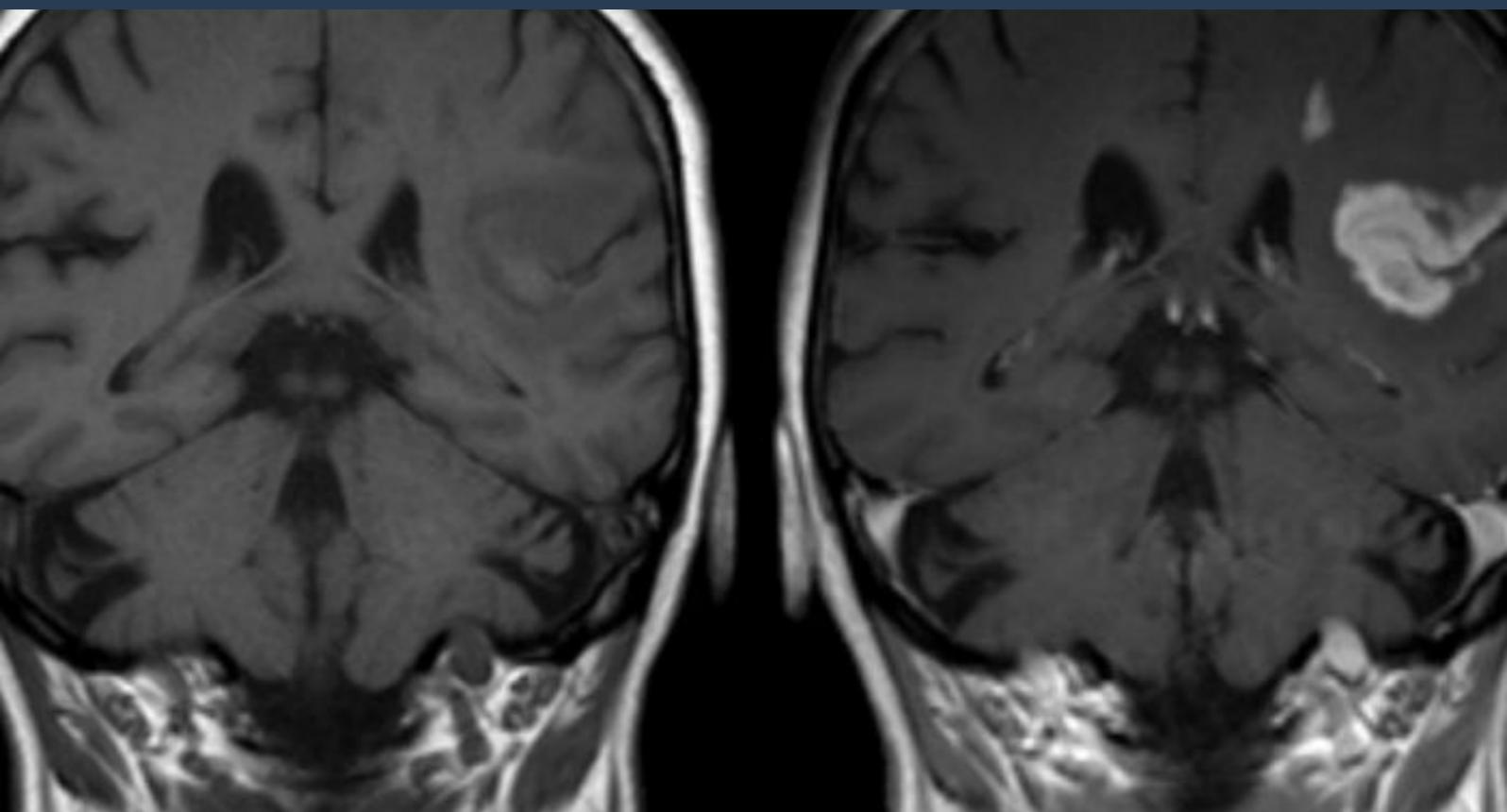


Mouldable Polymer Paste for Local Delivery of Temozolomide to Brain Tumours

A mouldable biodegradable microparticle paste capable of sustained and multiple drug release



Please note, header image is purely illustrative. Source: Hellerhoff, Wikimedia Commons, CC BY-SA 3.0

IP Status

Patent application submitted

Seeking

Development partner, Commercial partner, Licensing

About **University of Nottingham**

The University of Nottingham produces world-changing research by focussing on the problems and challenges that affect societies and people on a wide scale. More than 80% of Nottingham research is ranked in the highest categories 'world-leading' or 'internationally excellent'.

Background

The median survival of patients with Glioblastoma Multiforme (GBM) stands at less than 18 months despite surgery, chemotherapy and radiotherapy.

Currently, upon initial diagnosis of GBM, standard treatment consists of maximal surgical resection, radiotherapy and concomitant adjuvant chemotherapy of oral Temozolomide (TMZ). The neuro-surgical resection cavity offers an opportunity for adjuvant localized drug administration. This technology is a paste that sets around the surgical cavity, releasing TMZ, targeting residual disease cells whilst minimising systemic toxicity by bypassing the blood brain barrier.

The major advance for sustained drug delivery is that this paste formulation overcomes the short half-life of TMZ, protecting it in prodrug form. It only converts spontaneously to the methylating species after leaving the matrix, entering the space left by the removed tumour.

The delivery of TMZ using this paste bridges an oncological gap in the standard of care treatment for GBM, post-surgery and prior to systemic chemotherapy and local radiation.

Tech Overview

The technology comprises of a mouldable biodegradable polymer matrix of poly(lactic-co-glycolic acid) (PLGA)/poly(ethylene glycol) (PEG) microparticles capable of sustained multiple drug release. This technology delivers TMZ, protected as the prodrug, directly to the residual disease too infiltrative to be removed surgically. The technology is capable of releasing other agents in a sustained manner, alongside TMZ.

Preclinical data has shown that dual release of both TMZ and another agent via an implanted polymer paste following surgery alongside radiotherapy has greatly improved survival benefit when compared to the current standard treatment. The current standard consists of surgery, oral TMZ and radiotherapy (**figure 1. Orthotopic rat model survival data**)

Benefits

- Delivery of TMZ via implantable drug delivery system bypasses the Blood Brain Barrier
- Localised delivery negates systemic toxicity
- Mouldable matrix forms to the irregular post resection cavity
- The matrix protects and releases TMZ in prodrug form
- Possible to load more than one agent for localised targeted release
- Simple and quick procedure to apply to the resection cavity during surgery
- Can be used adjuvant to radiotherapy

Applications

The paste has been designed with the specific application of treating Glioblastoma Multiforme (GBM), the underlying technology could be extended to other solid tumours using the paste as a delivery platform.

Opportunity

We are looking for a partner to develop, commercialise or license this technology.

Patents

- UK Patent Application filed June 2017

Appendix 1

figure 1. Orthotopic rat model survival data

An orthotopic rat model of the current standard of surgical removal, oral TMZ and radiological treatment of GBM is compared to the proposed treatment including a TMZ releasing polymer paste. The data shows that in this model, surgery to remove the tumour, implantation of a dual agent releasing polymer paste adjuvant to radiotherapy confers vastly increased survival benefit. Survival benefit is shown against no treatment (control) and treatment including a blank polymer.

