

## **Crossing the blood-brain barrier: a review on drug delivery strategies for treatment of the central nervous system diseases**

### **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 (i.e. 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.

**Keyword:** Blood-brain barrier; Central nervous system; Neurodegenerative diseases; Drug delivery system; Nanoparticles; Colloidal carrier system