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Assessment of the Level of Rage in Cells Blood–Brain Barrier in Experimental Alzheimer's Disease

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Alzheimer's disease is a progressive neurodegenerative disorder in which the accumulation of β-amyloid and neurofibrillary tangles is a determining pathological sign. Activation of RAGE plays a decisive role in the production and aggregation of β-amyloid, formation of neurofibrillary tangles and degeneration of neurons. The aim of this work is to assess the influence of RAGE and its ligands – β-amyloid (Aβ1-42) on endothelial cells of cerebral microvascular in model blood-brain barrier (BBB) *in vitro* with experimental Alzheimer's disease. Modeling of experimental Alzheimer's disease *in vitro* caused a significant ($P \leq 0.05$) increase expression of RAGE on endothelial cells and decrease in the transendothelial electric resistance (TEER) in both the static and dynamic models BBB. However, suppressed expression of RAGE led to a persistent and long-term increase value of TEER. In this case, the ligand RAGE – Aβ1-42 – caused reduced parameters of TEER. Alzheimer's disease is accompanied by pathological changes in the expression of RAGE on endothelial cells, thereby leading to altered structural and functional integrity of the BBB. Blocking the RAGE expression in cerebral endothelial cells inhibits development of endothelial dysfunction and restores integrity of BBB impaired by the action of β-amyloid.

Keywords: RAGE, β-amyloid, endothelium, BBB, Alzheimer's disease