A hydrogel based on lipid nanocapsules to kill residual glioblastoma cells after surgical resection - GLIOGEL - 8th Joint Call of EuroNanoMed3 (ERA-Net)

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Auteur	Gazaille, Claire [1], Lépinoux-Chambaud, Claire [2], Bertrand, Nicolas [3], Préat, Véronique [4], Bastiat, Guillaume [5]
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Résumé en anglais	Despite their low prevalence (annual global incidence of 5 cases out of 100,000 in the European Union and United States), glioblastoma (GBM), malignant brain tumours, result in high morbidity and mortality. Due to recurrences from infiltrating GBM cells at the border of resection, the median survival is 14 months with the current standard of care (surgical resection combined with adjuvant radiotherapy and/or chemotherapy). The objective of this research project is to develop an implantable hydrogel technology which will bridge the current therapeutic needs between surgical resection and initiation of systemic regimens. In this project, a polymer-free hydrogel prepared from biodegradable lipid nanocapsules (LNCs) will act as a sustained-release matrix to deliver targeted therapeutic nanoparticles specifically to cancer cells. This technology is expected to limit GBM recurrences by i) maintaining therapeutic concentrations of anticancer drugs at the resection border (without the necessity of crossing the blood-brain barrier) and ii) targeting GBM cells specifically using a unique proprietary targeting peptide (NFL-TBS.40-63) (NFL).Preliminary data shows that the peptide NFL can adsorb at the surface of LNCs. This surface functionalization can be used to target drug-loaded LNCs to GBM cells in vivo, and achieve therapeutic efficacy. In parallel, when using a crosslinking agent, LNCs can self-associate in a network forming a polymer-free hydrogel. When loaded with drugs, this hydrogel can provide sustained release and improve in vivo therapeutic efficacy compared to the drug alone. The GLIOGEL project will combine these two independent technologies to create unique synergy and to address an existing clinical need.
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