

Targeting polymeric conjugates with biologic-responsive properties to manufacture docetaxel-loaded nanoparticles for glioblastoma chemotherapy

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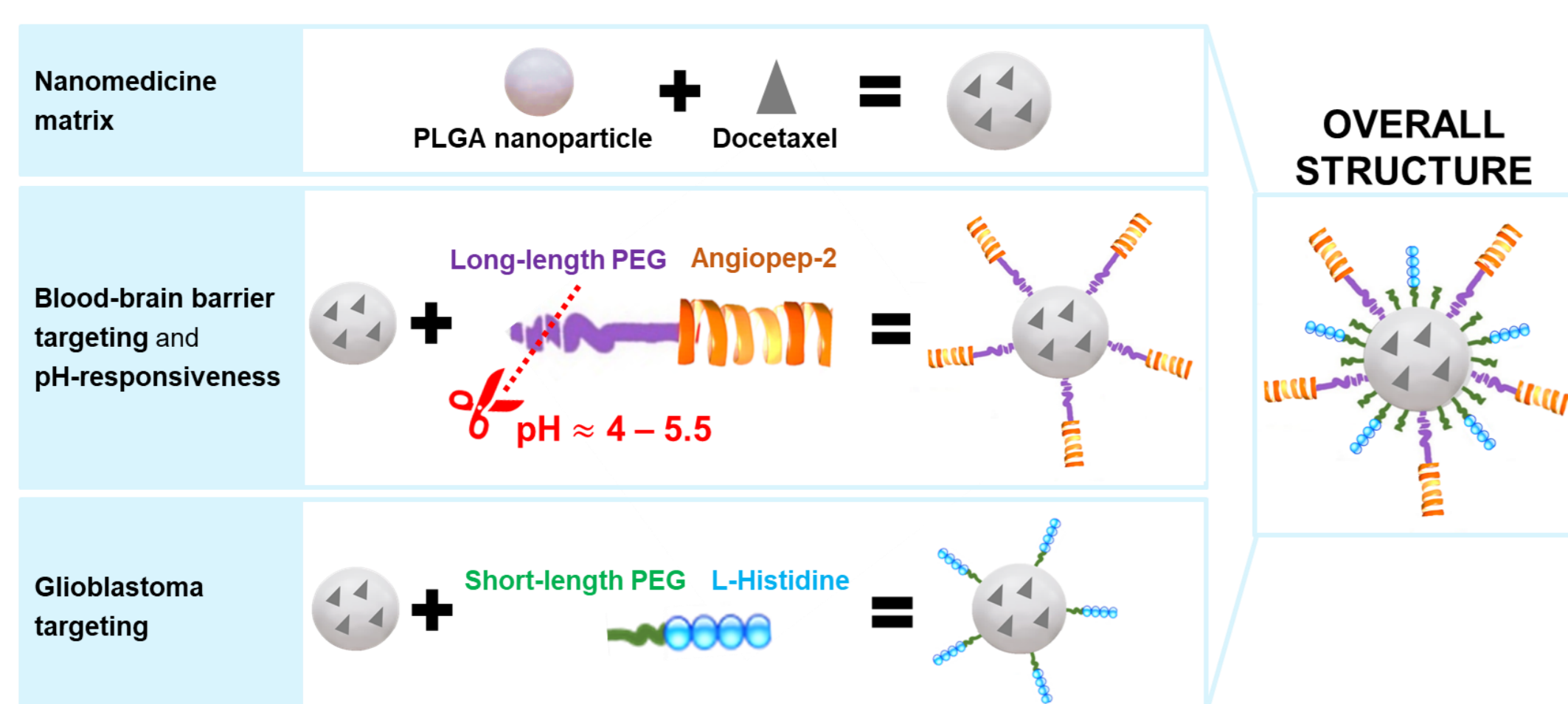


