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[Biomaterials](#). 2010 Aug 3. [Epub ahead of print]

# Mesenchymal stem cells as cellular vehicles for delivery of nanoparticles to brain tumors.

Roger M, Clavreul A, Venier-Julienne MC, Passirani C, Sindji L, Schiller P, Montero-Menei C, Menei P.

INSERM Unit 646, Ingénierie de la Vectorisation Particulaire, 10 rue André Bocquel, Université d'Angers, 49100 Angers, France.

### Abstract

The prognosis of patients with malignant glioma remains extremely poor, despite surgery and improvements in radio- and chemo-therapies. Nanotechnologies represent great promise in glioma therapy as they protect therapeutic agent and allow its sustained release. However, new paradigms allowing tumor specific targeting and extensive intratumoral distribution must be developed to efficiently deliver nanoparticles (NPs). Knowing the tropism of mesenchymal stem cells (MSCs) for brain tumors, the aim of this study was to obtain the proof of concept that these cells can be used as NP delivery vehicles. Two types of NPs loaded with coumarin-6 were investigated: poly-lactic acid NPs (PLA-NPs) and lipid nanocapsules (LNCs). The results show that these NPs can be efficiently internalized into MSCs while cell viability and differentiation are not affected. Furthermore, these NP-loaded cells were able to migrate toward an experimental human glioma model. These data suggest that MSCs can serve as cellular carriers for NPs in brain tumors.

PMID: 20688391 [PubMed - as supplied by publisher]

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