments provide opportunity for observations ranging from population level to the subcellular, nanoscale level.

TECHNIQUES AVAILABLE IN THE LAB

Transcardial perfusion, tissue preparing techniques for high-resolution anatomical experiments, immunohistochemical reactions, immunofluorescent labelling, immunogold and immunoperoxidase labelling, confocal microscopy, superresolution microscopy (STED, STORM), electron microscopy, electron tomography, in vivo electrophysiology.

SELECTED PUBLICATIONS

Cserép, C., Schwarcz, AD., **Pósfai, B.**, László, ZI., Kellermayer, A., Környei, Z., Kisfali, M., Nyerges, M., Lele, Z., Katona, I., Dénes, Á. (2022) Microglial control of neuronal development via somatic purinergic junctions. *Cell Rep* **40(12)**: 111369.

Császár, E., Lénárt, N., Cserép, C., Környei, Z., Fekete, R., **Pósfai, B.**, Balázsfi, D., Hangya, B., Schwarcz, AD., Szabadits, E., Szöllősi, D., Szigeti, K., Máthé, D., West, BL., Sviatkó, K., Brás, AR., Mariani, JC., Kliewer, A., Lenkei, Z., Hricisák, L., Benyó, Z., Baranyi, M., Sperlágh, B., Menyhárt, Á., Farkas, E., Dénes, Á. (2022) Microglia modulate blood flow, neurovascular coupling, and hypoperfusion via purinergic actions. *J Exp Med* **219(3)**: e20211071.

Tóth, K., Lénárt, N., Berki, P., Fekete, R., Szabadits, E., **Pósfai, B.**, Cserép, C., Alatshan, A., Benkő, S., Kiss, D., Hübner, CA., Gulyás, AI., Kaila, K., Környei, Z., Dénes, Á. (2022) The NKCC1 ion transporter modulates microglial phenotype and inflammatory response to brain injury in a cell-autonomous manner. *PLoS Biology* **20(1)**: e3001526.

Cserép, C., **Pósfai, B.**, Dénes, Á. (2021) Shaping Neuronal Fate: Functional Heterogeneity of Direct Microglia-Neuron Interactions. *Neuron* **109(2)**: 222–240.

Cserép, C.[#], **Pósfai, B.**[#], Lénárt, N., Fekete, R., László, Z. I., Lele, Z., Orsolits, B., Molnár, G., Heindl, S., Schwarcz, A. D., Ujvári, K., Környei, Z., Tóth, K., Szabadits, E., Sperlágh, B., Baranyi, M., Csiba, L., Hortobágyi, T., Maglóczky, Z., Martinecz, B., Szabó, G., Erdélyi, F., Szipőcs, R., Tamkun, MM., Gesierich, B., Duering, M., Katona, I., Liesz, A., Tamás, G., Dénes, Á. (2020). Microglia monitor and protect neuronal function through specialized somatic purinergic junctions. *Science* **367(6477)**: 528–537.

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