Intranasal Administration of Novel Nanocarriers for Glioblastoma treatment

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The progressive population aging in developed countries has favored a steady prevalence increase over the years of many pathologies of the central nervous system (CNS), such as neurodegenerative diseases (e.g., amyotrophic lateral sclerosis, Alzheimer's, Parkinson's, Huntington's, and prion diseases), genetic deficiencies (e.g., lysosomal storage diseases, leukodystrophy) and brain cancer (i.e. glioblastoma multiforme).

Most of neurological diseases (ND) clearly diverge in their origin, overall population incidence and treatment though all of them share the same problem, namely the lack of efficacy of their state-of-the-art therapies originated largely by the existence of the blood-brain barrier (BBB). This barrier limits the access of most therapeutic agents to the brain area, and for those crossing requires ever-increasing drug doses increasing side effects.

Intranasal administration represents an alternative route to transport drugs from the nasal mucous membrane through the trigeminal nerve, and from there to the brain while largely avoiding the systemic dispersal of the drug and the limitations of BBB. However, as far as we know no IN products for GB are nowadays commercialized mostly due to the poor mucosa penetration of most drugs, the rapid mucociliary clearance and the enzymatic degradation.

In this sense, the use of nanotechnology-based approaches is of special interest as allows for control of the formulation, surface charge, hydrophilicity, and mucoadhesion and favors the transcellular transport to the brain as well as induce both a systemic and local immune response. In this presentation we will face the work developed at the Nanostructured Functional Materials group with this aim.

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Figures

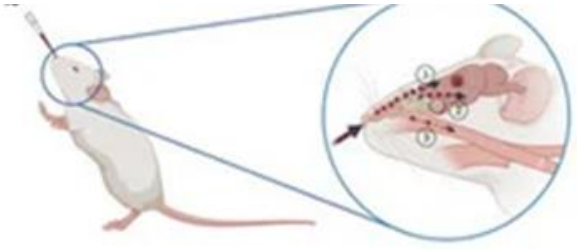

Figure 1. Schematic representation of the intranasal delivery of nanocarriers for Glioblastoma treatment