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## Crossing the Blood-Brain Barrier: A Review on Drug Delivery Strategies for Treatment of the Central Nervous System Diseases

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### CURRENT DRUG DELIVERY

Volume: 16 Issue: 8 Pages: 698-711

DOI: 10.2174/1567201816666190828153017

Published: 2019

Document Type: Review

[View Journal Impact](#)

### Abstract

Many drugs have been designed to treat diseases of the central nervous system (CNS), especially neurodegenerative diseases. However, the presence of tight junctions at the blood-brain barrier has often compromised the efficiency of drug delivery to target sites in the brain. The principles of drug delivery systems across the blood-brain barrier are dependent on substrate-specific (ie. protein transport and transcytosis) and non-specific (i.e. transcellular and paracellular) transport pathways, which are crucial factors in attempts to design efficient drug delivery strategies. This review describes how the blood-brain barrier presents the main challenge in delivering drugs to treat brain diseases and discusses the advantages and disadvantages of ongoing neurotherapeutic delivery strategies in overcoming this limitation. In addition, we discuss the application of colloidal carrier systems, particularly nanoparticles, as potential tools for therapy for the CNS diseases.

### Keywords

**Author Keywords:** Blood-brain barrier; central nervous system; neurodegenerative diseases; drug delivery system; nanoparticles; colloidal carrier system

**KeyWords Plus:** TIGHT JUNCTION PERMEABILITY; ENDOTHELIAL BETA-CATENIN; MAGNETIC NANOPARTICLES; BRADYKININ AGONIST; PLGA NANOPARTICLES; APOLIPOPROTEIN-E; CELL BIOLOGY; ALBUMIN; OCLUDIN; PROTEIN

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### Funding

| Funding Agency                            | Grant Number |
|---|--------------|
| Ministry of Agriculture of Malaysia (MOA) | NH1014D045   |

[View funding text](#)

### Publisher

BENTHAM SCIENCE PUBL LTD, EXECUTIVE STE Y-2, PO BOX 7917, SAIF ZONE, 1200 BR SHARJAH, U ARAB EMIRATES

### Journal Information

**Impact Factor:** [Journal Citation Reports](#)

### Categories / Classification

**Research Areas:** Pharmacology & Pharmacy

**Web of Science Categories:** Pharmacology & Pharmacy

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