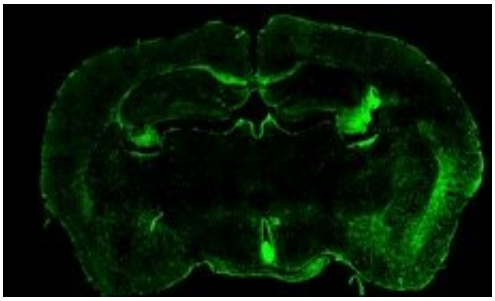
Lethal brain tumour shields itself from immune attack

September 11 2019, by Hayley Jarvis



GBM cells can be highly invasive in the brain, or fast growing while being localised. Credit: Dr SK Singh, Gottingen Medical Centre, Germany

One of the deadliest brain tumours forms a genetic force field around itself to protect it from attack by the immune system, scientists have discovered.

Glioblastoma multiforme (GBM) is the most common, most aggressive brain cancer. Even with surgery, radiotherapy and chemotherapy, the average patient survives just 15 months.

Now scientists have pinpointed a process inside the tumour's cells that could hold the key to a new form of treatment.

A team led by Brunel University London found GBM cells secrete a protein that blocks the most powerful immune defence—the

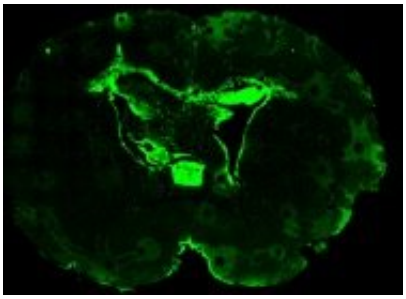
complement system.

"If there's a way we can knock this out, deactivate this gene, or inhibit the protein in GBM patients, we can make it more susceptible to attack by the immune system," said Brunel immunologist, Dr. Uday Kishore.

The study published online by *Immunobiology* is the first to show primary GBM tumour cells secrete the active complement-inhibiting CFHR5 protein.

The complement system is a group of proteins in the blood which join forces to kill invading pathogens. In GBM, tumour cells have now been found to secrete CFHR5, which stops the complement system attacking the tumour cells.

"It is likely the CFHR5's complement-inhibiting activity is to promote tumour survival as tumour cells readily exploit many strategies to overcome immune attack," added Dr. Kishore.



GBM cells can be highly invasive in the brain, or fast growing while being localised. Credit: Dr SK Singh, Gottingen Medical Centre, Germany

GBM is responsible for 35–40% of malignant brain tumours. Symptoms

include headaches, double or blurred vision, vomiting and seizures. Patients usually have surgery before radiation and chemotherapy. But for almost all patients, it recurs after treatment. Because the cancer forms like a spider's web, rather than a solid mass, it intertwines with delicate brain tissue, which makes it almost impossible to get rid of.

Brain tumours are the biggest cancer killer of children and adults under 40. Each year almost 11,700 people in the UK are diagnosed with a primary brain tumour, including 500 children and young people—that's 32 people a day.

The discovery that GBM cells secrete CHFR5 now needs more research, said Dr. Kishore. "We need to know what other effects it is having. Its potential inflammation-causing properties can be differentially exploited by GBM cells which switch between being 'fast growing (but slow moving)' and 'highly mobile (but slow growing)'."

More information: Syreeta DeCordova et al. Secretion of functionally active complement factor H related protein 5 (FHR5) by primary tumour cells derived from Glioblastoma Multiforme patients, *Immunobiology* (2019). DOI: 10.1016/j.imbio.2019.07.006

Provided by Brunel University