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Mechanisms of glioma tumor invasion

Invasion of malignant glioma tumors is typically very aggressive and a highly complex phenomenon involving molecular and cellular processes at various spatiotemporal scales, whose precise interplay is still not fully understood. By means of a mathematical modeling, we compare theoretical results to the experimental data and deduce microscopic interactions (cellular mechanisms) from microscopic and macroscopic observables (experimental data). In particular, using multicellular spheroid data, we exhibit the key role of migration/proliferation in tumor invasion dynamics. Finally, we study the influence of vascularization on tumor growth with the help of a combination of in vivo data from implanted xenografts of U87 MG in nude mice brain and a mathematical model.