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### **The role of genetic and environmental insults in glioblastoma carcinogenesis**

Glioblastoma, the most common primary brain tumor, is uniformly fatal, with a majority of patients dying within 2 years of diagnosis. Emerging data suggests a small subpopulation of cells in glioblastoma have stem cell-like properties and are key to tumorigenesis. Concerted efforts to understand the underlying biology regulating these cells are currently underway, with an overarching goal of identifying novel tumor-specific pathways that may be effectively targeted as a strategy for anti-cancer therapy.

An important advancement towards our understanding of glioblastoma stem-like cells has been identifying the similarities these cells share with normal neural stem cells; most notable being the role the physical microenvironment plays in regulating their phenotype. Although the majority of the theoretical work has focused on elements extrinsic to the tumour microenvironment, the microenvironment that has yet to be explored in relation to glioblastoma stem-like cell biology. Further, current laboratory-based models are limited in providing meaningful insight into how the complex adaptive systems defining the tumor microenvironment may interact to contribute towards glioblastoma tumorigenesis. Our goal is to apply an integrative approach, coupling mathematical modelling with laboratory-based investigations, to better understand the interplay between glioblastoma stem-like cells and the microenvironment driving tumour initiation and the role hypoxia may play in modulating the tumor stem-cell niche.