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[Review](#) [Trends Neurosci.](#) 2024 Aug 26:S0166-2236(24)00129-2. doi: 10.1016/j.tins.2024.07.004.

Online ahead of print.

Tools to study neural and glioma stem cell quiescence

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PMID: 39191628 DOI: [10.1016/j.tins.2024.07.004](https://doi.org/10.1016/j.tins.2024.07.004)

Abstract

Quiescence is a prolonged but reversible state of cell-cycle arrest that is an adaptive feature of most adult stem cell populations. In the brain, quiescence helps to protect adult neural stem cells from stress and supports lifelong neurogenesis. Unfortunately however, entry into a quiescent or a slow-cycling state is also a malignant feature of brain cancer stem cells. In glioblastoma, where the process has been best characterised, quiescent glioma stem cells preferentially survive chemoradiation, and after therapy, reactivate to regrow the tumour and drive recurrence. In this Review, we discuss the in vitro and in vivo models that have been developed for studying neural stem cell quiescence and how these tools may be used to deepen biological understanding and to develop novel therapies targeting quiescent glioma stem cells.

Keywords: brain cancer; dormant; mesenchymal; niche; resistance; tumour.

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