BACKGROUND

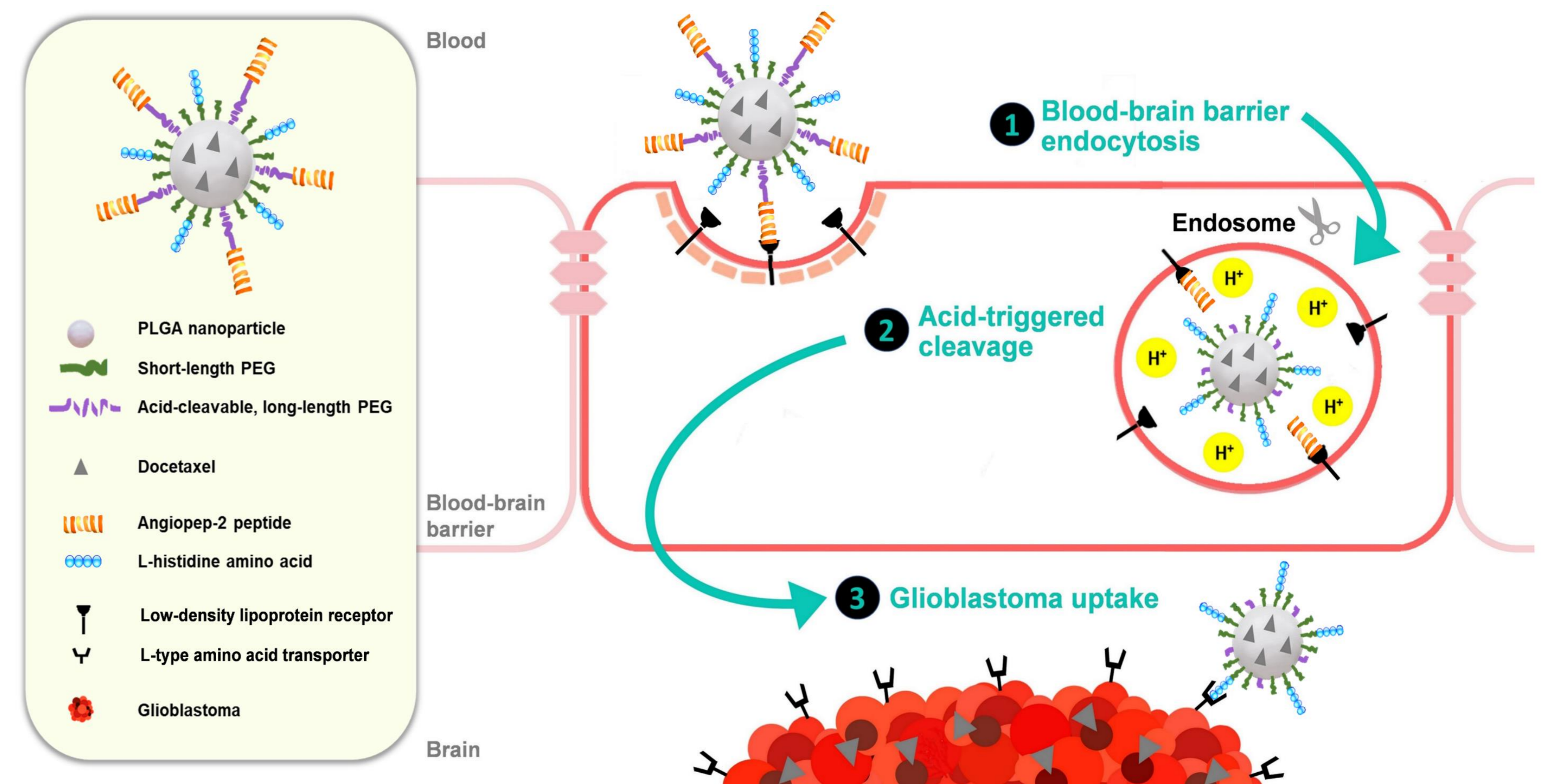
Glioblastoma represents less than 5% survival in 5 years, which is close to the worst of the cancer landscape. This correlates with the ineffective standard chemotherapy based on temozolomide, which presents high brain bioavailability but limited glioblastoma anticancer potency (M Nakada et al. *Front Oncol* 2012. 2:98). More potent chemotherapeutics such as docetaxel have been suggested but their clinical application is hindered by poor blood-brain barrier (BBB) transport towards the brain and tumor targeting capability, therefore resulting in devastating side effects and arrival of irrelevant therapeutic concentrations to the glioblastoma site (BG Harder et al. *Front Oncol* 2018. 8:462).

AIM

Develop a docetaxel nanomedicine for glioblastoma chemotherapy based on poly(lactic-co-glycolic acid) (PLGA) and polyethylene glycol (PEG) polymers, functionalized with biorecognizable molecules and able to i) target the BBB and promote docetaxel blood-to-brain transport, ii) acquire different surface properties upon BBB vesicles stimuli and iii) use these properties to direct docetaxel to glioblastoma.



