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Local and targeted delivery of nanomedicines for the treatment of glioblastoma

Glioblastoma (GBM) treatment includes, when possible, surgical resection of the tumor followed by chemoradiotherapy, but the survival remains low mainly due to local recurrences. The local and targeted systemic delivery of anticancer drug-loaded nanomedicines to treat GBM after surgical resection of the tumor is a promising strategy. Among the strategies that have been adopted in the last two decades to find new and efficacious therapies for the treatment of GBM, the local delivery of chemotherapeutic drugs in the tumor resection cavity emerged. We developed two formulations of anticancer nanomedicines that can be injected peri-surgically in the resection cavity of orthotopic GBM. Both PEG-DMA photopolymerizable hydrogel containing Paclitaxel loaded nanoparticles and lauryl-Gemcitabine lipid nanocapsules that spontaneously form a gel significantly improved the survival of the GBM-bearing mice. Another nanomedicine-based strategy could also improve GBM outcome. Targeted nano-theranostics are promising multifunctional system characterized by nano-size, possibility of surface functionalization, diagnostic and therapeutic capabilities. Due to the loss of BBB integrity in the GBM area, we showed that active targeting or magnetic targeting of SPIO/paclitaxel loaded nanoparticles enhanced the biodistribution of the nanoparticles in the brain and enhanced the survival time of GBM bearing mice after IV administration. The potential of other nanomedicine-based treatments of GBM will be discussed.

Biography

Véronique Preat is a Professor of Pharmaceutics at the Faculty of Pharmacy and Head of the Laboratory of Advanced Drug Delivery and Biomaterials at the Louvain Drug Research Institute of the University of Louvain. She has received Master's degree and PhD in Pharmaceutical Sciences from the same university as well. Her research area is focused on advanced delivery systems for unmet medical and pharmaceutical needs, mainly focuses on the oral delivery of lipidic and polymeric nanoparticles loaded with drugs and the intravenous and local delivery of nanomedicines targeting the tumor endothelium and cancer cells. She has authored more than 250 publications and book chapters with h-index 54 and more than 11500 citations.

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