

Lay Summary

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Mass spectrometry mapping of childhood primary and recurrent cerebellar brain tumours

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Medulloblastoma and ependymoma are common and aggressive brain tumours in children. Unfortunately, these tumours lead to serious health problems and can be fatal, especially when they come back (recur) after standard of care treatments to the upfront tumour. In only the last 5-years have biopsies of recurrent tumours been collected for study, as surgery at recurrence can be risky. Although we are beginning to learn more about the genetic makeup and differences of primary and recurrent tumours, we still don't fully understand how to effectively target the recurrent tumour with treatments.

In an ongoing study, also supported by Brain UK, we are assessing how the immune cells in recurrent tumours change when they come back compared to when they first appear. Our data shows that there is a significant increase in the suppression of the immune system in the recurring tumours compared to the original ones. This discovery is guiding our research, including the use of special imaging techniques with mass spectrometry.

In the past, other studies on medulloblastoma used a technique called proteomic profiling to find many different proteins and pathways that are different in the original tumours. This research showed that new sugar structures could be potential markers and targets for treatment. However, recurring tumours are yet to be analysed using the same methods.

Our goal with this research is to use advanced proteomic imaging techniques and mass spectrometry, to find out which proteins are common to both the original and recurring tumours and which ones are more active in the recurrence. This will help us understand the processes that drive these recurring tumours, which can be very useful in developing better treatments for children with these brain tumours.