PCL/25/31 - Targeting therapeutics to the leading edge of glioblastoma to prevent post-operative recurrence

The brain cancer Glioblastoma (GBM) is fatal even despite the best available treatments. One of the challenges to treatment is that the abnormal cells making up the tumour can have important differences in their make-up which affect how well treatments work. Even within in a single tumour, there can be major difference between the cells.

This suggests that patients would benefit from therapies more specifically targeted to their tumour. Despite this, all patients receive the same initial drug therapy (Temozolomide) which extends life by only around three months. Many other drugs have failed in clinical trials. It would be better if we could offer patients drugs that target their specific subtype of GBM, especially those cells in the invading edge of the tumour, which is difficult to safely remove with surgery, and were the tumours most often recur after treatment.

Using tissue samples from different regions of the same GBM tumours, we discovered that a specific type of invasive cancer cell is more common at the edges of the tumour where it invades healthy brain tissue.

We also developed a computer program powered by artificial intelligence (AI) that analyses large datasets to predict which drugs are most likely to work against a patient’s unique tumour cells.

We would now like to combine these findings. First, we will carefully collect surplus brain tumour tissue during surgery to look at how the cancer cells at the edge of the tumour behave. We will analyse this using technology that preserves the invasive cell's exact location amongst the normal brain and other cell. We will then test if blocking the AI predicted targets slows tumour growth in these invasive cells. Finally, we plan to validate these findings in living brain tumour slice models grown from the surplus tissue collected during surgery.