Mi*EDGE

Title: **M**odelling cell plasticity at the **i**nvasive **E**dge to **D**iminish **G**lioblastoma **E**arly relapse risk

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Project partners

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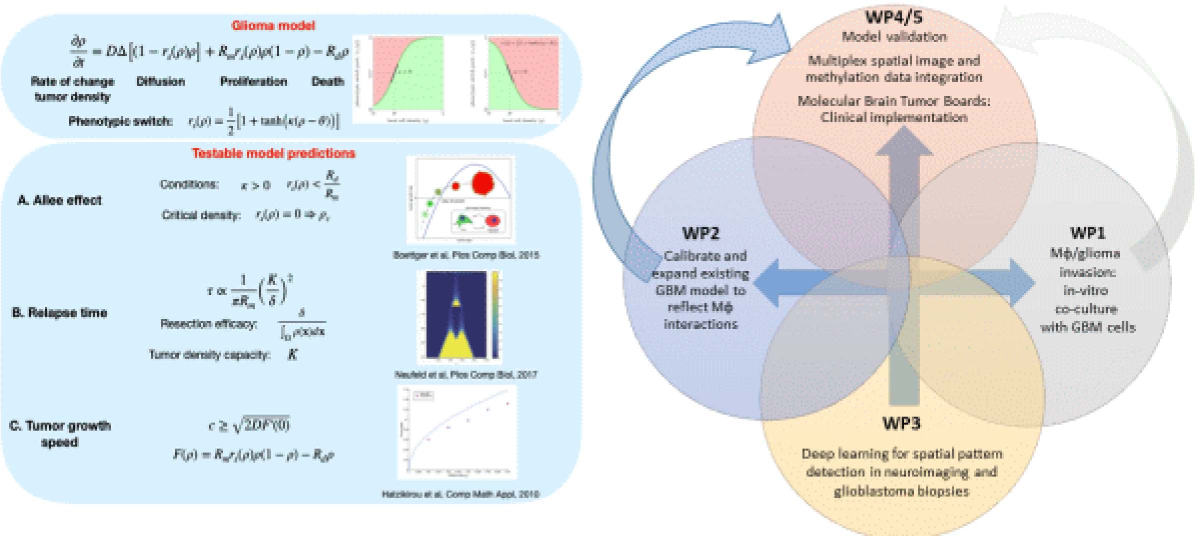
Abstract

Glioblastoma (GBM) is a malignant brain tumour with poor prognosis despite aggressive treatment. The biological behaviour of cells at their invasive edge is of major importance for the clinical course and patients' quality of life. The Mi*EDGE project is based on existing mathematical models of glioma invasion that predict development of GBM cells into two possible ways: the migrating, invasive ("Go") or tumour-forming proliferative ("Grow") type. The project aims at integrating computational simulations of "Go or Grow" behaviour at the surgical resection margins with real clinical data, including radiological brain imaging and microscopic evaluation of tumour tissues. The data-driven modelling will consider information about local immune cells like microglia and tumour-associated macrophages, as well as clinical pre-surgical imaging information. To demonstrate the relevance of the resulting predictive computational models for medical practice, the project will translate it to the clinical reality of medical decision taking. Model-based predictions of biological behaviour of marginal cells at the tumour edges will be compared with the clinical follow-up, monitoring control of the tumour, diffuse tumour invasion, local relapse, or reactive changes (pseudo-progression) by clinical neuroimaging at 3, 6, and 9 months after primary therapy. The knowledge gained by integrating transnational expertise in neuroradiology, neuropathology, image analysis driven by deep learning, and macrophage biology into validated and iteratively improved versions of existing mathematical models will help to optimize the timing of second-line surgical interventions, radiotherapy and chemotherapy and repositioning of established anti-cancer therapy.



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