Neural excitability promotes glioma growth

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Whalley K.

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Gliomas develop and expand within the brain's microenvironment and integrate into neural networks, even forming synapses with neurons in some cases. McAlpine et al. demonstrate a relationship between the clinical grade of a glioma and its impact on the surrounding neural tissue, with more aggressive tumours leading to neural hyperexcitability that, in turn, drives glioma proliferation.

To examine the relationship between the grade of glioma and its effects on the properties of neurons in its environment, the authors recorded from pyramidal neurons and glioma cells in tissue slices taken from the cortical infiltration zone of low-grade or high-grade human gliomas. The firing properties and action potential waveforms of neurons in tissue containing high-grade glioma showed that these cells are more excitable than those in tissue infiltrated by low-grade glioma. In line with this, neuron–glioma synapses in high-grade tumours exhibited excitatory postsynaptic currents that had a smaller amplitude but a longer duration than those in low-grade tumours.

References

Original article

McAlpine, H. et al. Increased neural excitability and glioma synaptic activity drives glioma proliferation in human cortex. *Nat. Neurosci.* https://doi.org/10.1038/s41593-025-02149-0 (2025)