



pharmaceutics



Special Issue Reprint

Non-invasive Device-Mediated Brain Drug Delivery across the Blood-Brain Barrier

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It is well known that the blood–brain barrier (BBB), substantially composed of tight junctions between the capillary endothelial cells and efflux transporters such as MDR1 at the apical membrane of the capillary endothelial cells, prevents drugs from entering the brain. Accordingly, drug delivery into the brain across the BBB is a challenging task, particularly in central nervous system diseases such as Alzheimer’s disease and Parkinson’s disease, as well as brain cancers such as glioma. It is true that drugs in systemic circulation go through intentional membrane disruption or intentional tight junction disruption into the brain across the BBB, but bystander harmful compounds can enter the brain together. Moreover, although craniotomy is often conducted for surgical removal or direct drug administration, this process burdens and torments patients. Thus, non-invasive, device-mediated brain drug delivery across the BBB should be developed to improve not only patient health, but also quality of life. At present, brain drug delivery systems that utilize biological transport machineries such as carrier-mediated transport, receptor-mediated transcytosis, lipid-raft-mediated transcytosis, or macropinocytosis at the BBB have been extensively investigated. This Special Issue aims to share recent progress and trends in this field.



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