# Camouflage nanosystems based on chitosan and cellular membranes for the rivastigmine delivery to the brain

Luca Cerri [a,b]
[a] Department of Life Sciences, University of Siena, via Aldo Moro 2, 53100 Siena, Italy;
[b] Department of Pharmacy, University of Pisa, via Bonanno Pisano 33, 56100 Pisa, Italy

Targeting to the Central Nervous System (CNS) is a challenging issue for pharmaceutical technology. The blood brain barrier (BBB) is highly selective and consistently limits the permeation of actives. Currently, nanomedicine has developed new strategies for CNS delivery, including those related to treatment of neurodegenerative diseases, such as Alzheimer's disease [1]. The purpose of this work is to develop a homoselective targeting toward the BBB by using the cell membrane camouflage approach [2]. A nanocarrier prototype was prepared, formed by a central core made of depolymerized chitosan, loaded with rivastigmine (NP) and a lipid shell consisting of either synthetic lipids (NP-L) or cell membrane (NP-M) extracted from bEnd.3 murine endothelial cell line. The prepared NP showed an encapsulation efficiency about 20% and a size diameter of 150 nm. The cytoplasmic membrane isolation was carried out and immunostaining studies confirmed the maintenance of cell adhesion molecules within the collected membranes (vascular cell adhesion molecules-1, V-CAM 1, vascular endothelial cadherin, VE-cadherin). NPs were coated by thermal controlled co-extrusion, resulting in size increment and reduction of the Zeta potential values for both NP-L and NP-M. The coating was confirmed by immunostaining studies and cytotoxicity evaluation was also performed. Coated and uncoated fluoresceinated nanoparticles underwent to BBB in vitro permeation study, by using bEnd.3 monolayer cell model. This study confirmed that NP-M were internalized to a higher extent with respect to NP and NP-L. The in vitro targeting efficacy of the developed carrier is presently under investigation.

**Biography**

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