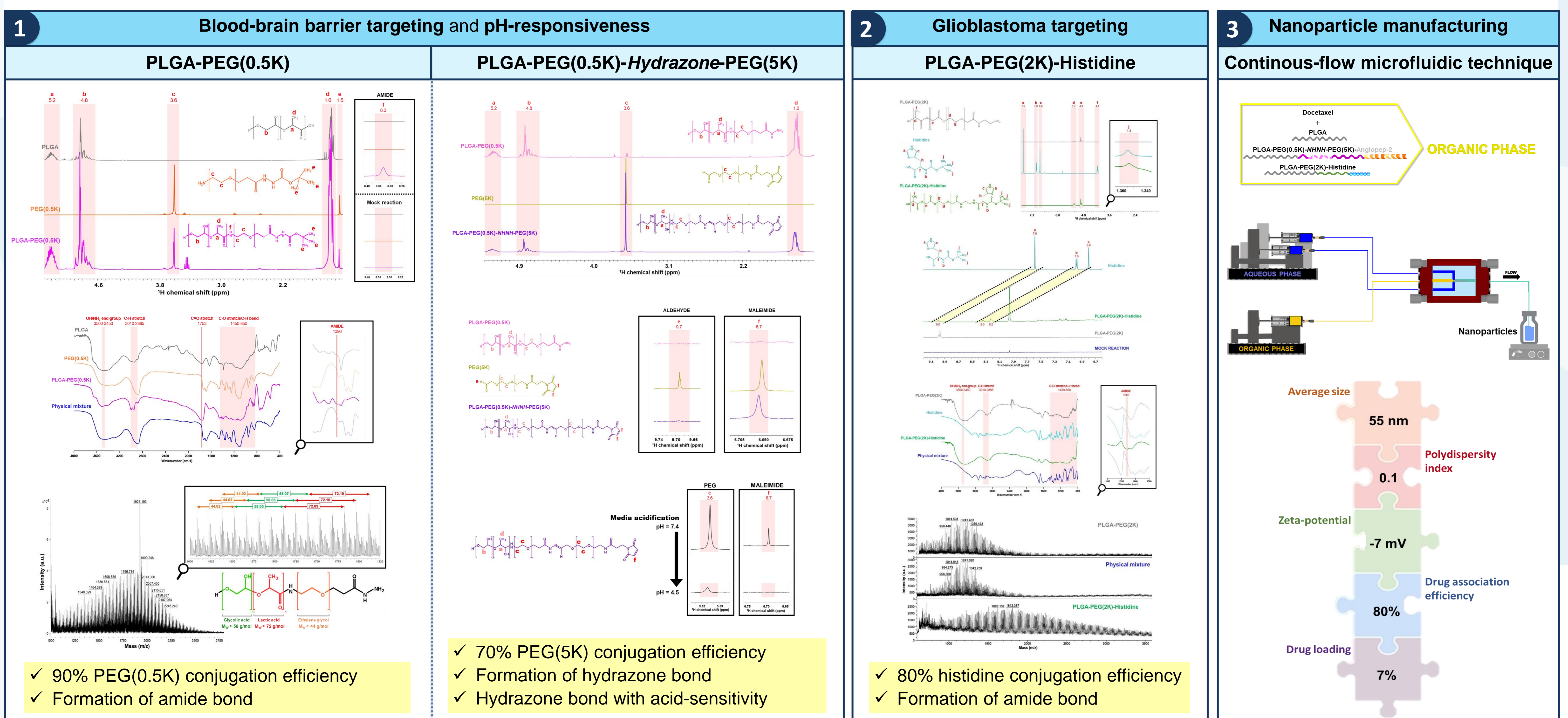
GRAPHICAL ABSTRACT



EXPERIMENTAL RATIONALE – POLYMER COMPOSITION



RESULTS



CONCLUSION & FUTURE WORK

- Polymeric conjugates synthesized with high conjugation efficiency (>70%), suitable to manufacture a 50 nm, monodisperse and highly loaded glioblastoma nanomedicine
- Future work envisages to scale-up the chemical synthesis of the polymeric conjugates, and evaluate the developed nanomedicine *in vitro* and *in vivo*