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**Review**

## Physiology and pharmacological role of the blood-brain barrier

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**Abstract:**

The central nervous system (CNS) is a perfectly regulated environment with conditions far different from those in the rest of the organism. Even slight changes in this machinery affect its functioning. The blood-brain barrier (BBB) is the frontier that isolates brain tissues from the substances circulating in the blood vascular system. It is also a diffusion barrier that allows only water and small lipophilic molecules to freely access the brain in accordance with their concentration gradients. Moreover, animal studies have revealed differences in the barrier tightening time-course during development. The BBB becomes resistant to larger molecules before it stops smaller ones. Thus, its maturation has a progressive scheme. A similar scheme is true for BBB transporters. Due to all of these facts, the BBB is the most significant element responsible for the preservation of CNS homeostasis.

As a functional system, the BBB can be investigated as a frontier composed of pericytes, astrocytic end feet, and brain endothelial cells (ECs). Special emphasis is placed on the tight junctions (TJs) existing between them. An alternative point of view considers the BBB to be a functional complex consisting not only of bricks of cells but also of structures between those cells and their co-functioning elements.

**Key words:**

blood-brain barrier, endothelium, tight junctions, transport systems

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