School of
Medicine
Academic Child Health

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

Neurosurgically-applied biodegradable paste for the localised delivery of chemotherapy for childhood brain cancers

R Rahman[1], S Smith[1], R Grundy[1], K Shakesheff[2], T Gould[1]
[1]Academic Child Health, School of Medicine, [2]School of Pharmacy

Children's Brain Tumour Research Centre

The Clinical Rationale

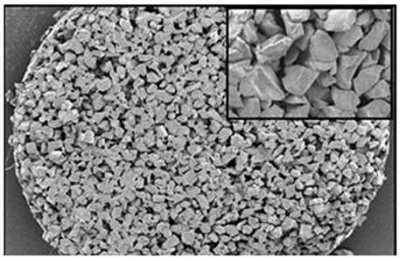
Childhood high grade gliomas are invasive astrocytic brain tumours with **only 20% of children surviving 5 years**, despite radical surgery, chemotherapy and radiotherapy. The opportunity to deliver multiple chemotherapy agents within a resection cavity following surgery, offers hope in targeting residual cancer cells, responsible for tumour recurrence post-surgery.

Our Technological Solution

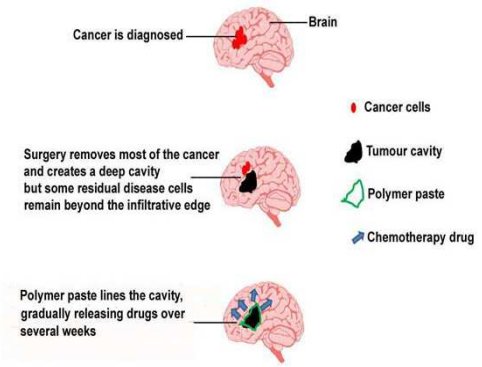
We have developed **biodegradable polymer microparticles** (*PLGA/PEG*) which create a paste when mixed with chemotherapy agents and saline solution at room temperature. This paste can be moulded to the tumour cavity lining left behind after surgery. Within fifteen minutes at body temperature, particles solidify into a porous matrix, gradually releasing drugs into the brain parenchyma over several weeks.

Benefits for Children

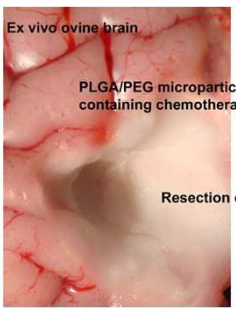
This approach has the potential to achieve a **high effective dose locally, whilst reducing intolerable systemic side-effects**. *PLGA/PEG* is a clinically-compatible tuneable system for the delivery of several approved and experimental chemotherapy agents in the treatment of childhood gliomas. Future evaluation of the *PLGA/PEG* system will be conducted in a clinically-relevant glioma animal model, with Phase 0/1 clinical trials anticipated at Queen's Medical Centre, Nottingham.



PLGA/PEG biodegradable microparticles magnified x1000



How the PLGA/PEG will deliver drugs locally in the brain



Application of PLGA/PEG to a pseudo-resection cavity in a cadaver juvenile sheep brain

For more information email:
ruman.rahman@nottingham.ac.uk

The Brain Tumour Charity · Sparks For children's health · The Royal College of Surgeons of England