

Blood Neural Barrier; Coordinated Interaction between Neurons, Endothelial cells, and Astrocytes

Jeong Hun Kim*

Fight against Angiogenesis-Related Blindness (FARB) Laboratory
Department of Ophthalmology, Artificial Eye Research Center of Clinical Research Institute,
Seoul National University Hospital

* E-mail :

The bloodneural barrier (BNB), including blood-brain barrier (BBB) and blood-retinal barrier (BRB), is an endothelial barrier constructed by an extensive network of endothelial cells, astrocytes and neurons to form functional 'neurovascular units', which has an important role in maintaining a precisely regulated microenvironment for reliable neuronal activity. Although failure of the BNB may be a precipitating event or a consequence, the breakdown of BNB is closely related with the development and progression of CNS diseases. Therefore, BNB is most essential in the regulation of microenvironment of the CNS. The BNB is a selective diffusion barrier characterized by tight junctions between endothelial cells, lack of fenestrations, and specific BNB transporters. The BNB have been shown to be astrocyte dependent, for it is formed by the CNS capillary endothelial cells, surrounded by astrocytic end-foot processes. Given the anatomical associations with endothelial cells, it could be supposed that astrocytes play a role in the development, maintenance, and breakdown of the BNB. Therefore, astrocytes- endothelial cells interaction influences the BNB in both physiological and pathological conditions. If we better understand mutual interactions between astrocytes and endothelial cells, in the near future, we could provide a critical solution to the BNB problems and create new opportunities for future success of treating CNS diseases. Here, we focused astrocyte-endothelial cell interaction in the formation and function of the BNB.