Nanoparticles transport in Glioblastoma from intracranially-administered thermosensitive hydrogels

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Glioblastoma multiforme (GBM) is the most common and aggressive primary brain tumor in adults[1]. Intracranial (IC) drug delivery is a promising strategy to treat GBM, because of the potential to bypass the blood-brain barrier (BBB), reduce systemic side effects and enhance drug concentration at the tumor site[2,3].
However, high interstitial fluid pressure in GBM results in rapid elimination of IC-administered treatments from the tumor bulk, thus requiring new strategies to increment treatment retention.
In this work, thermosensitive hydrogels loaded with multifunctional polymer nanoparticles (HG-NPs) were designed and characterized for IC drug delivery in GBM.

HG-NPs and free NPs were IC administered in tumor free mice and in a highly infiltrative GBM model[4] (18 days after tumor inoculation) and their transport kinetics were investigated using complementary 2D/3D In vivo imaging (IVIS) system and ex vivo fluorescence imaging.
HG-NPs resulted in reduced treatment clearance after injection, high tissue penetration ability, enhanced tumor coverage and significant increase in long-term retention inside the brain, thus warranting further investigation as novel approach for GBM treatment.

References:

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