

PubMed

Display Settings: Abstract

J Control Release. 2011 Aug 18. [Epub ahead of print]

Transport of drugs across the blood-brain barrier by nanoparticles.

Wohlfart S, Gelperina S, Kreuter J.

Goethe-University, Institute of Pharmaceutical Technology, Frankfurt am Main, Germany.

Abstract

The central nervous system is well protected by the blood-brain barrier (BBB) which maintains its homeostasis. Due to this barrier many potential drugs for the treatment of diseases of the central nervous system (CNS) cannot reach the brain in sufficient concentrations. One possibility to deliver drugs to the CNS is the employment of polymeric nanoparticles. The ability of these carriers to overcome the BBB and to produce biologic effect on the CNS was shown in a number of studies. Over the past few years, progress in understanding of the mechanism of the nanoparticle uptake into the brain was made. This mechanism appears to be receptor-mediated endocytosis in brain capillary endothelial cells. Modification of the nanoparticle surface with covalently attached targeting ligands or by coating with certain surfactants enabling the adsorption of specific plasma proteins are necessary for this receptor-mediated uptake. The delivery of drugs, which usually are not able to cross the BBB, into the brain was confirmed by the biodistribution studies and pharmacological assays in rodents. Furthermore, the presence of nanoparticles in the brain parenchyma was visualized by electron microscopy. The intravenously administered biodegradable polymeric nanoparticles loaded with doxorubicin were successfully used for the treatment of experimental glioblastoma. These data, together with the possibility to employ nanoparticles for delivery of proteins and other macromolecules across the BBB, suggest that this technology holds great promise for non-invasive therapy of the CNS diseases.

Copyright © 2011. Published by Elsevier B.V.

PMID: 21872624 [PubMed - as supplied by publisher]

 **LinkOut - more resources**