Endothelial cells are key-players in pilocarpine-induced epileptogenesis

Beatrice Mihaela Radu¹#, Eda Suku², Grygoriy Tsenov¹, Flavia Merigo¹, Petr Kacer³, Alejandro Giorgetti², Mihai Radu⁴¶, Giuseppe Bertini¹, and Paolo Francesco Fabene¹

¹School of Medicine, Dept of Neuroscience, Biomedicine and Movement, Section of Anatomy and Histology, University of Verona, 37134 Verona, Italy
²Department of Biotechnology, University of Verona, Verona, 37134, Italy
³National Institute of Mental Health, Klecany, 25067, Czech Republic
# Current position: Department of Anatomy, Animal Physiology and Biophysics, Faculty of Biology, University of Bucharest, Bucharest, 050095, Romania
¶ Current position: Department of Life and Environmental Physics, Horia Hulubei National Institute for Physics and Nuclear Engineering, PO Box MG-6, Reactorului 30, Magurele, 077125, Romania

In recent years, the concept of the neurovascular unit (NVU) has emerged as a new paradigm for investigating both physiology and pathology in the CNS. This concept proposes that a purely neurocentric focus is not sufficient, and emphasizes that all cell types in the brain including neuronal, glial and vascular components (endothelial cells, blood cells, including immunity cells) must be examined in an integrated context. Cell–cell signaling and coupling between these different compartments thus form the basis for normal function (Lok et al. 2007). We tested the hypothesis that disordered signaling and perturbed coupling of these different components can be the basis for epileptogenesis in the pilocarpine model of epilepsy. We thus determined that pilocarpine can act on endothelial cells via receptors, comparing the response of the same stimulation in neurons as well.

References


Keywords

Seizures, epilepsy, Bend3, BMVECs, neurovascular unit, endothelial cells