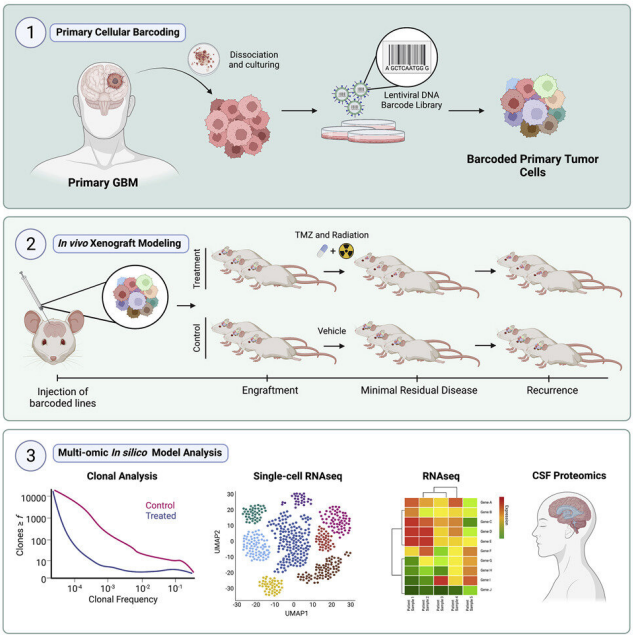
# How deadly brain cancer evades treatments

29 September 2022




Graphical abstract. Credit: *Cell Reports* (2022). DOI: 10.1016/j.celrep.2022.111420

McMaster University researcher Sheila Singh and her team have discovered how glioblastoma, a lethal brain cancer, can evade treatments and kill.

The researchers found the cancer cells that survive the first round of radiotherapy or chemotherapy do so by mutating during the post-treatment minimal residual disease (MRD) or dormant state. The MRD profile of each patient was mapped using single cell sequencing to find a genetic signature that predicted how the cancer would recur in each individual.

Singh said that by mapping the MRD, researchers found that each patient had a different trajectory to their cancer recurring, potentially opening the door to future treatments tailored to each individual with glioblastoma. Singh's team monitored five patients between 2018 and 2022.

The research has been published in *Cell Reports*.

"The MRD state is the reservoir of disease that will generate its recurrence, and this is the first time it has been profiled in patients with glioblastoma," said Singh, a professor of the Department of Surgery and director of McMaster's Center for Discovery in Cancer Research.

"Since we've discovered that every glioblastoma patient has a different route to recurrence, we have found that we can predict better therapeutic avenues," she said.

"Our long-term hope is fully deciphering the MRD condition of glioblastoma cancer cells, which will allow us to develop drugs that can really extend patients' lives."

Singh said that mapping one patient's glioblastoma cell profile in its MRD state found that it would respond well to immunotherapy. Another patient's cell profile showed the cancer was highly resistant to treatment.

However, all five patients monitored by Singh's team did die. She said that at this time current therapies including surgery, radiotherapy and chemotherapy can only extend a patient's life by 15 months on average.

Singh said that for other cancers, such as leukemia, the MRD state of cancer cells is already well-known. This is done by monitoring blood and bone marrow samples to check for cancer cells and if they have mutated or been damaged by treatment.

Profiling the MRD condition of leukemia cells allows clinicians to devise treatments tailored to each patient, ensuring the best possible outcome.

"When glioblastoma occurs, the patient is currently a black box and we don't know the biology of their tumor, nor can we predict the progression from its original state," said Singh. "We must do better for

people with this cancer."

**More information:** Maleeha A. Qazi et al, Characterization of the minimal residual disease state reveals distinct evolutionary trajectories of human glioblastoma, *Cell Reports* (2022). DOI: 10.1016/j.celrep.2022.111420

Provided by McMaster University